TOPICS IN

ENTREPRENEURSHIP

AND

FAMILY BUSINESS MANAGEMENT

Jan-Philipp Ahrens

University of Mannheim

TOPICS IN
ENTREPRENEURSHIP AND FAMILY BUSINESS MANAGEMENT
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Einleitung

Die vorliegenden fünf Essays sind Bestandteile einer Inauguraldissertation zur Erlangung des akademischen Grades eines Doktors der Wirtschaftswissenschaften der Universität Mannheim. Sie widmen sich Themen aus der Familienunternehmens-, Mittelstands- und Unternehmertumsforschung. Des Weiteren sind sie in fünf einzelne Kapitel unterteilt, davon vier empirischer und eines logischer Natur, wobei diese Unterteilung dem Wesen des jeweiligen Forschungsgegenstandes des Kapitels geschuldet ist. So befassen sich die Kapitel eins bis vier mit der Unternehmensnachfolge in mittelständischen Familienunternehmen, während sich Kapitel fünf dem Unternehmertum in Märkten mit unvollkommenen Institutionen widmet.

Ferner sind die Essays in englischer Sprache verfasst um dem Umstand Rechnung zu tragen, dass ein Großteil des akademischen Diskurses derzeit in dieser Sprache erfolgt. Die Kapitel eins bis vier sind Folge eines gemeinsamen Forschungsprojektes des Instituts für Mittelstandsforschung der Universität Mannheim und des Zentrums für europäische Wirtschaftsforschung zum Thema Unternehmensnachfolge, an welchem der Autor mitgewirkt hat. Die Idee zu dem fünften Essay entstand während der Doktorandenkurse an den Lehrstühlen von Professor Strausz und Professor Wolfstetter an der Humboldt-Universität zu Berlin.

Das Thema Unternehmensnachfolge als Forschungsgegenstand ist von vielen menschlichen Aspekten geprägt, daher vielschichtig, komplex und mit rationalen Ansätzen nur teilweise erklärbar. Vielmehr erfordert es geradezu aufgrund seiner unebenen, polyvalenten und unregelmäßigen Beschaffenheit einen quantitativ- und qualitativ-empirischen Forschungsansatz. In Anbetracht der Größe dieses Forschungsgegenstandes beschränken sich die vorliegenden Essays auf vier spezielle Facetten der Unternehmensnachfolge. Diese Teilgebiete werden anhand beobachteter Nachfolgen aus den Jahren 2002 bis 2008 in deutschen mittelständischen und eigentümergeführten Familienbetrieben in der Größe dreißig bis tausend Mitarbeiter erforscht. Gleichzeitig wird durch die Einbeziehung der Auswirkungen des jeweiligen zu untersuchenden Phänomens auf den Unternehmenserfolg gewährleistet, dass eine klare Relevanz, auch über die Grenzen der akademischen

Sphäre hinaus, gegeben ist.[1]

Kapitel eins befasst sich mit Präferenzen für Familienmitglieder im Rahmen von Unternehmensnachfolgen und der daraus resultierenden möglichen Bevorzugung von Familienmitgliedern sowie ihrer Auswirkungen auf den Unternehmenserfolg. Die Ergebnisse nach Firmen-, Branchen-, Trend- und Zeitkontrollen zeigen, dass sich Bevorzugung negativ auf die natürliche Selektionskraft des Arbeitsmarktes für Geschäftsführer auswirkt und es dadurch zu Erfolgseinbußen auf der Unternehmensebene im Zeitraum nach der Unternehmensnachfolge kommt.

Generell wird beobachtet, dass Familiennachfolger im Schnitt signifikant schlechtere Humankapitalwerte aufweisen als externe Nachfolger, was vermutlich als eine Folge der gelockerten Auswahlkriterien aufgrund familiärer Bevorzugungen erklärt werden kann. Gleichzeitig wird gemessen, dass externe Nachfolger in den Jahren nach der Nachfolge deutlich mehr organisationale Veränderungen initiieren als Familiennachfolger und ferner, dass familiennachfolgergeführte Firmen sich im Vergleich zu Firmen mit einem externen Nachfolger signifikant schlechter hinsichtlich des Unternehmenserfolges und der Arbeitsplatzgenerierung entwickeln. Interessanterweise lässt sich kein signifikanter Unterschied in der Unternehmenserfolgsentwicklung zwischen Familiennachfolgern und externen Nachfolgern feststellen, wenn nur Nachfolger mit starken Humankapitalwerten analysiert werden.[2] Dies deutet darauf hin, dass die Erfolgsentwicklungen nicht mit dem Familienhintergrund an sich zu erklären sind, sondern durch gelockerte Selektionskriterien bedingt durch Präferenzen für Familiennachfolger.

Die Ergebnisse unterstreichen die Bedeutung von objektiven Auswahl- und Bewertungskriterien im Wettbewerb der potentiellen Firmennachfolger. Wird diesem Vernunftkriterium nicht Rechnung getragen und beschränkt der scheidende Firmenlenker die Auswahl der Nachfolger nur auf den Kreis der Familienmitglieder, so ist ein starker und signifikanter Einschnitt in der Erfolgsentwicklung des jeweiligen Unternehmens beobachtbar. Der Beitrag dieses Essays für die Forschung ist, dass in diesem Zusammenhang und nach bestem Wissen des Autoren erstmalig Bevorzugung und ihre Konsequenzen direkt beobachtet werden. Ferner können die Ergebnisse einer Studie zu großen US-amerikanischen Familienunternehmen mit einem Eigenkapital von 1,1 bis 1,7 Milliarden US-Dollar (Pérez-González, 2006) durch dieses Werk für deutsche eigentümergeführte mittlere Familienunternehmen bestätigt und um zusätzliche Erkenntnisse bezüglich des Humankapitals und des organisationalen Wandels erweitert werden.

Das zweite Kapitel geht der Frage nach, unter welchen Umständen der Senior-Unternehmer im Rahmen einer Nachfolge weiterhin im Unternehmen aktiv bleibt und welche Auswirkungen dies auf die anschließende Erfolgsentwicklung hat. Nach bestem Wissen des Autoren erkundet der Essay damit akademisches Neuland, welches bis dato, insbesondere bezüglich der Erfolgsauswirkungen, allenfalls durch Fallstudien und Anekdoten beschrieben wurde. Gleichzeitig ist die Relevanz des Themas durchaus gegeben,

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[1] Speziell für Familienunternehmen hat das Thema Unternehmensnachfolge eine hohe Relevanz. Jedes Jahr erleben tausende Familienunternehmen eine Unternehmensnachfolge, jedoch nur 30 Prozent der Familienunternehmen werden älter als die Lebensspanne ihrer Gründer (Sonnenfeld und Spence, 1989).

[2] Die Erfolgsmessung erfolgt hierbei auf Basis der Methoden und des Werkes von Barber und Lyon (1996). Bezüglich des Humankapitals orientiert sich der Essay an den Ideen von Murphy und Zábojník (2004).

denn die Ergebnisse des Essays zeigen, dass der Vorgänger in zwei Drittel aller Unternehmensnachfolgen dem Unternehmen erhalten bleibt. Ferner wird beobachtet, dass der Vorgänger mit signifikant höherer Wahrscheinlichkeit aktiv bleibt, wenn es sich um eine Familiennachfolge handelt, die Nachfolge als nepotistisch charakterisiert werden kann oder das Unternehmen in einer Branche aktiv ist, die in hohen Maße mit spezifischem oder tazitem Wissen verbunden ist. Eine signifikant niedrigere Verbleibenswahrscheinlichkeit wird hingegen für Fälle nachgewiesen, in welchen der Nachfolger mit hohem Humankapital ausgestattet ist. Ebenfalls scheint der Besitz von Unternehmensanteilen durch den Nachfolger zum Zeitpunkt der Nachfolge mit einer niedrigeren Wahrscheinlichkeit von verlängerter Aktivität des Senior-Unternehmers einherzugehen.

Für Unternehmer mag die Frage nach den Auswirkungen einer weiteren Aktivität im Unternehmen auf den Unternehmenserfolg am wichtigsten sein. Nach Firm-, Branchen-, Trend- und Zeitkontrollen und unter Anwendung von instrumentierten Variablen ergeben die Resultate des Essays folgendes Bild: Eine weitere Aktivität des scheidenden Unternehmers ist mit einem signifikant positiven Einfluss auf den Unternehmenserfolg verbunden wenn der Nachfolger relativ niedriges Humankapital besitzt. Jedoch nimmt dieser positive Effekt auf den Unternehmenserfolg mit zunehmenden Humankapital des Nachfolgers ab und wird bei sehr hohen Humankapital signifikant negativ, was auf mögliche Konflikte hindeutet. Ein weiteres Ergebnis hierbei ist, dass der oben beschriebene Zusammenhang durch die Intensität des Einflusses des Senior-Unternehmers verstärkt wird. Daraus lässt sich für die Praxis eine direkte Empfehlung ableiten. Wenn der Nachfolger noch relativ schwache Fähigkeiten aufweist, so ist eine stärkere Begleitung des Nachfolgers oft mit positiven und schützenden Effekten verbunden. Mit zunehmender Verantwortung und Fähigkeit des Nachfolgers sollte jedoch die Rolle des Seniors sukzessive reduziert werden und dem Nachfolger das Feld überlassen werden. Dieses Ergebnis kann als empirische Validierung der Theorie vom Tanz der Nachfolge (Handler, 1990) angesehen werden, in welcher die Unternehmensnachfolge als ein Prozess der graduellen Rollenanpassung beschrieben wird.

In Kapitel drei wird der Einfluss der Familienstruktur der Vorgängers auf die Nachfolgeentscheidung in eigentümergeführten Familienunternehmen beleuchtet. Dabei wird der Frage nachgegangen, ob es zusätzlich zur Präferenz für Familiennachfolger gegenüber externen Nachfolgern, innerhalb der Klasse der Familiennachfolger weitere den Selektionsprozess beeinflussende Präferenzen des Vorgängers gibt. Insbesondere die Studie von Dahl und Moretti (2008) über Präferenzen von Eltern in US-amerikanischen Haushalten unter dem Titel *The Demand for Sons* gibt für diese Überlegung begründeten Anlass.

Die Ergebnisse des dritten Essays deuten auf eine recht deutliche Favorisierung von Söhnen gegenüber Töchtern als Nachfolger durch die Vorgänger hin. Bei Vorgängern mit Kindern wird die Wahrscheinlichkeit von Familiennachfolgen signifikant positiv durch die Präsenz von Söhnen unter den Kindern des Vorgängers beeinflusst. Des Weiteren legt ein Blick auf die Familienstruktur nahe, dass der Wunsch nach einem Sohn sich sogar auf die Familienplanung der Unternehmer niederschlägt, da Unternehmer mit ausschließlich Töchtern viel seltener zu beobachten sind als Unternehmer, die ausschließlich Söhne haben. Darüber hinaus ist erkennbar, dass die Wahrscheinlichkeit von nepotisti-

schen Tendenzen im Rahmen von Nachfolgen ebenfalls durch Söhne in der Familie des Vorgängers positiv beeinflusst wird. Dieses Ergebnis spiegelt sich unter anderem auch in der Beobachtung wider, dass weibliche Familiennachfolger tendenziell mit stärkerem Humankapital ausgestattet sind als männliche Familiennachfolger, was wiederum Konsequenzen auf die Erfolgsentwicklung der eigentümergeführten Unternehmen mit sich bringt. Über diese Beiträge für die Forschung hinaus lässt sich daraus für die Praxis ableiten, dass die Präferenzen des Vorgängers eine zentrale Rolle im Nachfolgeprozess spielen. Eine Sensibilisierung des Senior-Unternehmers auf diesen Umstand, auch im Hinblick auf die damit verbundenen Erfolgsauswirkungen, erscheint vor diesem Hintergrund durchaus empfehlenswert.

Das vierte Kapitel befasst sich mit dem organisationalen Wandel im Rahmen der Nachfolge in eigentümergeführten Familienunternehmen. Insbesondere werden dabei auch Nachfolgen in Krisensituationen betrachtet, wie Unternehmen in Turnaround- und Restrukturierungssituationen, Unternehmen in Märkten welche einem Abschwung ausgesetzt sind und Unternehmen mit schwacher Profitmarge im Vergleich zum Wettbewerbsfeld.[3] In seinem Essay *Some Organizational Consequences of CEO Succession* zeigte Miller (1993), dass Organisationen, welche eine Nachfolge erleben, durch eine Phase von starkem organisationalen Wandel gehen. Allerdings ist über die Natur dieses Wandels relativ wenig und insbesondere über die Erfolgsauswirkungen, nach bestem Wissen des Autoren, kaum etwas bekannt, was den Ausgangspunkt und die Motivation für die Betrachtungen des vierten Essays darstellt.

Eine wichtige Beobachtung des vierten Essays ist, dass sich in vielen Nachfolgefällen ein Potential für erfolgssteigernde Verbesserungen aufgebaut hat, welches durch intensiven Wandel in der Zeit nach der Nachfolge gehoben werden kann.[4] Es lässt sich beobachten, dass die Hebung dieses Potentials nach Firmen-, Branchen-, Trend- und Zeiteffekten mit signifikant positiven Erfolgsauswirkungen verbunden ist. Weiterhin lässt die Analyse den Schluss zu, dass Nachfolger mit hohem Humankapital signifikant mehr Wandel initiieren als Nachfolger mit niedrigem Humankapital. Dies ist vermutlich der Fall, weil Nachfolger mit hohem Humankapital die Verbesserungspotentiale besser erkennen und heben können als Nachfolger mit niedrigem Humankapital.

Gleichzeitig lässt sich beobachten, dass die Art und die Intensität des Wandels deutlich von der Situation des Unternehmens abhängig ist. So ist die Intensität des Wandels in Nachfolgefällen in Turnaroundsituationen deutlich und signifikant höher als in Nachfolgefällen unter normalen Bedingungen. Weiterhin werden spezifische Erfolgsfaktoren identifiziert. So wird beobachtet, dass insbesondere mit der Überprüfung und Anpassung von alten Zuliefererbeziehungen und der Vergütungsstrukturen, sowie mit einer moderaten Überprüfung des Produktportfolios ein signifikanter Anstieg des Unternehmenserfolges verbunden ist, während sich dieser positive Effekt durch den Gewinn neuer Kundengruppen teilweise verstärkt. Dies legt nahe, dass das oben beschriebene Verbes-

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[3]Diese situative Betrachtung folgt dabei der Unternehmenskrisenliteratur, insbesondere den Werken von Harrigan (1980), Hambrick und Schecter (1983), Whetten (1987), Robbins und Pearce II (1992) und Barker III und Duhaime (1997).

[4]Diese Ergebnisse sind im Einklang mit Argumenten und Beobachtungen aus dem Essay *Stale in the Saddle: CEO Tenure and the Match between Organization and Environment* von Miller (1991).

serungspotential oftmals in diesen Bereichen zu vermuten ist. Internationalisierungen im Rahmen der Nachfolge sind hingegen oftmals mit signifikant negativen Erfolgsauswirkungen verbunden. Diese Beobachtung deutet darauf hin, dass durch die Doppelbelastung durch Nachfolge und Internationalisierung für viele Unternehmen eine Machbarkeitsgrenze erreicht wird. Obwohl sich diese Ergebnisse nach Firmen-, Branchen-, Trend- und Zeiteffekten sowie für diverse Unterstichproben als größtenteils robust erweisen, wird gleichzeitig darauf verwiesen, dass die daraus abgeleiteten Hinweise nicht als Gesetzmäßigkeiten zu verstehen sind. Vielmehr ist ein Verständnis der individuellen Unternehmenssituation unerlässlich und kann zu situativ bedingt anderen Empfehlungen führen.

Für den Forschungsgegenstand des fünften Essays, eine makroskopische Anschauung von Märkten mit unvollkommenen Institutionen, bevölkert mit von Anreizen motivierten Unternehmern, bietet sich eine von Vereinfachungen und Idealisierungen inspirierte abstrakte Herangehensweise an. So wird der Unternehmer weitgehend reduziert auf einen gewinnmaximierenden *homo oeconomicus* im Sinne eines ideengetriebenen und initiierenden Schumpeterianischen Unternehmers. Ausgangspunkt für dieses theoretische Kapitel bilden ambivalente Argumente und Beobachtungen in der Literatur, sowohl bezüglich des Volumens des sich unter unvollkommenen Institutionen entfaltenden Unternehmertums, als auch des daraus resultierenden Wohlstandswachstums.[5] Um diesen scheinbar widersprüchlichen Zustand zu überwinden, wird ein konzeptionelles und geometrisches Rahmenwerk verwendet, welches in der Lage ist, die divergierenden Argumente zu umfassen. Dabei wird auf die Prinzipal-Agenten-Theorie, insbesondere auf das mathematische Werk von Laffont und Martimont (2002), zurückgegriffen. Der Beitrag des Essays beschränkt sich dabei auf die Anwendung und den Transfer der Theorie und der Mathematik von Laffont und Martimont (2002) in den Bereich Unternehmertum, damit aus diesem konzeptionellen Rahmenwerk als Sphäre der Anschauung Handlungsempfehlungen sowohl für die für Politik als auch für unternehmerische Praxis abgeleitet werden können.[6]

Aus den Ergebnissen des fünften Essays geht hervor, dass sich, unter unvollkommenen Institutionen und verglichen mit der Aktivität unter Institutionen der Qualität der ersten Welt, sowohl das Volumen unternehmerischer Aktivität, als auch die Profitabilität für den Initiator der Aktivität, reduziert. Im generellen Fall lässt sich daraus ein negativer Wohlstandseffekt ableiten. In Grenzfällen ist jedoch möglich, dass dadurch auf nationaler oder regionaler Ebene vorteilhafte Wohlstandsentwicklungen entstehen können. So zum Beispiel, wenn der Wohlstandsverlust durch die Abnahme der unternehmerischen Aktivität kleiner ist, als der Wohlstandsgewinn durch die Kapital- oder Wissensakkumulation einzelner Agenten, welche beispielsweise durch unzureichenden Technologie- und Patentschutz aufgrund einer unvollkommenen Institution ermöglicht wurde.

Ferner wird diskutiert, ob und unter welchen Umständen es sinnvoll sein kann, unvoll-

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[5]Siehe zum Beispiel Leff (1964), Mauro (1995), Méndez und Sepúlveda (2006) und Méon und Weill (2010).

[6]Dies ist insbesondere vor dem Hintergrund relevant, dass viele deutsche Unternehmen international orientiert sind und somit häufig auch in Märkten mit unvollkommenen Institutionen (beispielsweise mit unvollkommenem Rechts-, Vertrags- und Patentschutz) agieren.

kommene Institutionen durch bessere zu ersetzen. Dabei wird insbesondere die Wichtigkeit des Verstehens der individuellen Situation des Landes beziehungsweise der Region hervorgehoben. Handeln die Unternehmer beispielsweise nur mit wenigen Kaufleuten, könnte ein auf Vertrauen basierendes und somit mit höheren marginalen Handelskosten verbundenes Model vorzuziehen sein. Sind die Unternehmer jedoch vernetzt und haben sehr viele Kontakte, so sind unter Umständen funktionierende Institutionen mit höheren Fixkosten, dafür aber niedrigeren marginalen Handelskosten opportuner. Des Weiteren wird diskutiert, wie sich Unternehmen unter unvollkommenen Institution erfolgreich bewegen können. Beleuchtet werden sowohl altertümliche Zusammenschlüsse wie Handelsgilden, als auch moderne strategischen Governance-Allianzen, welche Handelsverfehlungen gegenüber Mitgliedern der Allianz durch Bestrafungen durch die gesamte Allianz ahnden und somit eine Abschreckung aufbauen. Ferner werden Internalisierungsstrategien diskutiert, welche beispielsweise mit sogenannten Township and Village Enterprises in China einen Ausdruck finden. Die Idee dabei ist, die Institution selbst mit dem Prinzipal zu verschmelzen, was zu einer Parallelisierung der Zielfunktionen führt und somit Handelsverfehlungen gegenüber dem initiierenden Unternehmer unwahrscheinlicher werden.

In einer zusammenfassenden Betrachtung stellen die fünf Essays zu den Themengebieten Nachfolge, Präferenzen, Humankapital und Unternehmenserfolg, als auch den Themenkreisen organisationaler Wandel, Unternehmen in Turnaroundsituationen und in Märkten, welche die durch einen Abschwung gekennzeichnet oder mit nur unvollkommenen Institutionen ausgestattet sind, einen nach Sicht des Autors übergreifenden und zusammenhängenden Beitrag zur Unternehmertums- und Familienunternehmensforschung dar. Dieser wird nun als Dissertation gemäß der Promotionsordnung zur Erlangung des Doktorgrades der Wirtschaftswissenschaften der Universität Mannheim vom 27. März 2006 den Referenten und Koreferenten zur Begutachtung vorgelegt.

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Chapter 1

Nepotism

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CEO Succession, Ownership and Enterprise Performance

By Jan-Philipp Ahrens, Sandra Gottschalk and Michael Woywode *

We consider the effects of CEO successions on enterprise performance in medium-sized enterprises with strong ownership concentration (family firms). By evaluating an unique data set we show that firms which install relatives or heirs as CEO successors perform worse as compared to firms which install external CEO successors. Furthermore we identify the driving forces behind this inferior performance as lower human capital and a lower propensity to implement organizational changes, which is presumably caused by limited selectivity of CEO succession contests due to concentrated ownership structures. Interestingly, no performance gap is observable for well-chosen high human capital family successors. (JEL: E32, G30, J24, L25, M51)
Keywords: CEO succession, ownership structure, nepotism, agency costs, firm performance.

"But whereas I said a moment ago that we have to follow in the steps of our fathers, let me make the following exceptions: first, we need not imitate their faults; second, we need not imitate certain other things, if our nature does not permit such imitation; [...]"
Marcus Tullius Cicero (44 BC)[1]

I.   Introduction

When power changes hands, companies, institutions and even states reach a critical moment. In a large number of medium sized enterprises resigning owners and chief executive officers (CEOs) can install family successors in key corporate positions in a nearly autonomous manner due to strong ownership concentration. Given that the resigning owner's reign extends to the empowerment of his successor, then a veil of uncertainty is cast over the question of whether he maximizes the wealth of the enterprise he commands or the wealth of his kin? Alternatively, he might even maximize and prolong his own influence by choosing a successor who acts tributary.

Furthermore, CEO successions can also be understood as selective signaling contests according to the voting majority's rules. Restricting the pool of contestants, for example by limiting the search to ones kin or acquaintances, could thus lead to imperfect succession decisions, since the candidate might have been inferior given a larger pool. However, an internal successor (a CEO successor related to or acquainted with his predecessor) may also exert particularly high levels of effort to justify his positive selection. For example, the honor of heading this particular company may make him proud and particularly motivate him intrinsically (Davis et al., 1997). In addition, compared to an external succession in an internal succession the transition process might be particularly smooth and the transition of critical business related knowledge and values might be easier due to a close relationship between predecessor and successor (Cabrera-Suárez et al., 2001, and Le Breton-Miller et al., 2004). The later arguments would speak in favor of internal successions. Surprisingly, relatively little empirical research has been conducted to explicate the impact of this potential imperfection on enterprise performance (Pérez-González, 2006). Every year around the world millions of firm successions take place and potential inefficiencies in the transition process may cause high costs at the firm as well as on the societal level. However, if the succession is managed well and the right successor is chosen, then a succession might be a chance for company rejuvenation and sustainable growth.

Thus, what is the impact of CEO successions on the performance of firms with highly concentrated ownership structures? And can different performance levels of successors be explained by differences in human capital and the record of managerial actions executed?

For this purpose, we develop in this article a contest-theory based succession model and analyze mid-run post-succession enterprise performance using an unique data set on CEO successions. Going beyond the limits of previous research, this article also explores

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[1] Marcus T. Cicero (44 BC), De Officiis, Book I, XXXIII, p.121 in reprint (1913).

the role of human capital (such as academic degree and leadership experience) and the post-succession managerial decision patterns (we track 25 managerial actions types) of CEO successors, two aspects which potentially give rise to particular performance differentials and which have experienced only minor attention in previous research. We gather and evaluate information from 804 CEO successions in enterprises with high ownership concentration and ownership control over a time period of up to eight years. These observations are categorized as either involving successors from inside the family (family successions), successors who previously worked for the company (enterprise successions) or external successors without previous ties to the company (external successions). The data are complemented by 22 qualitative in-depth interviews with successors and experts to capture causalities and motivations not covered by the empirical analysis.

This article focuses on non-publicly traded medium sized enterprises, thus most of the performance analysis in this article is accounting-based. We employ a difference-in-difference approach by comparing profit margins to investigate the impact of appointing a certain type of successor.[2] Furthermore, the performance data are adjusted by using industry-adjustments and performance-matched adjustments of control groups to reduce the effects of time and industry trends as well as possible mean reversion effects (Barber and Lyon, 1996). Following the literature on firm performance, we include common controls for firm characteristics such as size, momentum, ownership and default probability in our regressions to control for firm performance prior to the succession event to increase the robustness of our results.

In line with the literature on ownership and on private benefits (Dyck and Zingales, 2004), the results of this article offer empirical evidence that concentrated ownership structures can lead to imperfect successions and a decreased appreciation of typical labor market signals of future CEOs. This is reflected in highly significant differences in the attributes of the successors: Only 9.0% of family CEO successors benefit from previous executive board experience, whereas the majority of external CEO successors are experienced in this respect. Furthermore, family CEOs possess 2.6 years less industry experience and are 6.6 years younger relative to external successors. In addition, family heirs are 10.9 percentage points less likely to have an university degree compared to external CEO successors. Also, with respect to the measures of post-succession operative managerial activity one observes significant differences between family and external successors. For instance, family heirs are significantly less active in terms of organizational changes implemented in the post-succession period and, finally, only 46.8% of family successors employ a business plan during the succession, while 70.8% of the external CEOs flank the succession process with this professional planning instrument.

Since all the differences listed above turn out to be highly significant, this suggests that the successor-selection follows other motives than picking the best in class. Arguably private benefits from promoting a kin surpass the costs arising from choosing an inferior successor. These costs can be measured by tracking the performance gap be-

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[2]A difference in difference-approach is advantageous because it controls for time-invariant firm characteristics which might drive performance. In addition, we employ an array of additional performance measures. For articles which employ a comparable approach we refer to Pérez-González (2006) and Bennedsen et al. (2007).

tween external and family successors, which in our sample is -1.3 percentage points in profit margin significant at the five percent level, and -1.6 percentage points in industry- and performance-adjusted profit margin using a propensity score matching. Furthermore, it can be shown that the performance gap is driven by family heirs with poor human capital. We also show, that, if exclusively and only family members were considered as successors (a case which we call strong nepotism), a highly significant performance gap of -1.95 percentage points of industry- and performance-adjusted profit margin is observable, which is robust to the inclusion of several commonly used controls. Our regression results furthermore indicate that the level of human capital of the firm successor as well as the level of post-succession business restructuring are significantly positively related with enterprise performance. Interestingly, there is no performance gap if high human capital successors are compared. Here family heirs perform slightly (and insignificantly, id est outside the 10% level) better than externals on average.

Overall, this article hints that in a considerable number of cases nepotism tends to damage the performance of medium sized enterprises with strong ownership concentration which experience a CEO succession. The results confirm theories of nepotism articulated in the literature (e.g. Levinson, 1971, and Pollak, 1985).[3] The costs of nepotistic behavior are likely to be borne by stakeholders and minority shareholders with weak control rights (Gompers et al., 2003), which do not reap the private benefits of seeing a family heir steering the fortunes of their family business. By investigating medium-sized (with 30 to 1000 employees) enterprises with very high ownership concentration (more than 50%), as well as successor attributes and post-succession managerial actions, this article is a contribution to the recent literature on CEO turnover and firm performance (Pérez-González, 2006, Bennedsen et al., 2007, and Mehrotra et al., 2011).

The structure of this article is designed as follows: section II gives an overview of the literature, while the main propositions are derived from a succession model presented in the theoretical section III. Section IV informs in detail on the sample selection. In section V the data are analyzed and discussed. Section VI summarizes the results.

II.   Review of Empirical Literature and Evidence

The key issue of finding an optimal CEO successor (or agent) is related to manifold strands of literature. To start with, the topic possesses theoretical links to the theory of the firm literature, as ownership structure and agency problems are focal (Jensen and Meckling, 1976, and Fama, 1980).[4] Furthermore, it is related to the signaling (Arrow, 1973, Spence, 1973, and Spence, 1974) and contest literature strand. The agents' (successors') ability-signaling in the inter-firm CEO labor market (Fama, 1980) can be interpreted as a career ladder contest in the spirit of Lazear and Rosen (1981) and Rosen (1986).

The empirical literature on family control and firm performance is complex and sometimes contradictory. Morck et al. (1988) find that in new firms the control of the founding family raises market-to-book values (Tobin's Q), while the relationship is negative

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[3] Pollak (1985) writes that "nepotism may prove a serious problem for the family firm".

[4] A view that extends the Jensen and Meckling (1976) model for family firms, is presented by Schulze et al. (2001).

for old firms. They attribute this result to the entrepreneurial spirit and the high levels of energy exerted by founders and suspect descendants of entrenchment. McConaughy et al. (1998) show that firms whose CEOs are founders or descendants of the founder are more efficient and valuable compared to similar enterprises. Following this line of argument, Anderson and Reeb (2003) report evidence for S&P 500 firms with family influence and family CEOs, indicating that family firms perform significantly better than non-family firms. However, Anderson and Reeb find that these effects wash out if family influence becomes overwhelming. Maury (2006) shows that active family control enhances firm performance and valuation when compared to non-family firms. Furthermore, Villalonga and Amit (2006) indicate that founder CEO management is beneficial to firm value, but descendant family CEOs seem to destroy firm value. This result is mirrored by Adams et al. (2009), who find a positive impact of founder CEOs on firm performance. Finally, Mehrotra et al. (2011) find that Japanese family firms outperform non-family firms, indicating adoptions are likely to drive descendants' performance and discuss possible beneficial effects of family control and connectedness in countries with weak institutions (Faccio, 2006, and Mehrotra et al., 2011).[5]

A second group of studies documents rather negative influences of internal successions. Yermack (1996) observes that founding family board membership is detrimental to company valuation. In line with these findings Morck et al. (2000) observe that inherited wealth is detrimental to growth and find evidence that family CEO successors are associated with lower operational performance. Bennedsen et al. (2007) find that descendant family CEOs significantly damage enterprise performance, particularly in industries with large firms or a particularly well skilled labor force. Miller et al. (2007) observe empirically that only lone founder firms perform in a superior way, while superior performance cannot be found for other family firms. Finally, Hillier and McColgan (2009) find evidence that stock prices rise if family CEOs announce their departure.

We are aware of only a small number of empirical studies which address the critical post-succession phase. These studies (Smith and Amoako-Adu, 1999, Pérez-González's, 2006, and Bennedsen et al., 2007) find a negative impact of family successions on post-succession performance, but they all have their limitations: A study of Smith and Amoako-Adu (1999) on the immediate and long-term financial performance impact of successions in Canadian family firms, which works with a small sample size (124 firms). Its performance analysis (ROA) does not allow for sharp inference, since it does not control for firm characteristics and trends. Pérez-González's (2006) work on the immediate (days around the successions announcements, using stock prices) and long-run (using differentials of three years performance averages around successions) performance impact of inheriting control employs a rather broad definition of family firms (individuals with at least five percent ownership) and thus examines rather large firms with an average market value of equity of between $1.1 and $1.7 billion. With regard to enterprise size, Bennedsen et al.'s (2007) study on the impact of family characteristics in corporate decision making and consequential firm performance (using differentials of three years performance averages around successions) is most comparable to our study, but lacks

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[5]In Japan adoptions of otherwise unrelated CEO successors are not uncommon.

detailed ownership data.

To summarize it can be said that despite the large amount of literature on ownership structure and control, surprisingly little research has been conducted to analyze their impact on performance in small- and medium sized enterprises during succession phases. We are aware of no comparable study which addresses the relationship of successor type (origin and human capital) and enterprise performance in non-publicly traded small- and medium-sized enterprises (between 30 to 1,000 employees) with strong concentrations of ownership and control (ownership above 50%). Moreover, previous studies mainly neglected small and medium sized enterprises. This omission is particularly astonishing if one considers that the high ownership concentration amongst this group is likely to lead to high agency costs borne by minority shareholders (Jensen and Meckling, 1976, Gompers et al., 2003, and Dyck and Zingales, 2004).[6] In addition, this study uses an unique data set, which allows us to investigate the human capital, the post-succession decision pattern of each successor as well as further characteristics of the successions and the firms involved at a detailed level. This opens a window for a closer investigation of potential post-succession performance effects. In order to pursue this objective, our analysis follows the techniques suggested by Barber and Lyon (1996) and the difference-in-difference approach employed by Pérez-González (2006) and Bennedsen et al. (2007).

III. Theoretical Section

A. *A Contest-oriented Model of CEO Successions*

There are good reasons to believe that family successions might be advantageous for enterprise performance. Family CEOs arguably reduce agency conflicts because of better monitoring and disciplining possibilities within families (Fama and Jensen, 1983) and stronger family peer pressure (Kandel and Lazear, 1992). In addition, family CEOs are argued to function as pro-organizational stewards of their firms who derive utility from the success of their enterprise (Davis et al., 1997). Furthermore, they tend to be long-term oriented and invest more in long-term projects relative to non-family firms (Le Breton-Miller and Miller, 2006, and Block and Thams, 2007). Moreover, if talent was inherited as efficiently as property and control rights, then the children of gifted founder CEOs should perform better than average external CEOs and could be expected to be the winners of succession contests.

However, there is evidence in the literature that inherited talents are subject to gravitational forces which constantly drag them down towards the population's mean, the son of a great merchant is not necessarily a gifted merchant (Galton, 1886, Galton, 1890, Heckman, 1995, Mulligan, 1999, and Mehrotra et al., 2011). Even worse, it is argued that inheriting large property possibly induces lethargic and contemplative behavior, deadening the talents of the legatee (Carnegie, 1891 (reprint 1933), and Holtz-Eakin et al., 1993). Carnegie (1889) writes: "[...] *the thoughtful man must shortly say, "I would as soon leave to my son a curse as the almighty dollar," [...]"*, since "[...] *the parent who*

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[6]One example is the principal's private benefit derived from seeing a heir steering the fortunes of his family business.

leaves his son enormous wealth generally deadens the talents and energies of the son, and tempts him to lead a less useful and less worthy life than he otherwise would, [...]" (Carnegie, 1891 (reprint 1933), p.49). However, it is a fact that some companies are steered over many generations by descendants of the founding family with quite remarkable success.

Taking these considerations into account, this article focuses on a contest theoretical model of successions where internal CEO-candidates are assumed to compete with external candidates. In general, the design of a contest, its structure and its pool of contestants are decisive for its intended outcome (Konrad, 2009). In CEO succession contests the contest designer and ruler holds nearly always the controlling majority in votes, which is, following La Porta et al. (1999), very often a family.[7] However, powerful contest rulers (exemplia gratia a departing CEO) are potentially capable of designing a contest according to their preferences and favors (Baye et al., 1993, Chan, 1996, Welch, Jr. and Byrne, 2001, Agrawal et al., 2006, and Tsoulouhas et al., 2007). However, a monopolistic pursuit of majority preferences in the contest design potentially inflicts agency costs on non-controlling shareholder minorities, which highlights links of the contest design literature to the ownership and control (theory of the firm) literature strand (Jensen and Meckling, 1976, Demsetz and Lehn, 1985, Shleifer and Vishny, 1986, Demsetz and Villalonga, 2001, and Villalonga and Amit, 2006). For example, a departing family CEO might constrain the contest pool of potential succession candidates to his kinship or acquaintances and thus install, due to the ownership structure, a second-best succession candidate.

The above considerations lead to two general questions: (I.) Does the successor's origin (family or external) matter for post-succession enterprise performance? (II.) What are the contest rules (constrained vs. unconstrained)? These thoughts are summarized in a theoretical model which is presented in figure 1 and serves as a starting point for the derivation of the following propositions. The figure highlights that the succession contest has access to two pools of CEO successor contestants: the family and the external labor market. The contestants within the pools have independent ability attributes (f.e. 1 for low ability and 10 for high ability). Furthermore, it indicates that the voting majority designs the contest via its implicit rules and constraints. The contest winner is the chosen and installed CEO successor whose attributes might have an effect on post-succession enterprise performance.

B.   Categorizations and Constructs

The aim of this article is to explicate the impact of imperfect succession decisions on enterprise performance in enterprises with concentrated ownership control. For the purposes of this article we begin with an explication of what we mean by an "enterprise with concentrated ownership control": An enterprise with concentrated ownership control is present if a maximum of three natural persons own more than 50% of the enterprise and at least one of these owners is a leading member of the executive board.

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[7]In addition, La Porta et al. (1999) provide evidence that ownership concentration in medium sized publicly traded companies is considerable from a global perspective: 45% of the observed enterprises are controlled by families.
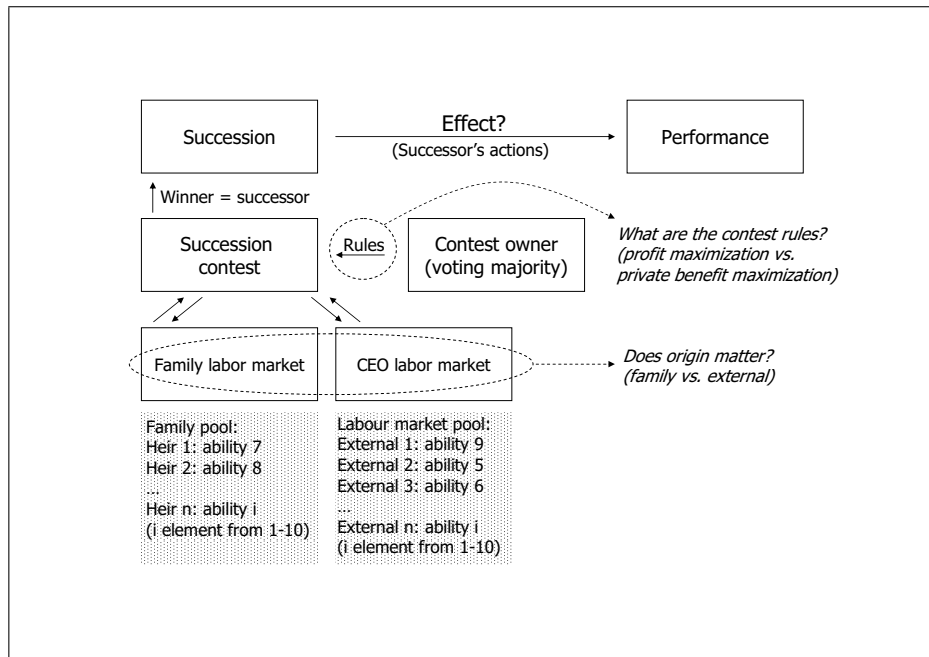
FIGURE 1. A SUCCESSION MODEL BASED ON CONTEST-THEORY

Regarding the origin of the successors, the observed successions can be categorized into: *family* successions, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *enterprise* successions, for unrelated successors who were previously employees of the enterprise; *external* successions, for successors with no previous ties to the enterprise and *hybrid* successions, for multiple successors with differing backgrounds.

To assess the intensity of the human capital signaled by the CEO successors, we follow Murphy and Zábojník (2004) who argue that general managerial skill became more important for CEOs over the last three decades due to the progress in management science, corporate controlling and finance and other disciplines, which, if mastered by the CEO, contribute substantially to the CEO's ability to steer a company. Compared to earlier decades, the computerization has made company specific knowledge more accessible to managers, which is sometimes just a keyboard fingertip away. With regard to the general managerial skills we argue that leadership experience, a degree in business studies and the ability to apply this knowledge using advanced professional instruments, such as a business plan (which includes a strategic plan, but also an earnings forecast and a finance- and liquidity-plan), are acceptable proxies.[8] In line with human capital theory, we argue

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[8]One can also motivate the choice of these proxies using the small business, succession and signaling literature. An investment in education in general management is costlier for less able individuals making it a valuable signal of higher ability (Spence, 1973, Arrow, 1973, and Spence, 1974), while it is possible to use the business plan proxy to ensure that the managerial skills acquired are being used as opposed to being only a signal. We focus on education in business

that productivity-augmenting investments in human capital can also take place in the post-education phase (Mincer, 1974, and Strober, 1990) and pick this thought to motivate the inclusion of proxies regarding experience as measures for CEO relevant human capital investment acquired through "on-the-job-training". First of all, Mincer (1974) shows that the time distribution of these investments leads to an age variation in earnings resulting in a positive correlation between age and earnings (the age profile), which might arguably be interpreted as remuneration for higher ability due to experience. Following this thought, we employ age as a proxy for general experience and argue that this is also relevant to the job of CEO.[9] Further, we argue that one can also interpret leadership experience as an investment with respect to building up CEO relevant human capital. This is also in line with findings of the succession literature which points out that the successor's proven skills, such as previous leadership experience, generate credibility and are helpful in successions (Barach et al., 1988, Barach and Ganitsky, 1995, Chrisman et al., 1998, and Le Breton-Miller et al., 2004). In addition to these general management skills, we also include one company specific proxy. Here, we choose industry experience and argue that this proxy mirrors the potential advantages due to learning the specific "tricks of the trade" of the industry in which the accordant company operates.[10] In addition, in this article we try to capture the detrimental effects of the "Carnegie Conjecture" on human capital (Carnegie, 1891 (reprint 1933), and Holtz-Eakin et al., 1993). In order to depict this effect on motivation and commitment, we observe whether the successor bought a share of the enterprise (as opposed to inheriting).

Following the above argumentation, we design a human capital score for each successor which is composed of the sum of the following elements: (1) age above median (of the successors in the sample, proxy for general experience); (2) industry experience above median (proxy for industry specific experience); (3) leadership experience (proxy for practical managerial skills); (4) merchant education, if the successor holds an university degree in business studies (or strongly related field) or was educated at an university of cooperative education (proxy for theoretical managerial skills); (5) use of a business plan during the succession (proxy for professional managerial skills); and (6) bought a share of the enterprise (used as a proxy for the "Carnegie Conjecture" effects).[11] If the overall score of the successor is equal to or above the median score of the sample, the successor is assigned the attribute "HHC" for high human capital and "LHC" for low

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studies, as this an education closely related to general managerial skills and potentially applicable and transferable across all industries. In the same vein, the small business literature highlights the crucial role of education in business studies and managerial skills (f.e. cash-flow management, which is a prerequisite for a business plan) for success (Ibrahim and Goodwin, 1986), whilst arguments in favor of positive effects of successor education can also be found in the succession literature (Morris et al., 1997, and Le Breton-Miller et al., 2004).

[9]We draw attention to the fact the positive marginal effect of age on earnings reduces with higher age and eventually turns negative at high age (Mincer, 1974). In addition, there is evidence in the literature that seasoned CEOs may become less effective and virtually "stale in the saddle" (Miller, 1991). This introduces a caveat to the age proxy. However, the average age of the CEO successors observed here falls into the increasing section of the inverted u-shape observed by Mincer (1974), and therefore we can neglect the diminishing marginal effect in this study.

[10]One could also choose the proxy "experience within the respective company" which is often pointed out in the succession literature, but this would exclude external successors per definition. Thus, we refrain from this approach.

[11]In addition to human capital point of view, the use of the "Carnegie Conjecture" proxy might also be motivated from an incentive theory point of view.

human capital otherwise.[12]

In addition, we try to capture nepotistic tendencies and successions biased by favoritism. In order to pursue this aim, we observe whether the predecessor considered only and exclusively family heirs as potential successors. If this category was met, the accordant succession was categorized into the "nepotism" category, as it excludes the external labor market from having access to the succession contest.[13]

C.   *Derived Propositions*

From a theoretical view, successors tested in an unconstrained pool are the winners in the inter-firm CEO market whose competition exhibits a permanent pressure to perform, evolve and to signal excellence (Fama, 1980). As a result, they can be expected to outperform the successor candidates of a restricted pool (Pérez-González, 2006). Furthermore, if some candidates are favored, they will be promoted more frequently without previous merits, hence in disregard of labor market signals (Arrow, 1973, Spence, 1973, and Spence, 1974). It follows that labor market signals, such as the degree of education and experience in industry and leadership, are expected to be of lower quality amongst the favored CEOs. Overall, the result of a limited successor pool or of candidate favoritism should be inferior post-succession enterprise performance. Assuming the candidate pool is constrained in some family successions in family firms, this leads to the appointment of candidates who might have been considered as inferior in an unconstrained contest, which should decrease the average performance of family successions (Pérez-González, 2006).[14] The above logic immediately suggests, that family successors can be expected to be outperformed by enterprise and external successors, if some predecessors or family firms restrict the successor candidate pool to family members or strongly favor family candidates.[15]

PROPOSITION 1:   *Average performance of family successors underscores the performance of external successors.*

Thereby, we implicitly assume that the successor's human capital is material for enterprise performance (Brüderl et al., 1992) and assume a positive relation between them. Successors equipped with more experience and education might be expected to asses a company's situation more reliably and execute the "right" changes, while their past merits might foster their credibility among the employees. As a result, successors with high human capital should perform better as compared to successor's with low human capital

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[12]For a comparable approach using undergraduate college selectivity as proxy, we refer to Pérez-González (2006).

[13]Please note that this should not be confused with a definition of nepotism. Further, this is a very strict category for nepotistic favoritism, as one could also think of weaker forms of favoritism which are not investigated in this article.

[14]We cannot expect that the enterprises have access to a fully transparent and perfect labor market. Hence, a bias from the market imperfections remains. However, we argue that a larger, but still imperfect, pool of candidates should on average outperform a limited pool of family successors, assuming that leadership attributes have influence on firm performance.

[15]One could also argue that there might be a certain degree of constraints in favor of enterprise successors. However, we assume that this is a less likely niche case and concentrate one the more obvious case of favoritism due to family relations.

in the post-succession period. In order to test this proposition, we employ the simple high versus low human capital indicator derived in the previous section.

PROPOSITION 2:   *Higher human capital of the successor is positively related with enterprise performance.*

Assuming that some successors are installed because of favoritism or family ties, then this preference rule of the predecessor should have outweighed the labor market signals of some successors. As a consequence of the omitted evaluation, we should observe a lower performance of the preferred candidates as compared to the contrary when the contest pool is unconstrained and embraces selection of the best in class. In the later case the constant and self-selective pressure of the labor market should lead to a much better selection resulting in a more able successor. Further, for successions in which exclusively and only the pool of family members was considered as a source for successors (nepotism), we expect a strongly negative performance impact due to a small size of the candidate pool, a strong reduction of the labor market contest and the most negative effects of the "Carnegie conjecture".

PROPOSITION 3:   *Strictly preferring family successors (nepotism) is particularly negatively related with post-succession enterprise performance.*

On the contrary, in successions, which are unplanned due to sudden death or disease of the predecessor, it is more likely that no biased succession contest (by favoritism or strong constraints) is carried out by the predecessor. This is because we find it very unlikely that a predecessor suffering from a heavy disease or a deceased predecessor still has a strong influence on the succession contest, which arguably leads to a less constrained succession contest. Therefore, we suspect that unconstrained successions contests occur more often in unplanned successions as compared to normal successions, which should be reflected in a positive effect for post-succession enterprise performance as successors with a true higher ability are installed more often in these cases.[16]

PROPOSITION 4:   *Unplanned successions are positively related with post-succession enterprise performance.*

Provided the rule of the predecessor lasts long enough, the gathered experience of the organization's history leads to the gradual formation of an internal equilibrium of stable and established rules or norms, roles, processes, routines, tacit knowledge and a distribution of power, as well as an external equilibrium of economic and sociological embeddedness (Granovetter, 1985). Changing this stabilizing institutionalized fabric is likely to spark opposition from organizational members (Coch and French, Jr., 1948) and leads to costly disruptive processes as well as inertia stemming from structures and environmental embeddedness (Hannan and Freeman, 1977, and Barnett and Carroll, 1995).

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[16]Furthermore, if the predecessor is actively involved in the enterprise, he might be an impediment to post-succession change and renewal. In unplanned successions this issue is resolved.

Nonetheless, restructuring the organization might be a necessity. Since after a long reigning period of a CEO companies run the risk of falling into a competency trap. When optimal solutions to organizational challenges change over time, change may become necessary. This is particularly true in old organization which respond more slowly to necessary change. The older the organization, the stronger the inertial forces and the more complex and hazardous becomes its reorganization (Hannan and Freeman, 1984, and Amburgey et al., 1993). In this context the successor serves as a reset in the organizational learning process and must assess the contemporary fit of the organizational equilibria.

However, if favored family successors were more strongly bound to firm traditions and were more inclined to show respect for their predecessors' achievements than their counterparts from an unconstrained pool, then this should be reflected in a lower willingness to implement changes due to lower propensity to realize the need for change or because of lower self-confidence and more constrained behavior. Furthermore if the operational influence of the predecessor is still considerable, then a neutral due diligence of the organization is in some cases not desired. Thus less willingness to change the status quo should be observable in such cases. We expect that successors with active predecessors implement fewer post-succession changes compared to successors with no active predecessor. As a consequence, a different pattern of post-succession managerial decisions should be expected between the two groups of CEO successors. Less able or inexperienced successors, in particular when they come from inside the family, should be less successful in realizing the need for change as well as less successful in overcoming resistance while implementing organizational changes and innovations. This lack of ability, combined with stronger psychological ties to preserve the work of a family predecessor, could result in a lower magnitude of organizational change among family successors compared to external successors.

PROPOSITION 5: *Family successors implement fewer post-succession changes compared to external successors.*

In line with Amburgey et al. (1993) we furthermore argue that organizational changes have disruptive effects on organizational stability independent of their content and thus increase the risk of default in the short run (Haveman, 1993). This should be reflected in the credit rating score (default probability) of the company. After the first disruptive phase of change there will be an adaptive phase of change taking place which can lead to performance improvement above the original performance level (prior to organizational change).

IV. Sample Selection

The collection of analyzable data for the purpose described above builds on several databases: (1) the Mannheim Enterprise Panel (MUP), (2) the Bureau van Dyjk Amadeus database (Amadeus), (3) the Hoppenstedt database, (4) the Creditreform solvency index

information, (5) the German Bundesbank database, (6) standardized computer aided telephone interviews, (7) non-standardized direct interviews and (8) web-searches.[17]

As a first step, we filter out a population of owner controlled enterprises using the MUP database. The enterprises are required to match the following criteria for the years 2002 to 2008:[18]

1) 30 to 1,000 employees, and

2) going concern, and

3) possessing the concentrated ownership control attribute.

In order to identify succession events within this population we employ a second filter, see appendix A1. After applying both filters we arrive at a population of 14,250 succession candidates.

We gather financial data and impute missing values using the following hierarchy: 1. MUP information, 2. Amadeus information, 3. Creditreform solvency index information, 4. Hoppenstedt information and 5. web-searches. Apart from the sample group, a control group of 187,388 company-year observations is drawn from the Amadeus database.[19] Using Bundesbank information, all data in the sample and control group are adjusted and reported in 07/2009 euros.

The gross sample population is contacted and interviewed yielding a total of 804 observations on CEO successions. The interviewees are required to match the following criteria:

1) the interviewee is a successor, and

2) the interviewee is a leading member of the executive board, and

3) the interviewee holds an ownership fraction of the enterprise, and

4) the succession took place between the years 2002 and 2008.[20]

Four main areas are covered in the interview: (1) succession type, (2) human capital of the successor, (3) post-succession managerial decision pattern of the successor and (4) enterprise performance. Concerning the succession type, the interview asks for the successor's origin, the operational activity of the predecessor and the perceived quality of the predecessor's succession planning. Furthermore, the successor indicates the way in which he acquired (bought, inherited or else) his ownership share. The above information permits a fine distinction of succession types.

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[17]The Mannheim Enterprise Panel is an economic panel data set including over six million active and inactive enterprises and is maintained by the Centre for European Economic Research (ZEW). About 90% of the enterprises listed in this panel are enterprises with concentrated ownership control. The Creditreform solvency index information was used to calculate default probabilities from ratings.

[18]MUP data from earlier than 2002 are less complete and reliable.

[19]The control group companies are required to be of a size between 30 up 1,000 employees. Financial data are gathered for the years 2002 to 2009. Unconsolidated sister statements (Amadeus consolidation code U2) and duplicates are excluded.

[20]We ask for the year when the successor became a leading member of the executive board.

Within the second area information on the successor's age, leadership experience, industry experience and highest degree or qualification is gathered amongst other variables. This information on general and specific human capital allows us to test for succession contest pool constraints. Furthermore, we ask for information on the successor's consumption of consulting and coaching services during the succession period.

In order to identify areas of the successor's post-succession managerial decisions and actions between the years 2002 and 2009, the data set includes changes in the following corporate areas

(a) labor organization: top management, hierarchy, working-time policy and compensation scheme;

(b) organizational structure: purchasing, production, marketing and sales, personnel and corporate finance & controlling;

(c) products and innovations: product innovations, new methods of production, additional products, moderate sorting out of previous products, heavy sorting out of previous products;

(d) business relations: new customers, new suppliers, new bank relations, new financiers, loss of previous customers and dismissal of previous suppliers;

(e) geographical activity: regional market activity, national market activity, international market activity.

This collection of strategic and operative measures assigns to each successor a corresponding action pattern which facilitates interpretations of observable correlations, for instance between succession type and enterprise performance.

The enterprise performance is measured using the difference in accounting variables such as profit margin and by performance controls such as the number of employees and credit rating score measured in the succession year and 2009. We flank these variables by using additional indicators on the state of the company such as unexpected post-succession financing requirements and perceived pre-succession investment delays. The data set is analyzed using the STATA 12 software.

Parallel to the standardized interviews 20 additional successors and two experts regarding successions in family firms agreed to participate in non-standardized in-depth interviews. The in-depth interviews cover areas inaccessible by the standardized interviews, such as: motivation for succession, the role and character of the predecessor and his co-operation behavior, leadership style and the necessity of post-succession business restructuring. The in-depth interview sample is not representative but serves as a source of vital indications for the interpretation of the correlations within the data sample of the standardized interviews. The in-depth interviews were transcribed and evaluated using ATLAS.ti.

V. Data Analysis

A. Summary Statistics

Table 1 gives an overview of the data set grouped by succession type per industry cluster using aggregations of the International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations.[21]

TABLE 1—OBSERVED SUCCESSIONS BY TYPE AND INDUSTRY

Variable	Full sample	Family succession	Enterprise succession	External succession	Hybrid succession	Difference in shares type (2) minus (4)
	(1)	(2)	(3)	(4)	(5)	(6)
1. Manufacturing	322	198	55	54	15	
	(40.0)	(43.5)	(34.6)	(37.5)	(32.6)	6.0
	[100.0]	[61.5]	[17.1]	[16.8]	[4.7]	*(4.7)*
2. Construction	114	70	19	21	4	
	(14.2)	(15.4)	(12.0)	(14.6)	(8.7)	0.8
	[100.0]	[61.4]	[16.7]	[18.4]	[3.5]	*(3.4)*
3. Business services	139	45	49	37	8	
	(17.3)	(9.9)	(30.8)	(25.7)	(17.4)	-15.8***
	[100.0]	[32.4]	[35.3]	[26.6]	[5.8]	*(3.3)*
4. Consumer services	72	36	16	16	4	
	(9.0)	(7.9)	(10.1)	(11.1)	(8.7)	-3.1
	[100.0]	[50.0]	[22.2]	[22.2]	[5.7]	*(2.6)*
5. Wholesale & retail	127	87	17	11	12	
	(15.8)	(19.1)	(10.7)	(7.6)	(26.1)	11.5***
	[100.0]	[68.5]	[13.4]	[8.7]	[9.5]	*(3.5)*
6. Other	30	19	3	5	3	
	(3.7)	(4.2)	(1.9)	(3.5)	(6.5)	0.7
	[100.0]	[63.3]	[10.0]	[16.7]	[10.0]	*(1.8)*
Total	804	455	159	144	46	
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	
	[100.0]	[56.6]	[19.8]	[17.9]	[5.7]	
7. Difference in shares		29.1***	-18.1***	-9.8**	-1.0	
industry 1. minus 3.		*(5.0)*	*(4.2)*	*(4.0)*	*(2.2)*	
8. Difference in shares		36.1***	-21.9***	-18.0***	3.7	
industry 5. minus 3.		*(6.1)*	*(5.3)*	*(4.7)*	*(3.2)*	

Note: The total number of observed successions is reported in column 1. The successions are categorized into: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External* for successors without previous ties to the enterprise (column 4); and *Hybrid* for multiple successors with differing backgrounds (column 5). The industries are clustered using aggregated ISIC classifications, see appendix for a detailed classification key. Standard errors are reported in italics. The fraction of successions as a percentage of the total number of observed successions per succession type is displayed in parentheses. The fraction of successions as a percentage of the total number of observed successions per industry cluster is displayed in square brackets.

Overall, 56.6% of the enterprises were handed over to family successors, while 37.7% of the enterprises went to non-family successors and 5.7% were categorized as hybrid successions. We observed the largest amount of successions within the manufacturing

[21] The industry classification key for the ISIC aggregation is given in the appendix A2.

sector (322), second being business services (139) and third wholesale & retail (127). Across some of the industry clusters highly significant differences in the family succession rates are perceivable. Whilst the manufacturing and the wholesale & retail sector have strong rates of family successions (61.5% and 68.5% respectively), only a minority of 32.4% of the enterprises in the business services sector was handed over to family heirs, which is mirrored in the highly significant differences in succession type shares reported in rows 7 and 8 (29.1 and 36.1 percentage points respectively, significant at the one percent level). Furthermore, while 25.7% of all external successions took place in the wholesale & retail sector, only 9.9% of all the family successors were located within this industry (-15.8 percentage points, significant at the one percent level). The majority of the family CEO successor population (43.5%) was observed in the manufacturing sector.

Table 2 presents summary statistics of the characteristics of the successions in the sample. An inspection of the average years passed since the succession event indicates that successions in the sample were relatively evenly distributed with an average of 3.54 years and an insignificant difference of 0.15 years between family and external successions.[22] Overall, the significant differences between external and family successors (column 6) in nearly all other succession characteristics are striking. Omitting a business plan during a critical phase such as a succession is a questionable decision. It is surprising that family heirs used this instrument 24.0 percentage points less often, although they were significantly less experienced in their industry and in leadership. This might be explained by the stronger familiarity of family heirs with their enterprise.

Furthermore, family successors relied 13.6 percentage points less often on the advice of new consultants, however their predecessors remained active 8.6 percentage points more often. This prolonged activity of the predecessor could be interpreted as a sign of weakness, since the successor could act in a tributary manner and be dependent on the predecessor's knowledge. But this may not necessarily be the case, from a positive point of view the predecessor's activity could also explain the lower consumption of additional consulting products by family heirs (fewer new consultants). However the strong and significant differences in experience and education raise concerns whether the best in class successor was chosen by the predecessor, or whether private benefits outweighed these (labor market) signals. In this context, the highly significant difference in leadership (executive board) experience is striking. Only 9.0% of the family successors benefit from previous executive board experience, whereas the majority of external successors are veterans, which is in line with the difference in age. Overall it must be stated that the attributes of the successor types entail strong differences.

Table 3 presents the characteristics of the enterprises in the succession year. Panel A gives an overview of the accounting data (panel A) which is flanked by additional indicators (panel B) on the state of the company. Overall, the average enterprise in the sample has 82 employees and is remarkably profitable, with a profit margin of 6.1% of

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[22]The median for both groups is four years and the standard deviation for family successions is 1.07 and for external successions 1.18.

TABLE 2—SUMMARY STATISTICS OF OBSERVED SUCCESSION CHARACTERISTICS

Variable	All	Succession type				Difference of means (2) and (4)
		Family	Enterprise	External	Hybrid	
	(1)	(2)	(3)	(4)	(5)	(6)
Observations (number)	804	455	159	144	46	599
Acquired shares (%)	38.7	20.9	63.5	65.3	45.7	-44.4***
	(1.7187)	(1.9075)	(3.8296)	(3.9812)	(7.4253)	(4.4146)
Used business plan (%)	51.9	46.8	48.4	70.8	51.7	-24.0***
	(1.7632)	(2.3419)	(3.9758)	(3.8010)	(7.4253)	(4.4644)
Successor's age (years)	41.9	39.27	44.9	45.9	43.9	-6.6***
	(0.2420)	(0.3007)	(0.5042)	(0.5499)	(0.8014)	(0.6267)
University degree (%)	41.2	35.6	43.4	46.5	71.7	-10.9**
	(1.7367)	(2.2473)	(3.9429)	(4.1711)	(6.7121)	(4.7380)
Merchant education (%)	37.4	38.0	31.4	39.6	45.7	-1.6
	(1.7079)	(2.2782)	(3.6938)	(4.0894)	(7.4253)	(4.6813)
Educated for succession (%)	-	53.4	-	-	41.3	-
	-	(2.3412)	-	-	(7.3400)	-
Industry experience (years)	15.8	14.4	19.0	17.0	15.4	-2.6***
	(0.2668)	(0.3398)	(0.5587)	(0.6939)	(1.0101)	(0.7726)
Leadership experience (%)	21.6	9.0	22.0	56.3	37.0	-47.2***
	(1.4532)	(1.3439)	(3.2962)	(4.1484)	(7.1954)	(4.3607)
Hired new consultants (%)	30.0	26.7	30.2	40.3	31.1	-13.6***
	(1.6199)	(2.0773)	(3.6522)	(4.1014)	(6.9792)	(4.5975)
Predecessor active (%)	45.6	47.5	48.4	38.9	39.1	8.6*
	(1.7578)	(2.3436)	(3.9758)	(4.0767)	(7.2753)	(4.7023)
Years since succession (years)	3.54	3.66	3.26	3.51	3.39	0.15
	(0.0702)	(0.0922)	(0.1552)	(0.1799)	(0.2515)	(0.2021)

Note: Successions are categorized into: *Family*, if successors are related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External*, for successors with no previous ties to the enterprise (column 4) and *Hybrid*, for multiple successors with differing backgrounds (column 5). *Acquired shares* indicates if the successors bought a share of the enterprise or the entire enterprise. *Used business plan* is an indicator variable equal to one if a business plan is used. *Successor's age* is the age of the successor in the succession year. *University degree* is an indicator variable equal to one if the successor holds an university degree. *Merchant education* is an indicator variable equal to one if the successor studied business studies at university or attended an university of cooperative education. *Educated for succession* is an indicator equal to one if the successor is a family successor with special company-relevant education. *Industry experience* describes the years of industry experience of the successor in the succession year. *Leadership experience* is an indicator variable equal to one if the successor benefits from previous executive board experience. *Hired new consultants* is an indicator equal to one if the successor is supported by new external consultants. *Predecessor active* refers to an indicator equal to one if the predecessor still holds shares and remains operatively active in a leading position. *Years since succession* indicates the average time passed since the succession. The stars display significances (Welch-Satterthwaite test) at: * ten percent, ** five percent and *** one percent. The values in parentheses display standard errors.

an operating revenue of 10.5 million euros in 07/2009 values.[23] The majority of the successions are well planned (77.1%) and in only 10.4% of the cases do considerable financing requirements indicate severe post-succession difficulties.[24]

An inspection of the accounting variables reveals that the enterprises in the sample are of nearly comparable size with regard to sales across the succession types. However, het-

[23]The median profit margin is 4.8% and the median operating revenue is 6.1 million euros in 07/2009 values, while the the median number of employees is 58. The medians are not reported separately in table 3.

[24]The strong profitability may be a result of a survivor-bias, since this article does not include enterprises which are not handed over to the next generation.

TABLE 3—SUMMARY STATISTICS OF OBSERVED ENTERPRISE CONDITIONS IN THE SUCCESSION YEAR

Variable	All	Succession type				Difference of means (2) and (4)
		Family	Enterprise	External	Hybrid	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Accounting variables						
Operating revenue (in mil. euros)	10.5	10.5	10.1	9.7	15.0	0.8
	(0.6548)	(0.9730)	(1.1650)	(1.0346)	(3.8512)	(1.4203)
Profit margin (%)	6.1	6.8	5.6	4.9	6.2	1.8**
	(0.3185)	(0.4683)	(0.5982)	(0.5469)	(1.8261)	(0.7200)
Industry-adjusted	3.3	4.0	2.5	2.1	3.3	1.9***
profit margin (%)	(0.3211)	(0.4747)	(0.6062)	(0.5513)	(1.7761)	(0.7275)
Employees (number)	82.2	78.6	73.6	102.1	85.2	-23.5*
	(3.1147)	(3.6417)	(4.7998)	(11.3591)	(10.1418)	(11.9286)
Rating (score)	223.0	220.3	230.1	227.7	211.7	-7.4**
	(1.3107)	(1.6392)	(3.3686)	(3.1475)	(4.7511)	(3.5488)
Industry-adjusted	11.8	10.2	16.6	14.9	1.8	-4.7
rating (score)	(1.2700)	(1.5835)	(3.2829)	(3.0768)	(4.9827)	(3.4604)
B. Additional indicators						
Good quality of predecessor's	77.1	82.5	76.0	60.9	78.0	21.5***
succession planning (%)	(1.6027)	(1.9064)	(3.8969)	(4.3293)	(6.5446)	(4.7305)
Investment delay	20.6	12.5	30.2	36.0	18.6	-23.5***
(%)	(1.4761)	(1.6080)	(3.7740)	(4.1319)	(6.0046)	(4.4338)
Financing requirements	10.4	7.7	9.5	16.7	19.6	-8.9***
(%)	(1.0362)	(1.2559)	(2.3394)	(3.1164)	(5.9136)	(3.3600)

Note: Successions are categorized into: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External*, for successors without previous ties to the enterprise (column 4) and *Hybrid*, for multiple successors with differing backgrounds (column 5). The performance indicators presented are: *Profit margin (PM)*: earnings before taxes divided by operating revenue; *Industry-adjusted PM*: the subtraction of the median PM of the according year and industry (two-digit ISIC) from PM; *Employees* the number of employees in the succession year; *Rating*: based on the Creditreform solvency-index; and *Industry-adjusted rating*: the subtraction of the median rating of the according year and industry (two-digit ISIC) from rating. The additional indicators signal: *Good quality of predecessor's succession planning* is an indicator equal to one if the succession planning was perceived by the successor as good. *Investment delay* is an indicator equal to one if the successor believes that investments were delayed before the succession. *Financing requirements* is an indicator equal to one if considerable unexpected financing requirements occurred in the aftermath of the succession. All values are displayed in 07/2009 euros. The stars display (Welch-Satterthwaite) significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

erogeneity between the enterprises across the succession types is observable with regard to all other parameters, including profitability (momentum) in the succession year.[25]

Overall, it must be stated that the more profitable enterprises are handed on to family successors, whereas less profitable enterprises are passed to externals. In terms of profit margin enterprises of family heirs are initially 1.9 percentage points (significant at the one percent level) more profitable in terms of industry-adjusted profit margin, but also 4.0 percentage points more profitable than their industry peers. At this stage, we draw attention to the fact that we exclude successions which went out of business during a succession, which limits the applicability of these findings to the surviving succession cases.

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[25] We shall address this heterogeneity later using a propensity score matching procedure.

External CEOs have to cope with more difficult starting positions: they face a significantly (at the five percent level) higher default probability and experience in 16.7% of the cases severe and unexpected post-succession financing requirements, which is more than twice the rate of family successors (significance of the difference is at the one percent level).[26] Furthermore, successions of external successors are drastically less well prepared by their predecessors and even worse: predecessors seem to squeeze money out before external successions far more often. 36.0% of external successors report a perceived pre-succession investment delay, while only 12.5% of family successors report such circumstances. One CEO interview partner (1) noted on this: *"You have to pay attention like hell. [...] You think the basics are being adhered to, but not a bit of it. You have to examine every single segment!"*

To summarize, more profitable enterprises tend to stay within family ranks, while less profitable enterprises tend to be milked before they are sold to externals. From these initial summary statistics the advice can be given, that a thorough due diligence is vital in external successions. We will now test the propositions derived in the theory section by using a differential abnormal performance methodology.

B. Differential Performance

In order to investigate the impact of CEO successions on subsequent firm performance in firms with highly concentrated ownership structures we mainly employ accounting based criteria. We are aware that this approach is second-best, since accounting values predominantly mirror past values and thus fall short of future-oriented (market-based) performance indicators. Furthermore, accounting values may be subject to over- and understatement (Barber and Lyon, 1996). Thus, ideally one would wish to base an analysis on market-based data, for example market-to-book ratios, as well as on accounting based data (e.g. Villalonga and Amit, 2006, and Pérez-González, 2006). However, this approach is unavailable since the overwhelming majority of small and medium sized enterprises is not traded publicly.[27]

Our analysis focuses on differential performance using profit margins (PM). The ratio of earnings before tax and operating revenue is a straightforward indicator of operational efficiency and a practical benchmark for comparisons of performance. One advantage of using profit margin is that it matches values from the same time period, since both items, earnings and operating revenue, stem from accruals of the same accounting period.[28]

However, the ratio of earnings before taxes over operating revenue potentially fluctuates across industries. In order to address this concern we introduce industry adjustments. Furthermore, employing a differential measure of performance automatically controls for time-invariant firm attributes which might possibly affect performance. In addition we

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[26]This finding is in line with findings in the literature, see Kerkhoff et al. (2004).

[27]In our sample there is not a single publicly traded company. Overall, in Germany only 460 companies out of 3,5 million companies are publicly traded.

[28]One alternative indicator of performance might be return on assets (ROA). However, assets are measured at historic costs, while earnings is measured in current dollars. In addition, idle or recently acquired assets potentially influence ROA. The drawback of using profit margin or return on sales is that the efficiency of assets employed is not measured (Barber and Lyon, 1996).

address concerns of possible mean reversion due to transitory components in accounting data, but also possible performance trends by employing control-group-matched performance adjustments (Barber and Lyon, 1996). In order to take into account general issues with the profit margin measure, we also present additional differential performance proxies, such as the percentage change in the number of employees, the change in credit rating and the overall amount of organizational changes implemented.

Following the recent literature on firm performance and successions (Villalonga and Amit, 2006, and Pérez-González, 2006) we include controls for typical firm characteristics such as size (sales) and momentum (e.g. industry-adjusted profit margin), ownership structure and default probability in our regressions to increase the robustness of the results. By tracking abnormal performance due to the appointment of a certain type of successor we test our advanced propositions, but we implicitly also test for a null relationship indicating managerial action in successions might be a ritual of symbolic meaning having a null effect on performance (Gamson and Scotch, 1964, Pfeffer, 1981, and Meindl and Ehrlich, 1987).

We begin our analysis by presenting differential performance for various types of successors. The unadjusted difference in profit margins between the succession year and the year 2009 is presented in the first row of table four. Profit margins are calculated by dividing earnings before taxes (Amadeus item 33) by operating revenue (Amadeus item 24) and a multiplication by 100.

Addressing concerns of mean reversion in accounting data and with the intention of minimizing the impact of industry trends or trends due to pre-succession performance, we include industry-adjusted as well as industry- and performance-adjusted PM indicators in panel A. Both industry and performance adjustments were calculated from a control group of 187,388 company-year observations of the Amadeus database. Industry adjustments are calculated by subtraction of the median profit margins of the accordant year and industry (at the two-digit ISIC code level) from the Amadeus database.[29] The adjusted values indicate whether firms which go through a succession entail positive or negative abnormal performance as compared to the median of their industry.

Following Barber and Lyon (1996) and Pérez-González (2006), we design our control groups for performance adjustments by sorting the industry-adjusted values of the Amadeus database enterprises into deciles. By matching the industry-adjusted variable (e.g. profit margin) of each sample firm with the accordant Amadeus decile in the year of the succession, the relevant control group is identified for each enterprise. The median value of the relevant control group and year is then used as a control for the observations of the sample group. Furthermore, in order to prevent our results from being biased by extremes or outliers, the tails of the distribution of the unadjusted profit margin values are winsorized at the 0.025 level.

To start with, the first item in column 1 in table 4 shows that the average gain in profit margin between the succession year and the year 2009 is 0.21 percentage points,

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[29]The industry clusters in the control group are required to include a minimum of five observations per year and industry (at the two-digit ISIC code level), otherwise the control reports missing data. We use two-digit industry controls because Clarke (1989) shows that the difference between two-digit and four-digit SIC controls is marginal.

TABLE 4—DIFFERENTIAL PERFORMANCE OF SUCCESSORS

Variable	All	Succession type				Differences in differences		
		Family	Enterprise	External	Hybrid	Family vs. External	Family = 1 LHC vs. HHC	LHC = 1 Family vs. Non-family
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Profit margin indicators								
Δ Profit margin	0.21	-0.32	0.61	0.97	0.77	-1.28**	-1.90**	-2.01
	(0.25)	(0.36)	(0.50)	(0.50)	(1.27)	(0.62)	(0.74)	(1.22)
Δ Industry-adjusted	0.39	-0.05	0.90	0.99	0.33	-1.04	-1.84**	-1.42
profit margin	(0.25)	(0.38)	(0.51)	(0.51)	(0.66)	(0.64)	(0.78)	(1.15)
Δ Industry- and per-	1.54	1.37	1.75	1.89	0.97	-0.52	-1.59**	-1.59
formance-adjusted	(0.23)	(0.33)	(0.50)	(0.49)	(0.63)	(0.59)	(0.68)	(1.00)
profit margin								
B. Changes implemented score								
Changes (amount)	8.36	8.01	8.07	9.59	9.05	-1.58***	-1.68***	-0.33
	(0.15)	(0.20)	(0.34)	(0.33)	(0.52)	(0.38)	(0.40)	(0.72)
C. Additional performance indicators								
Δ Rating (score)	3.17	5.44	-0.97	1.01	0.38	4.43	-1.67	10.31**
	(1.27)	(1.72)	(2.59)	(3.20)	(4.13)	(2.62)	(3.38)	(4.66)
Δ Industry-adjusted	1.96	3.67	-0.52	-0.50	0.15	4.16	-1.05	7.95*
rating (score)	(1.27)	(1.73)	(2.59)	(3.21)	(4.40)	(3.64)	(3.40)	(4.66)
Δ Employees	20.7	14.0	14.0	48.1	23.2	-34.0**	-5.5*	-6.2
(%)	(3.27)	(2.09)	(2.20)	(16.48)	(8.28)	(16.58)	(3.83)	(4.87)
Δ Industry-adjusted	36.7	29.9	30.3	64.3	37.7	-34.3**	-5.5	-9.2
employees (%)	(3.42)	(2.30)	(2.52)	(16.78)	(9.53)	(16.91)	(4.33)	(6.16)
D. Profit margin indicators -single successors only								
Δ Profit margin	0.28	-0.15	0.48	1.15	-	-1.30**	-1.76**	-0.87
	(0.30)	(0.41)	(0.60)	(0.59)	-	(0.72)	(0.89)	(2.19)
Δ Industry-adjusted	0.55	0.11	0.92	1.27	-	-1.16	-1.74*	-0.90
profit margin	(0.31)	(0.43)	(0.63)	(0.59)	-	(0.73)	(0.93)	(2.03)
Δ Industry- and per-	1.71	1.50	1.76	2.18	-	-0.68	-1.30	-1.14
formance-adjusted	(0.28)	(0.39)	(0.63)	(0.56)	-	(0.68)	(0.83)	(1.75)
profit margin								
E. Changes implemented score - single successors only								
Changes (number)	8.37	8.03	7.68	9.58	-	-1.55***	-2.71***	-0.32
	(0.27)	(0.44)	(0.57)	(0.68)	-	(0.55)	(0.85)	(1.01)

Note: The table presents the mean development between the succession year and the year 2009. Successions are categorized into: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External*, for successors without previous ties to the enterprise (column 4) and *Hybrid*, for multiple successors with differing backgrounds (column 5). The human capital of successors is distinguished by *Low human capital* (LHC) and *High human capital* (HHC) depending on the successors' score on a human capital proxy score including the elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, (5) professionalism, and (6) motivation. The performance indicators presented are calculated via: (a) profit margin: earnings before taxes divided by operating revenue, (b) industry-adjusted variables: the subtraction of the median of the variable of the according year and industry (two-digit ISIC) from the variable, (c) industry- and performance-adjusted variables: industry-adjusted variables less the median industry-adjusted variable of the relevant control group, (d) changes implemented score: the sum of observed changes per enterprise (Score ranges from 0 to 25), (e) rating: based on the Creditreform solvency-index, and (f) number of employees: the growth of the firm's employees in percent. Control groups for performance are designed by sorting the industry-adjusted values of the variables of the Amadeus database enterprises into deciles and matching the industry-adjusted values of the variable in the sample with the accordant Amadeus decile in the year of the succession. The median of the relevant variable in the respective decile and year is then employed as a control. The stars display (Huber-White) significances at: * ten percent, ** five percent and *** one percent. Huber-White robust standard errors are reported in parentheses.

but if industry- and performance-adjustments are applied, the overall average gain is 1.54 percentage points and statistically significant. However firms handed over to family heirs experience a decline of -0.32 percentage points.[30]

A comparison of the differences in means approach allows us to test for the propositions advanced in the propositions section. In column 6 of table 4 proposition 1 is explored. The difference-in-difference of family versus external successors is -1.28 percentage points and statistically significant, thus family heirs seem to underperform. From an economic point of view this means that family heirs lose five percent while externals gain 16% in enterprise performance (PM) as compared to the succession year. This trend is robust with respect to direction, but when adjustments are introduced the significance vanishes, while the overall pattern remains.[31] Thus, from these first results alone, proposition 1 cannot be rejected.

To continue, proposition 2 postulates that human capital is decisive for performance. This idea is advanced in column 7 of table 4 which displays the difference in means of performance between lower human capital (LHC) family successors and higher human capital (HHC) family successors. LHC family heirs seem to be responsible for the negative trend in performance of the family group with a highly significant performance gap of -1.90 percentage points, which remains robust up even after including all controls. Their performance declines by -1.42 percentage points, which in economic terms is equivalent to a decline of 20.9% of profit margin, while HHC family heirs manage to gain 7.1% PM.[32] Again, from these first results proposition 2 should not be rejected. One CEO successor interview partner (15) noted on this: *"One issue is that in an enterprise of this size the CEO has to be capable to understand and do virtually everything."*

In addition, companies which carefully and thoughtfully select a successor from an unconstrained candidate pool including various signals should be able to reduce the likelihood of selecting a "lemon" as compared to successor contest using a limited pool. Following this line of thought, we should expect that if these companies still picked an LHC candidate, then it is due to outstanding other merits of these candidates. As a result we should expect to detect a performance difference between family LHC successors and external LHC successors, which is evaluated in column 8 of table 4. The results are less clear, the observable difference is not significant. However the overall negative difference remains robust up to the inclusion of all controls: on average non-family LHC CEOs seem to perform 2.01 percentage points better than family LHC CEOs. Interestingly however, the company rating indicator highlights significant differences in column 8, which hints that relaxed selection processes for family CEOs might be the driving force for these results.

Furthermore, panel B inspects the overall amount of changes and thus allows us to advance proposition 5. In the interview 25 possible fields of changes are covered. The overall score of implemented changes is 8.36, which indicates substantial restructuring

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[30] For comparable results for large enterprises with lower levels of ownership concentration, we refer to Pérez-González (2006) who also finds that family successors perform worse as compared to non-family successors.

[31] We suspect that the significance might vanish due to differences in enterprise attributes in the succession year, which we address later using a propensity score matching.

[32] This result is not shown separately in table 4.

processes in most successions.[33] The general pattern observed for PM also holds robust for the changes implemented. Family successors implement significantly fewer changes (-1.58) than external successors. LHC family CEOs underscore HHC family CEOs by a highly significant difference of -1.68 changes and thus account for the general negative difference of the family group relative to the group of external successors. However, these results must be treated with caution, as the enterprises in the sample differ in their state at the time of the succession and the quality and adequacy of implemented changes in the business structure is not clear from this table alone. Nevertheless, proposition 5 should not be rejected from these results. One CEO successor interview partner (22) noted on post-succession changes: *"It does not help to refrain from tackling things. And that is a point where we all have learned. I mean I have learned, but also here in our enterprise: we had to learn this. The reason is that the topics and issues which have not been changed and been there for years are first which spring to ones mind when one asks oneself: where can I optimize? Here, you also have to be honest with yourself ask the question: why haven't we changed this in the last five years? We would have been so much more successful by now!"* Another CEO successor (10) noted: *"The internal organization was 30 to 40 years old and it was really time to overhaul it."*

In order to check the above results from further perspectives, panel C presents alternative performance indicators such as the development of the credit rating and the percentage change of the number of employees. On average we observe that enterprises where a succession has taken place grow substantially in terms of employees with an average increase of 20.7% and 36.7% above the industry trend, significant at the one percent level.[34] However, the difference-in-differences regarding the growth of the number of employees is -34.0 percentage points for family firms against externals, significant at the five percent level, while companies steered by LHC family successors seem to grow even more slowly.

In addition, the rating is particularly interesting, as it is the only forward oriented indicator available.[35] On average, the default probability rises in all enterprises, measured by an increase in the rating score by 3.17 score points. However it rose particularly strongly for family successions (5.44 points), while companies of external successors experienced only a slight deterioration of their solvency by 1.01 score points. When compared with the control group, we find that the industry-adjusted rating score rises for family successions by 3.67 score points on average, while external successors manage to improve their industry-adjusted rating by -0.50 score points on average. Considering the fact that external successors implement more organizational changes after the succession than family successors, external successors seem to cope with the amount of changes fairly well with respect to their company rating. As changes can increase default probability in the short

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[33] We left out the change product innovation due to low observations in this score.

[34] At this point we stress that our sample excludes enterprises which went out of business during a succession and is thus subject to a survivor bias.

[35] The Creditreform solvency-index scale reaches from 100, representing an excellent rating, to 600, indicating severe threats to solvency. We draw attention to the fact that various caveats lurk in the interpretation of the rating score, such as lagging-effects and a relation with the implemented changes for instance (Haveman, 1993). These reservations in mind, we emphasize these results with caution.

run (Amburgey et al., 1993, and Haveman, 1993), companies with a low changes score, such as family LHC firms, experience a lower increase in their rating as compared to firms with a higher change score, such as HHC family firms.[36]

One concern in interpreting the results of panel A to C of table 4 is that these successions consist of teams and single successors and that the heterogeneous constellations alone might drive the differences in performance. Panel D and E addresses these concerns and the results highlight that nearly identical values are reached for single successors and team successions, which leads us to reject the articulated concern.

In addition, it has been argued that family directors steer their firms with a long-run orientation (Le Breton-Miller and Miller, 2006, and Block and Thams, 2007). Possibly the long-run orientations of family members leads to a trade-off of present profits for higher profits in later periods.[37] To test this theory, we examine successions which took place between 2002 and 2005 and investigate the development between the year of the succession and the year 2009 to take a long run perspective.[38] Hence, the successors had four to seven years of time to actively influence the performances of the firms. However, a performance gap between family and non-family successions comparable to our previous findings is observable for the older successions as well. The results are presented in the table A2 of the appendix A2. We thus reject this argument in this context.

Another concern might be that the heterogeneity of the sample companies in the succession year might have driven these results. To address this concern, we employ a propensity score matching procedure (Rosenbaum and Rubin, 1983) to level the impact of differences in profitability (momentum) and sales (size) in the succession year. The treatment effect of the treatment (here: a family succession) on that which is treated (here: the succession enterprises) is then investigated (Angrist and Krueger, 1999). Heckman et al. (1997, 1998) investigate the performance of matching estimators. Amongst other things, results are best when data sources and definitions are similar and comparable for both the treated and the non-treated and when the propensity score can be estimated using many variables (Cameron and Trivedi, 2005). Our quasi-experiment meets these criteria and the results of the matching procedure using the STATA 12 psmatch2 nearest neighbor routine are presented in table 5. There remains a difference in differences in industry- and performance-adjusted PM of 1.607 percentage points between external and family CEO successors after the matching procedure, or in economic terms: family heirs manage to increase PM after controlling for industry- and performance-trends by 20% (between the succession year and the year 2009), while external successors manage to increase PM after controlling for industry- and performance-trends by 61% (between the succession year and the year 2009). This check reinforces and underlines the results of table 4, family successors seem to perform worse than external successors. However, regarding the previously strong differences in differences concerning the development of the number of employees in table 4, we see that the result of table

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[36] At a first glance, this may seem contradictory to the positive development concerning PM, but can be explained by the argument that productive change may entail a disruptive (and default risk increasing) effect in the short-run.

[37] This argument seems to be backed by the observation that family heirs introduce innovative products more often than externals (13.1 percentage points more than external CEOs at a statistically significant level, table 6).

[38] We excluded successions in the years 2006 to 2008.

TABLE 5—PROPENSITY SCORE MATCHING - NEAREST NEIGHBOR

Variable	Difference in industry- and performance-adjusted PM			Difference in industry- adjusted employees		
	Control = Succession type			Control = Succession type		
	Family	External	All except family	Family	External	All except family
	(1)	(2)	(3)	(4)	(5)	(6)
Observations (number)	175	78	162	203	88	182
Average years	3.5	3.7	3.4	3.5	3.4	3.3
A. Matched (ATT)						
Ind.& perf.-adj. Δ PM	1.385	2.991	1.941	16.217	25.924	27.603
Treatment difference	-	-1.607	-0.557	-	-9.707	-11.387
Standard error	-	(0.859)	(0.657)	-	(6.646)	(4.524)
B. Remaining bias in percent						
Lnsales	-	4.3	-5.9	-	-3.5	-10.7
(=size)	-	[47.2]	[9.1]	-	[38.7]	[-111.4]
Ind.-adj. PM	-	-0.6	-9.4	-	3.3	-6.3
(=momentum)	-	[98.3]	[67.4]	-	[89.1]	[74.9]

Note: The variables of interest are the difference in industry- and performance-adjusted profit margin (PM) and the difference in industry-adjusted number of employees between the succession year and the year 2009. The industry-adjusted variables are calculated by subtracting the median of the accordant year and industry (two-digit ISIC) of the control group from the variable of the sample. Industry- and performance-adjusted PM is industry-adjusted PM less the median industry-adjusted variable of the relevant control group, which are designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching industry-adjusted PM of the sample group with the according control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group and year then serves as a control for performance. Successions are categorized by succession type: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise, otherwise *External*, for successors with no previous ties to the enterprise; The values in square brackets display | bias | reduction in percent, using the *psmatch2* STATA routine. The probit model for treatment included the following predictors: Lnsales (1), industry-adjusted profit margin in the successor year (2), industry- and performance-adjusted profit margin in the succession year (3), interaction (1)*(2), interaction (1)*(3), interaction (2)*(3), and interaction (1)*(2)*(3). The values in parentheses display standard errors, assuming the propensity score is a precise estimate.

4 is to some extent driven by the heterogeneity, the remaining differences in differences in industry-adjusted employee growth rates are far less drastic, but still present.

But what drives these results? As we have seen in table 4, there exists a considerable difference in the number of changes implemented in the succession phase, which might indicate differences in managerial style or differences in the focus of actions. Following this thought, table 6 presents the observed changes during the successions.

It is striking to observe the high rates of changes in the core organizational structure, which indicate substantial reorganizational processes during successions. All core organizational functions (panel B of table 6) are changed at high rates, the lowest being production with 47.5%, while the marketing and sales department is even subject to changes in 65.3 of all cases. Furthermore, external successors implement substantially more changes in the core functional areas of the enterprises, as nearly all core organizational structures show statistically significant differences in change intensity. Externals also have a higher tendency to dismiss top managers or to renegotiate business contacts such as relations to suppliers, banks and financiers, while it is worth noting that they seem to create more jobs in terms of employee growth (table 4) and lose fewer previous customers as compared to family CEOs.

TABLE 6—SUMMARY STATISTICS OF OBSERVED MANAGERIAL ACTIONS AND CHANGES

		Succession type				Difference of means
Variable	All	Family	Enterprise	External	Hybrid	(2) and (4)
	(1)	(2)	(3)	(4)	(5)	(6)
Observed Changes (number)	8.4	8.0	8.1	9.6	9.0	-1.6***
	(0.15)	(0.20)	(0.34)	(0.33)	(0.52)	(0.38)
A. Labour organization (%)						
New executive directors	49.4	46.6	50.9	53.5	58.7	-6.9
Dropped executive directors	24.6	22.1	22.6	31.2	34.8	-9.2**
Flattened hierarchy	28.6	26.9	28.5	39.4	11.1	-12.5***
Steepened hierarchy	13.5	13.3	13.3	11.3	22.2	2.0
Working time policy	34.7	34.9	32.1	34.7	41.3	0.2
Compensation scheme	34.7	33.6	35.8	38.9	30.4	-5.3
B. Organizational structure (%)						
Purchasing	48.3	46.9	41.8	59.0	50.0	-12.1**
Production	47.5	44.2	44.2	59.9	53.3	-15.7***
Marketing and sales	65.3	61.7	63.9	76.9	68.9	-15.2***
Personnel	50.6	49.8	46.5	54.9	58.7	-5.1
Corporate finance & controlling	53.7	50.4	51.9	63.2	63.0	-12.8***
C. Products and innovations (%)						
Product innovation	40.6	45.2	37.1	32.1	34.5	13.1**
Additional products	59.1	58.3	61.0	58.3	63.0	0.0
Additional methods of production	50.8	50.8	47.8	52.8	54.3	-2.0
Sorting out of products (moderate)	30.0	30.1	26.6	33.0	30.4	-2.9
Sorting out of products (heavy)	2.9	2.2	2.5	4.9	4.3	-2.7
D. Business relations (%)						
New customers	84.8	83.3	85.5	86.7	91.3	-3.4
Loss of previous customers	24.4	27.0	20.9	20.8	21.7	6.2
New suppliers	54.8	54.6	52.2	58.7	52.2	-4.0
Dismissal of previous suppliers	34.3	32.4	28.7	43.0	44.4	-10.5**
New bank relations	16.0	13.6	16.4	23.6	13.0	-10.0**
New financiers	16.9	14.2	18.4	23.0	19.6	-8.9**
E. Geographical activity (%)						
Δ Regional markets	-2.8	-0.9	-1.9	-9.7	-4.3	8.8***
Δ National markets	2.7	1.5	0.6	9.0	2.2	-7.5**
Δ International markets	5.7	4.8	7.5	7.6	2.2	-2.8

Note: Successions are categorized into: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External*, for successors with no previous ties to the enterprise (column 4) and *Hybrid*, for multiple successors with differing backgrounds (column 5). Interviewees were asked to indicate post-succession changes of their enterprise in each of the subcategories from *A* to *D*. Each indicator variable is equal to 1 if a change was indicated and 0 otherwise. The geographical activity of the enterprise in the year of the succession and of the year 2009 were recorded in the interview. Category *E* presents the change per geographical subcategory. The stars display (Welch-Satterthwaite) significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

It is interesting to observe that family successors prefer a steeper hierarchy more than external successors, while externals successors seem to choose a different management approach by flattening hierarchies more often. Observe furthermore, that family successors have a higher tendency to innovate (product innovation) than externals. 45.2% of all family successions were flanked by innovations, which is significantly more compared to external successors. On average the companies in the sample tended to increasingly

serve national and international markets instead of local markets. This tendency is most pronounced amongst external successors, while family successors keep their focus more often on regional markets. The stronger appearance on these new markets could be reflected by the heavy rate of changes in the marketing and sales department by external successors, which implement changes in 76.9% of all cases.

Overall, this table shows that family successors implement fewer changes than the average of unrelated successors, which is in line with proposition 5.[39] Interestingly, enterprise successors accumulate the same number of changes as family successors, while external successors entail the highest number of overall changes.

C. *Differential Performance - Regression Analysis*

By performing a regression analysis including various controls we investigate what drives the results of the difference in difference analysis in more detail. The regressions are presented in table 7.

The dependent variables are the difference in industry-adjusted profit margin (PM) for columns 1 to 4 and the difference in industry- and performance-adjusted profit margin (PM) for columns 5 to 8. Our controls include firm size measured by the natural logarithm of sales in 07/2009 euros and momentum measured by industry-adjusted PM in the year of the succession for column 1 to 4 and by industry-adjusted PM plus industry- and performance-adjusted PM in the year of the succession for columns 5 to 8. Further firm controls include ownership, which is measured as an indicator variable of whether the successor owned shares of the enterprise in the year of the succession, and default probability which was measured by the score of the Creditreform solvency-index in the year of the succession.[40]

To account for further heterogeneity in the sample we introduce further controls with regard to the succession characteristics. These include: sudden and unexpected financing requirements and perceived investment delays to account for problematic starting conditions, the influence of the successor having an university degree and the activity of the predecessor. Furthermore, we decide to exclude roughly one percent of the observations to eliminate the influence of heavy outliers.[41]

Overall, we observe that the family successor indicator variable has limited and insignificant influence on performance. However, this variable must be interpreted in unison with the influence of the changes implemented and the human capital of the successors. Both variables entail a strong and highly significant influence: low human capital -1.23 (respectively -1.21 for columns 1 to 4) and ln changes 0.93 (1.15). Since family heirs implemented fewer changes and were equipped with lower human capital scores, the performance gap is thus also observable indirectly in the regressions. Thus proposition 1 cannot be rejected from these results.

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[39]At this point of the analysis, we do not want to overemphasize this result, because family heirs might have been equipped with better starting positions, thus less change might have been required.

[40]Note that all sample firms already have highly concentrated ownership structures due to the sample selection.

[41]We decide to exclude four observations due to high values using studentized residuals, Cook's D, DFITS and leverage to residuals squared plot inspections.

TABLE 7—REGRESSION ANALYSIS - DIFFERENTIAL ABNORMAL ENTERPRISE PERFORMANCE

| | Differential profit margin (PM) | | | | | | | |
| | Ind.-adj. ΔPM | | | | Ind.& perf.-adj. ΔPM | | | |
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family	-0.16	0.13	0.31	0.05	-0.21	0.06	0.32	0.01
	(0.451)	(0.443)	(0.602)	(0.462)	(0.440)	(0.465)	(0.617)	(0.468)
Ln changes	1.15***	-	0.95**	-	0.93**	-	0.71*	-
	(0.417)	-	(0.391)	-	(0.424)	-	(0.401)	-
LHC	-	-1.21***	-0.70	-	-	-1.23***	-0.63	-
	-	(0.455)	(0.685)	-	-	(0.460)	(0.730)	-
*Family * LHC*	-	-	-0.68	-	-	-	-0.86	-
	-	-	(0.914)	-	-	-	(0.971)	-
Nepotism	-	-	-	-1.74**	-	-	-	-1.95**
	-	-	-	(0.835)	-	-	-	(0.863)
Unplanned	-	-	-	1.93*	-	-	-	1.91*
	-	-	-	(1.051)	-	-	-	(1.094)
*Unplanned * family*	-	-	-	-0.05	-	-	-	-0.33
	-	-	-	(1.567)	-	-	-	(1.594)
Ln sales	-0.14	-0.06	-0.07	-0.09	-0.15	-0.04	-0.07	-0.07
	(0.246)	(0.236)	(0.245)	(0.238)	(0.254)	(0.240)	(0.253)	(0.241)
Ind.- and perf.- adj. PM	-	-	-	-	-0.31**	-0.26*	-0.31**	-0.25*
	-	-	-	-	(0.150)	(0.142)	(0.142)	(0.140)
Ind.-adj. PM	-0.30***	-0.28***	-0.29***	-0.29***	0.05	0.05	0.05	0.04
	(0.038)	(0.038)	(0.039)	(0.037)	(0.063)	(0.059)	(0.063)	(0.060)
Ownership	0.40	0.27	0.34	0.23	0.49	0.37	0.43	0.34
	(0.437)	(0.427)	(0.438)	(0.433)	(0.448)	(0.430)	(0.452)	(0.435)
Default prob.	0.06	0.03	0.06	-0.01	-0.07	-0.05	-0.07	-0.09
	(0.087)	(0.062)	(0.091)	(0.070)	(0.087)	(0.069)	(0.087)	(0.066)
Financing requirements	0.14	0.43	0.15	0.38	-0.16	0.02	-0.14	-0.05
	(0.557)	(0.549)	(0.556)	(0.550)	(0.568)	(0.554)	(0.568)	(0.557)
Investment delay	0.10	-0.07	0.13	-0.10	0.14	-0.02	0.17	-0.05
	(0.448)	(0.440)	(0.453)	(0.439)	(0.454)	(0.431)	(0.456)	(0.435)
University	0.07	0.05	-0.11	0.23	-0.01	-0.10	-0.20	0.09
	(0.495)	(0.477)	(0.492)	(0.476)	(0.504)	(0.481)	(0.503)	(0.478)
Predecessor active	0.52	0.54	0.56	0.55	0.57	0.54	0.59	0.54
	(0.475)	(0.443)	(0.478)	(0.446)	(0.484)	(0.447)	(0.486)	(0.450)
Years	-0.13	-0.10	-0.13	-0.08	0.07	0.11	0.07	0.13
	(0.110)	(0.106)	(0.111)	(0.105)	(0.112)	(0.108)	(0.114)	(0.108)
Observations	290	309	290	309	290	309	290	309
R-squared	0.2286	0.2214	0.2429	0.2259	0.0448	0.0503	0.0647	0.0564

Note: The dependent variables are the differences in industry-adjusted profit margin (PM) in columns 1 to 4 and differences in industry- and performance-adjusted profit margin (PM) in columns 5 to 8. The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Control groups for performance were designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted PM values of the sample with the accordant Amadeus decile in the year of the succession. The median industry-adjusted PM of the relevant control group and year then serves as a control. Successions variables are: *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Ln changes* is the natural logarithm of the sum of observed changes during the succession; *Low human capital* (LHC) indicates if the successor's human capital score (derived from the elements (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, (5) professionalism, and (6) motivation) is below the median score; *Nepotism* if the predecessor did only consider family members as successors; and *Unplanned* indicates if the succession was unplanned. Enterprise controls are: *Ln sales (size)* is the natural logarithm of sales in the year of the succession; *Industry-adjusted PM (momentum)* is PM in the succession year less the median PM of the accordant year and industry (two-digit ISIC); *Industry- and performance-adjusted PM (momentum)* is the industry-adjusted PM in the succession year less the median industry-adjusted PM of the relevant control group; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* represents probability of default based on the Creditreform solvency-index score of the enterprise in the year of the succession. Further controls are: *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; *Investment delay* is an indicator variable equal to one if an investment delay is observed; *University* is an indicator variable equal to one if the successor holds an university degree; *Predecessor active* is an indicator variable equal to one if the predecessor remains operatively active in a leading position and holds an ownership share; and *Years* is the time elapsed since the succession in years. Interactions between variables are marked via stars *. The values in parentheses display Huber-White robust standard errors.

Regressions 2 and 6 in table 7 advance proposition 2. The pattern mirrors the results reached by the difference-in-difference analysis section: Low human capital of the successor is significantly negatively (-1.23, respectively -1.21) related to performance. Furthermore, the underperformance is more pronounced amongst LHC family successors as compared to unrelated successors: the significance of the LHC variable in regression 3 and 7 vanishes, while the interaction term LHC*family is negative and of greater magnitude than the LHC variable alone (column 7). In turn, low human capital of a non-family successor seems to be far less detrimental to performance. To sum up, these results support proposition 2 and show that the negative impact of the human capital proxy is driven by LHC family heirs.

Regressions 4 and 8 in table 7 test propositions 3 and 4. The results are striking. Even with the inclusion of all controls, companies which strictly prefer family successors (nepotism) and thereby heavily limit the pool of candidates experience a significant decline in performance of -1.95 (respectively -1.74) percentage points in industry- and performance-adjusted PM (respectively industry-adjusted PM). In economic terms, this is equivalent to a decline of -48.75% of industry-adjusted PM compared to the succession year. This result mirrors the damaging effects of nepotism or, from another perspective, it mirrors the value of private benefits from seeing a family member steering ones family enterprise. It seems obvious, that in this case the succession contest rules embraced more than just picking the best in class.

Interestingly, unplanned successions are positively related to performance. This result is in line with the literature (Slovin and Sushka, 1993, and Hillier and McColgan, 2009) and with proposition 4. We suspect that this result is explained by the circumstance that less biased succession contests could be carried out in cases of unplanned successions. Furthermore we must keep in mind, that our sample is infected with a survivorship bias. Some unplanned successions might have resulted in complete shut-downs, which was not observed here.

Regressions 4 and 8 are thus supportive of propositions 3 and 4. Strongly concentrated ownership structures can thus lead to a limited CEO labor market competition due to favoritism which in turn damages firm performance.

The results furthermore show that firm characteristics, apart from momentum (industry- and performance-adjusted PM), do not predict differences in performance. Size (ln sales), ownership, and default probability are statistically insignificant. Furthermore, momentum is significantly negatively related to differential performance, which is a finding in line with the arguments for mean reversion or regression to mean.

Having arrived at these results, the next question that springs to mind is which attributes of the successors are especially beneficial for enterprise performance? This question might be most relevant for enterprises seeking to install quality criteria for successor selections. We approach this question by running regressions with the decomposed elements of the human capital score and other CEO attributes. The results are presented in table 8.

According to these results, it is significantly helpful for a successor to have studied in a management related field or, in the case of family successor, to have been prepared and

TABLE 8—REGRESSION ANALYSIS - HUMAN CAPITAL AND ENTERPRISE PERFORMANCE

Variable	Difference in industry- & performance-adjusted profit margin (PM)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Family	0.07	-0.08	-0.17	-0.10	-0.29	-0.77	-0.12	-0.22	-0.35	-0.43
	(0.445)	(0.484)	(0.424)	(0.405)	(0.427)	(0.469)	(0.430)	(0.408)	(0.547)	(0.648)
HHC	1.22***	-	-	-	-	-	-	-	-	0.74
	(0.456)	-	-	-	-	-	-	-	-	(0.676)
*HHC * *	-	-	-	-	-	-	-	-	-	0.68
family	-	-	-	-	-	-	-	-	-	(0.914)
Acquired	-	0.51	-	-	-	-	-	-	0.64	-
shares	-	(0.501)	-	-	-	-	-	-	(0.508)	-
Business plan	-	-	0.82*	-	-	-	-	-	0.64	-
	-	-	(0.426)	-	-	-	-	-	(0.440)	-
Age	-	-	-	0.54	-	-	-	-	0.21	-
	-	-	-	(0.448)	-	-	-	-	(0.629)	-
Merchant	-	-	-	-	0.61	-	-	-	0.85*	-
education	-	-	-	-	0.437	-	-	-	(0.450)	-
Educated for	-	-	-	-	-	1.07*	-	-	1.08*	-
succession	-	-	-	-	-	(0.610)	-	-	(0.616)	-
Industry	-	-	-	-	-	-	0.82	-	0.89	-
experience	-	-	-	-	-	-	(0.504)	-	(0.681)	-
Exec. board	-	-	-	-	-	-	-	0.20	-1.23	-
experience	-	-	-	-	-	-	-	(0.611)	(1.787)	-
Exec. bd. exp. *	-	-	-	-	-	-	-	-	1.18	-
family	-	-	-	-	-	-	-	-	(1.915)	-
Exec. bd. exp. *	-	-	-	-	-	-	-	-	1.47	-
external	-	-	-	-	-	-	-	-	(1.859)	-
Ln sales	-0.05	-0.08	-0.10	-0.08	-0.12	-0.12	-0.06	-0.10	-0.03	-0.04
	(0.227)	(0.228)	(0.227)	(0.233)	(0.230)	(0.228)	(0.238)	(0.233)	(0.232)	(0.227)
Ind.- and perf.-	-0.26*	-0.25*	-0.29**	-0.25*	-0.27*	-0.25*	-0.24	-0.26*	-0.24*	-0.26*
adj. PM	(0.142)	(0.143)	(0.143)	(0.144)	(0.143)	(0.142)	(0.143)	(0.144)	(0.140)	(0.141)
Ind.-adj.	0.05	0.04	0.06	0.04	0.05	0.04	0.04	0.04	0.06	0.05
PM	(0.059)	(0.059)	(0.060)	(0.059)	(0.059)	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)
Ownership	0.37	0.32	0.49	0.42	0.55	0.44	0.41	0.45	0.37	0.39
	(0.425)	(0.435)	(0.424)	(0.429)	(0.446)	(0.428)	(0.425)	(0.429)	(0.449)	(0.428)
Default prob.	-0.05	-0.05	-0.06	-0.05	-0.04	-0.04	-0.06	-0.04	-0.08	-0.04
	(0.069)	(0.071)	(0.069)	(0.065)	(0.074)	(0.068)	(0.067)	(0.069)	(0.071)	(0.070)
Financing	0.03	0.01	0.04	0.08	0.16	0.02	0.02	0.07	-0.02	0.06
requirements	(0.554)	(0.550)	(0.552)	(0.558)	(0.548)	(0.561)	(0.560)	(0.557)	(0.563)	(0.554)
Investment	-0.02	-0.03	-0.02	-0.01	-0.05	0.04	0.02	0.00	-0.02	-0.02
delay	(0.431)	(0.421)	(0.428)	(0.432)	(0.430)	(0.427)	(0.429)	(0.429)	(0.432)	(0.430)
Predecessor	0.54	0.51	0.63	0.52	0.48	0.47	0.52	0.50	0.60	0.51
active	(0.445)	(0.447)	(0.446)	(0.444)	(0.447)	(0.446)	(0.446)	(0.446)	(0.440)	(0.447)
Years	0.11	0.11	0.11	0.12	0.12	0.14	0.12	0.12	0.10	0.11
	(0.107)	(0.107)	(0.106)	(0.107)	(0.107)	(0.105)	(0.107)	(0.107)	(0.106)	(0.108)
Observations	309	309	309	309	309	309	309	309	309	309
R-squared	0.0502	0.0340	0.0412	0.0350	0.0365	0.0412	0.0411	0.0309	0.0793	0.0515

Note: The dependent variable is the difference in industry- and performance-adjusted profit margin (PM). The difference is calculated via: industry- and performance-adjusted PM of the year 2009 less industry-adjusted PM of the succession year. Control groups for performance were designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted PM of the sample with the accordant Amadeus decile in the year of the succession. The median industry-adjusted PM of the relevant control group and year then serves as a control. Successions variables are: *Family*, indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *High human capital* (HHC), indicates if the successor's human capital score (derived from (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, (5) professionalism, and (6) motivation) is above or equal to the median score of the sample; *Acquired shares*, indicates if the successor bought a share of the enterprise; *Business plan*, indicates the use of a business plan during the succession; *Age* is an indicator equal to zero if the age of the successor is below the median age; *Merchant education* is equal to one if the successor holds an university degree in business studies (or similar) or a degree of an university of cooperative education; *Educated for succession* is equal to one if the successor is a family successor with special company-relevant education; *Industry experience* is equal to zero if the successor's industry experience is below the median; *Executive board experience* is an indicator equal to one if the successor benefits from previous executive board experience. Enterprise controls and further controls are identical to table 7. Interactions between variables are marked via stars *. The values in parentheses display Huber-White robust standard errors.

educated as family successor (including a special company relevant education). Furthermore, if this knowledge is transferred into professional management practice (we use the proxy business plan, which is an advanced instrument including financial and liquidity plans, as well as strategic components) an additional significantly positive effect is observable. Remarkably, the above named success factors stay significant even after introducing various controls. Industry experience, successor ownership in the succession year and a high age are positive on average, but not significant and could thus be classified as weaker drivers for enterprise performance.

It is worth noting, as column 8 in table 8 shows that on average executive board experience is not strongly positively related to performance. However, the positive effect of this variable is dampened by the poor performance of enterprise successors. Family and external CEO successors perform better with respect to this variable as the interactions in column 9 in table 8 show. This may be indicative, that board experience in external companies is more beneficial than previous board membership in the predecessor's enterprise.

In addition, we may draw the attention of the reader to the regression results in column 10 in table 8. A post-estimation joint test for the variable HHC and the interaction term HHC * family is significant at the five percent level, while the sum of the coefficients of HHC and the interaction term HHC * family is 1.42, which is even greater than the HHC coefficient (1.22, significant at the one percent level) alone. This result is in line with the agency and the stewardship theories advanced in the theory section of this article and not astonishing at a second glance. This furthermore indicates that the overall underperformance of family successors must be attributed to the LHC successors, who appear more often in family succession due to relaxed selection criteria (favoritism). In line with this result we find that the difference-in-difference in industry- and performance-adjusted PM of family high human capital successors versus non-family high human capital successors is positive: 0.33 (standard error: 0.534), with a constant of 1.72 (standard error: 0.350). Moreover, high human capital family successors introduce nearly as many overall changes compared to non-family high human capital successors: -0.42 (standard error: 0.359), with a constant of 9.16 (standard error: 0.241).[42]

D. Discussion

The analysis above suggests that enterprises which promote weak family successors suffer from substantial declines in performance, which overshadow the potential benefits of the stewardship of family members. However, the results also show that family successors are not inferior per se, but reinforce the hypothesis that the concentrated ownership structures can lead to a limited scope of the CEO labor market contests (due to favoritism) which is potentially damaging to enterprise performance as "lemons" are picked more often. The damaging impact of favoritism became most evident, when we examined the performance of cases which only considered or allowed family members as successors. This danger to performance can be reduced if the selection of the suc-

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[42]These results are not shown in a separate table.

cessor follows qualitative criteria which could for instance be embedded in a company's governance codex or the family codex of a family firm.

Regarding this interpretation, one concern might be that firms of small size were forced to limit their successor candidate pool, since they might be unable to find an external successor. This concern is covered by the interview data directly: when asked why the enterprise was kept in the family only six of the 455 family successors answered that they were unable to find an adequate buyer. Another six successors answered that no agreement could be made on the price with potential buyers. Thus, only 2.6% of all family successions were strongly influenced by this argument. Hence, we reject this concern as minor.

Furthermore, unplanned successions could have led to time restrictions on finding other successors than family heirs. 37 of the 455 family successions were unplanned, which corresponds to 8.13% of the family successions within the limits of our sample. Here in three cases no buyer was found and in six cases no price agreement could be settled, which corresponds to 24.32% of all unplanned family successions. Thus unplanned successions introduce substantial difficulties to the transition process if no investor can be found for an executive-buy-out in time. But again, the fraction of family successions for which this was the case (2.0%) is negligible and cannot be made accountable on a holistic basis for the limitations of the candidate pool.

In addition, the summary statistics section indicates that more profitable enterprises tend to stay within family ranks, while difficult and doubtful investments tend to be passed to externals like a cuckoo's egg. From these findings the advice can be given that a thorough due diligence can play a very positive role in external successions.

VI.   Conclusion

Our results highlight that in enterprises with concentrated ownership control reduced selectivity and lower competition levels in CEO succession contests diminish post-succession enterprise performance. Overall, family successors achieve inferior results with respect to profit margin, number of employees, rating, human capital and the rate of change.

In detail, we find that high human capital and the rate of change are positively related to enterprise performance in successions. Furthermore, our results highlight that an university degree in business studies or a related field, the ability to put this knowledge into professional practice using a business plan, industry experience and experience as a member of the board in an external company are important performance drivers. Furthermore, for family CEOs a succession-relevant education including company specific knowledge is beneficial. In addition, the results indicate that management decisions are material for performance in this context. These results are robust to the inclusion of controls for industry effects, performance trends and company characteristics.

In addition, for family successors with high human capital no performance gap was observable. However, potential advantages of family successions, as discussed in agency and stewardship theories, are blurred and overshadowed by firms which promote family heirs with low human capital, leading to a general underperformance of family succes-

sors. Since lower human capital successors appear more frequently in family successions and the general lower performance of the family successors is due to low human capital successors, these findings reflect and are in line with nepotism theories. Moreover, and even with the inclusion of all controls, companies which strictly prefer family successors (nepotism) and thereby heavily limit the pool of CEO candidates experience a sharp decline in performance of -1.95** percentage points in industry- and performance-adjusted profit margin.

These results highlight the necessity of a thoughtful choice of successors, it may be vital for performance to accept external managers if the ability of family heirs is currently insufficient. Otherwise the human tradition of passing possessions and positions to the next generation, including the ownership and CEO position of a company, may endanger the performance or even the existence of the family firm. When asked why they became CEO, some CEOs answered in this fashion: *"It was definitely a family tradition"* (Interview partner 4, family CEO successor). But can this be immoral? On this, we refer to the words of the famous Roman statesman and constitutionalist Marcus Tullius Cicero in the opening quote of this article.

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Appendix

A1.   Detailed Sample Selection Information

The second filter employed in the Mannheim Enterprise Panel is designed as follows. A succession is likely if between 2002 and 2008:

1) a leading member of the executive board resigned, or

2) a new leading member of the executive board was appointed, or

3) a previous owner reduced his share, or

4) a new or previous owner (a natural person) increased his share, and

5) one of the previous owners and leading members of the executive board was at least 55 or older.

Due to the age restriction, this filter raises the chance of observing normal successions caused by high age, in contrast to successions caused by poor enterprise performance (John C. Coates IV and Reinier Kraakman, 2007). At the same time the filter serves as an upper boundary, since not all firms within the remaining population must necessarily have experienced a succession. Various motivations for changes in the ownership and management structure are imaginable. As a result a gross sample of 14,250 enterprises is extracted from the MUP database, which is then classified using the International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as activities of membership organizations (division 91) are not included. Furthermore enterprises for which no telephone

number is available in the MUP database are dropped (less than one percent). The filter also excludes take-overs by other enterprises (legal entities) during a succession, so that the observed population remains a population of enterprises with the concentrated ownership control attribute. Also unobserved are enterprises which went out of business or went through a re-foundation during a succession. The sample is thus infected by a survivorship bias. Hence, the results of this article are limited to the selected sample of surviving enterprises and are of limited holistic representativeness. However, these spatial boundaries of the selected sample do not seriously endanger the pursuit of the research objective of this article. The gross sample of 14,250 enterprises is contacted by the Center for Evaluation and Methods (CEM) using computer aided interview techniques (ZEW-Unternehmensbefragung "Generationenwechsel Mittelstand", 2010).

A2.   *Additional Tables*

The industry classification key for the industry aggregation employed is shown in table A1. The results of the long-run perspective for CEO successions and enterprise performance are presented in table A2.

TABLE A1—INDUSTRY CLASSIFICATION KEY

ZEW industry key	ISIC Rev. 3.1 code	ISIC Rev. 3.1 industry description
	(1)	(2)
1. Manufacturing	D	Manufacturing
2. Construction	F	Construction
3. Business services	K	Real estate, renting and business activities (without ISIC 70: real estate activities)
	O	Other community, social and personal service activities (only ISIC 90: sewage and refuse disposal, sanitation and similar activities)
4. Consumer services	H	Hotels and restaurants
	K	Real estate, renting and business activities (only ISIC 70: real estate activities)
	M	Education
	N	Health and social work
	O	Other community, social and personal service activities (only ISIC 92: recreational, cultural and sporting activities and ISIC 93: other service activities)
5. Wholesale & retail	G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
6. Other	I	Transport, storage and communication
	J	Financial intermediation

Note: For each aggregated industry cluster the key in form of the ISIC Rev. 3.1 code (column 1) and its description (column 2) is reported. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are not included. ISIC industry categories with no observations are not displayed.

TABLE A2—LONG-RUN DIFFERENTIAL PERFORMANCE OF SUCCESSORS

Variable	All	Succession type				Difference in difference Family versus External
		Family	Enterprise	External	Hybrid	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Profit margin indicators						
Observations	166	90	26	44	6	134
Δ Profit margin	0.28	-0.57	0.65	1.27	4.00	-1.84*
	(0.41)	(0.54)	(0.67)	(0.80)	(4.28)	(0.97)
Δ Industry-adjusted	-0.09	-0.71	0.25	0.89	0.65	-1.60
profit margin	(0.40)	(0.59)	(0.67)	(0.82)	(1.03)	(1.01)
Δ Industry- and performance-	1.47	1.11	1.49	2.21	1.20	-1.10
adjusted profit margin	(0.36)	(0.51)	(0.67)	(0.76)	(0.62)	(0.92)
B. Changes implemented score						
Observations	398	236	68	74	20	310
Changes (number)	8.87	8.47	9.05	9.81	9.50	-1.35**
	(0.21)	(0.27)	(0.53)	(0.46)	(0.88)	(0.54)
C. Additional performance indicators						
Observations	370	228	61	65	16	293
Δ Rating (score)	4.77	9.30	1.21	-4.20	-9.69	13.50**
	(2.15)	(2.75)	(5.15)	(5.44)	(6.34)	(6.07)
Δ Industry-adjusted	0.13	3.86	-0.79	-8.90	-13.00	12.75**
rating (score)	(2.15)	(2.75)	(5.20)	(5.33)	(6.61)	(5.98)
Observations	398	236	68	74	20	310
Δ Employees	21.52	12.31	17.69	54.38	21.65	-42.06**
(%)	(4.22)	(2.01)	(4.16)	(21.05)	(7.62)	(21.07)
Δ Industry-adjusted	27.66	24.94	33.56	32.14	23.34	-7.21
employees (%)	(1.69)	(1.95)	(4.09)	(5.18)	(5.44)	(5.52)

Note: The table presents the development between the succession year and the year 2009 and includes only successions between the years 2002 and 2005. Successions are categorized into: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 2); *Enterprise*, for unrelated successors who previously worked for the enterprise (column 3); *External*, for successors with no previous ties to the enterprise (column 4) and *Hybrid*, for multiple successors with differing backgrounds (column 5). The performance indicators presented are calculated via: (a) profit margin: earnings before taxes divided by operating revenue, (b) industry-adjusted variables: the subtraction of the median of the variable of the accordant year and industry (two-digit ISIC) from the variable, (c) industry- and performance-adjusted variables: industry-adjusted variables less the median industry-adjusted variable of the relevant control group, (d) changes implemented score: the mean of the sums of observed changes per enterprise (Score ranges from 0 to 25), (e) rating: based on the Creditreform solvency-index, and (f) number of employees: the growth of the firm's employees in percent. Control groups for performance are designed by sorting the industry-adjusted values of the variables of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted values of the variable in the sample with the according Amadeus decile in the year of the succession. The median of the relevant variable in the respective decile and year is then employed as a control. The stars display (Huber-White) significances at: * ten percent, ** five percent and *** one percent. Huber-White robust standard errors are reported in parentheses.

Chapter 2

Inside CEO Successions in Family Firms:
Should Predecessors Stay Active or Cultivate Roses?

By JAN-PHILIPP AHRENS, MICHAEL WOYWODE, AND JAN ZYBURA [*]

Employing an unique data set on CEO successions, we analyze the circumstances under which departing CEOs stay active within their enterprise subsequent to a CEO succession and highlight enterprise performance implications. We find that the likelihood of predecessor activity is increased by family succession, nepotism and tacit knowledge, but reduced by the successor's human capital, successor's ownership and corporate age. The performance impact of prolonged predecessor activity is positive for successors with low human capital, but turns negative with increased successor human capital, while this negative impact is amplified by the degree of influence of the preceding CEO.
(JEL: G32, G34, L25, M1, M51)
Keywords: CEO succession, firm performance, family-owned business, human capital, leadership transition

[*] Ahrens: University of Mannheim, School of Business Studies and Economics, Department of Business Studies, L9 1-2, D-68161 Mannheim, Germany, Tel: +49-177-656-2031, (e-mail: jahrens@mail.uni-mannheim.de). Woywode: University of Mannheim, School of Business Studies and Economics, Department of Business Studies, L9 1-2, D-68161 Mannheim, Germany, Tel: +49-62-1181-2894, (e-mail: mwoywode@staff.mail.uni-mannheim.de). Zybura: University of Mannheim, Center for Doctoral Studies in Business, D-68161 Mannheim, Germany, Tel: +49-176-21240641, (e-mail: jan.zybura@gess.uni-mannheim.de). Many thanks to Stefanie Ahrens, Robert and Margret Brownell and Andreas Landmann for helpful comments. Financial support from the Konrad-Adenauer-Stiftung e.V. and the Excellence Initiative of the German federal state government is gratefully acknowledged.

"All looked upon the throne, and heard and saw
Nothing but Jemshíd, he alone was king,[...]
Then proudly to his nobles he spoke,[...]:
"I am unequalled,[...] the universal voice
Declares the splendor of my government,[...]
And me the only monarch of the world."
-Soon as these words had parted from his lips,-[...]
His early grandeur faded:-[...] The day of Jemshíd
Passed into gloom, his brightness all obscured."

The Sháh Námeh (the book of kings), 997-1010 A.D., Firdausí[1]

I. Introduction

Organizations are often attuned to various aspects of their leaders ranging from be-
havior, norms and traditions to their strategy and performance (Miller and Dröge, 1986,
Sonnenfeld and Spence, 1989, Miller, 1990, Miller, 1993, Bigley and Wiersema, 2002,
and Bertrand and Schoar, 2003). This attunement is arguably strongest when the voting
majority and operative leadership are unified in one reign which is very often observable
within the ranks of family firms. The class of family firms is consequently a particu-
larly interesting object of research in the ownership concentration literature (La Porta et
al., 1999, and Anderson and Reeb, 2003).[2] Changes in organizational leadership, par-
ticularly CEO successions, have received enormous attention from various scholars. In
a remarkable way, CEO successions unify manifold aspects of several strands of eco-
nomic, psychological, anthropological and management research. This is possibly be-
cause a succession can have a big potential impact on a company's performance and
future prospects.

Previous research on firm performance in successions predominantly focuses on the
role of the successor. Various successor characteristics and influences, exempli gratia the
successor's human capital, his origin (family versus external) and the effects of inheriting
wealth and favoritism, have been explored (Smith and Amoako-Adu, 1999, Morck et al.,
2000, Pérez-González,2006, Bennedsen et al., 2007, Mehrotra et al., 2011, and Ahrens
et al., 2012). The findings highlight the crucial role of a thorough, honest and fair assess-
ment of a successor's leadership abilities. Despite these advances, there are astonishingly
few investigations into the role of the departing CEO, while further engagement of a de-
parted CEO within the company is indeed a common phenomenon (Handler, 1990, Dyck
et al., 2002, and Le Breton-Miller et al., 2004). However, the circumstances under which
a predecessor remains active subsequent to a CEO succession and the respective impli-
cations for enterprise performance are relatively uncharted territories. Furthermore, this
omission is surprising in the light of the growing literature on tacit knowledge (of the

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[1]Translated by Atkinson (1832).

[2]For a theoretical model of a constellation with a large shareholder and atomically scattered minority shareholders
we refer to Shleifer and Vishny (1986).

predecessor), but also astonishing with respect to the organizational inertia and change management literature (Hannan and Freeman, 1984, and Osterloh and Frey, 2000).

Predecessor activity often entails a reciprocal relation, a company may benefit from a former CEO, but also vice versa: to some CEOs the concept of retirement is threatening. Family business leaders are likely to develop a strong psychological attachment to the organization they have shaped and grown, especially if they are the company founders (Wasserman, 2003, and Adams et al., 2009). Just like the existence of an orchestra is a necessary condition for a conductor to create a fine piece of art, some CEOs need their business as a testimony of their virtuosity, and they become intertwined with the organization's identity.

The resulting wish of the departing CEOs to prolong their career and to maintain substantial influence in the firm (arguably private benefit maximization) may be pursued and realized given a concentrated ownership and control structure, which in family firms has often been held by the departing CEO. However, when private benefits are claimed too rigorously, this behavior can hurt enterprise performance and thereby the smoothness of the change of control (Johnson et al., 2000, Dyck and Zingales, 2004, Pérez-González, 2006, Villalonga and Amit, 2006, and Ahrens et al., 2012).[3]

The other side of the coin is that departing CEOs may possess an agglomeration of specific knowledge and unique status, which may be difficult to transfer and replace within a short period of time, especially family businesses are often highly idiosyncratic and their knowledge is in parts person-centric rather than institutionalized (Lee et al., 2003).[4] In line with this argument it has been argued that knowledge transfer is a central challenge in ensuring competent leadership succession (Cabrera-Suárez et al., 2001, and Le Breton-Miller et al., 2004). From such a knowledge transfer perspective, it may prove beneficial if predecessors prolong their stay on board rather than enjoying their sunset years by cultivating roses.

These clashing views on the merit of predecessor activity demonstrate a strong need to investigate the performance impact of the role of the CEO predecessors in CEO successions. Furthermore, to address a possible heterogeneity of predecessor roles, it is important to distinguish whether predecessors are still holding a title solely de jure, or whether they actively drive success while their designated successor is playing only minor walk-ons.

With these aims in mind, our article evaluates corporate performance following a succession by considering a matchless data set. We have information on 807 CEO successions in non-publicly traded medium sized enterprises with high ownership concentration and ownership control, including observations on various successor & predecessor attributes and enterprise performance. Employing approaches suggested by the firm performance literature strand (Barber and Lyon, 1996), we refine the performance data with

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[3]Exempli gratia, a CEO with an incomplete late life agenda could curb enterprise performance by pursuing a capital-intensive pet project, or a CEO with a pronounced desire to prolong his rule or status might want to install a tributary and powerless younger successor. After all, there are accounts of wrathful aging leaders heavily entrenching their control positions due to exuberant mistrust in the managerial capabilities of potential successors.

[4]In this vein, Smith and White (1987) show that corporations seem to select succession candidates who seem to be similar to the previous CEO and who understand and fit the current strategy best.

industry-adjustments and performance-matched adjustments to minimize the effects of industry and time trends, and to prevent potential mean reversion influence, but we also include arrays of often-employed controls for corporate attributes such as size, momentum, default probability and ownership structure in our analysis. In order to capture causalities and motivations not addressed by the quantitative empirical analysis, we furthermore carry out 22 qualitative in-depth interviews with CEO successors and experts.

This article offers empirical evidence that the likelihood of predecessor activity seem to be significantly positively influenced by a family origin of the successor, the presence of children of the predecessor, and nepotism. Furthermore, we find that industries with high levels of tacit knowledge (we use the intangibles-sales ratio as a proxy) seem to significantly positively influence the likelihood of predecessor activity. In contrast, successor ownership, high levels of successor human capital and time elapsed since the succession seem to be significantly negatively related with the likelihood of prolonged predecessor ability.

The results of Huber-White robust ordinary least squares (OLS) regressions highlight that the performance impact of predecessor activity, measured in industry- and performance-adjusted profit margin (PM), is significantly positive for successors with low human capital, but turns significantly negative with increased successor human capital, while this significant negative impact is amplified by the degree of influence of the preceding CEO. These findings are robust to the inclusion of an array of industry- and company-level controls. A two stage least squares instrumental variables (2SLS-IV) regression furthermore indicates that the OLS results are underestimated by roughly one percentage point in industry- and performance-adjusted PM, but that the pattern reported above remains. The results are relevant for entrepreneurs, banks, rating agencies, family business owners and successors. In addition, our results provide empirical support for knowledge which has so far only been based on anecdotal or case study related evidence.

The article is structured as follows: Section II provides a literature overview, while in section III the main propositions and hypotheses are derived. Section IV provides information on the sample selection. Further, section V comprises the underlying data analysis, which is then discussed in section VI. Section VII is dedicated to a brief conclusion.

II.   Related Literature

Successions are covered in manifold strands of literature. This review focuses on the research related to the activity of the predecessor. In large companies a replaced CEO often leaves the company for good, whereas there are reports that it is quite common for CEOs of family businesses to stay active within the company in a different role for some time after succession, particularly, if they are the founder of the business (Wasserman, 2003).[5] This prolonged activity may be regarded as a period of adjustment and mentoring (Vancil, 1987, Handler, 1990, Dyck et al., 2002, and Le Breton-Miller et al., 2004).

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[5] Interestingly, many corporate governance codices often recommend a cooling-off period of more or less two years before taking another board position within the same company.

However, Dyck et al. (2002) develop propositions that challenge what they refer to as an "accepted mantra" that overlap between incumbent and successor is always good.

Prolonged activity of the predecessor may be helpful, because there are accounts that not always the most suitable successor is chosen (Dawson, 2011).[6] Accordingly, a categorization of successors by Levinson (1974) also includes types such as the "loyal servant" or "the false prophet". The "loyal servant" leaves the old leader in charge and follows suit and reveals incompetent leadership, whereas the "false prophet" does not display the competence required to rise to the challenges of the role as CEO. In such circumstances a prolonged predecessor activity might mitigate potential negative implications for enterprise performance due to inferior ability of the successor.

By contrast, among the Levinson (1974) categories one can also find the "watchful waiter" successor. The "watchful waiter" is an external star performer, who might even be in charge "de jure", but who is not granted full decision-making power and responsibility, while the predecessor still has the say in the company. Founders in particular often have difficulty giving up what they have built up (Levinson, 1971, Churchill and Lewis, 1983, and Kets de Vries, 1985). Accordingly, the literature highlights that for some family enterprise CEOs barriers to retirement and succession include a substantial loss in terms of heroic stature, mission or even identity and life-task (Barnes and Hershon, 1976, Sonnenfeld, 1988, Handler, 1990).[7] However, in the long-run it is not sufficient for a shift of power and authority to occur pro forma only, but de facto. In addition, in such conditions a prolonged activity of the predecessor might even be an impediment to vital change and enterprise performance, as openness and responsiveness to change stimuli are potentially diminished under the incumbents CEO's prolonged reign (Hambrick and Fukutomi, 1991).

Successions, if they are not unplanned due to sudden death or illness of the predecessor, are not usually a static event but an evolutionary process in which the old executive phases out and his successor phases in (Vancil, 1987, and Handler, 1990). In a systematic literature review of successions in family-owned businesses, Le Breton-Miller et al. (2004) provide a synthesis of common predictors of successful successions. Following

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[6]A key question when determining potential successors in the realm of succession planning is whether to decide for or against a family member as a successor (Le Breton-Miller et al., 2004). For family firms this question possesses strong theoretical links to ownership and control related issues that are embedded in the literature strand of theory of the firm (Jensen and Meckling, 1976, Demsetz and Lehn, 1985, Shleifer and Vishny, 1986, Demsetz and Villalonga, 2001, and Villalonga and Amit, 2006). Ownership structure and agency problems can be regarded as focal (Jensen and Meckling, 1976, Fama, 1980, and Schulze et al., 2001), as in small to medium-sized enterprises with a usually rather strong ownership concentration, CEOs and owners can install successors almost omnipotently. The successor's ability to signal his skills in an inter-firm CEO labor market (Fama, 1980) can be considered as a career ladder contest in the manner of Lazear and Rosen (1981) and Rosen (1986), which makes signaling theory (Arrow, 1973, and Spence, 1973 and 1974) and the contest literature important theoretical foundations. In family firms especially the extent to which a contest takes place to recruit the best talent is not that clear-cut. Some family successors are chosen on the basis of nepotism, gender, or birth order rather than on economic criteria based on the future firm performance such as skill, experience and education (Dyer, 2003, and Dawson, 2011). Due to nepotism, family firms may select unqualified successors from a restricted successor pool, which in return leads to detrimental firm performance (Burkart et al., 2003, Pérez-González, 2006, Hillier and McColgan, 2009, and Ahrens et al., 2012).

[7]In this vein, studies of retirements have highlighted the role of internal and external continuity for aging individuals. Individuals seek internal continuity through ongoing reinforcement of their personal identity, self-esteem, and ego strength, whereas external continuity is fostered through predictable social responsibilities, relationships, and roles (Atchley 1989).

their analysis, key characteristics are successor and incumbent-centric factors, a shared vision, succession planning, hand-over of power, the development of successors, family relationships, and the presence of outside directors on the board (Le Breton-Miller et al. (2004).

From a more holistic perspective there are two central aspects to succession processes in family-owned businesses: the transition of leadership and the transition of ownership (Le Breton-Miller et al., 2004). Firstly and referring to transition of leadership, Sharma et al. (2003) put forward that if the incumbent does not reveal a propensity to step aside and does not effectively formulate and convey a succession plan and respective transition of leadership, a potential successor could lose interest in the firm. Handler (1990) points out that the predecessor should gradually reduce his influence and the manifest habits of his old leadership paradigm. If there are no clearly defined roles (Handler, 1990) and the independence of the successor's actions are not ensured, this may result in frustration of the successor leading to inferior performance (Lansberg, 1988, Dyck et al., 2002, and Le Breton-Miller et al., 2004).

Secondly, the transition of ownership is further complicated by the often concentrated ownership structures in many family firms. From a theory of the firm perspective (Jensen and Meckling, 1976), strong ownership safeguards incumbents from potential intrusion by outside managers competing for their position. Thus, Boeker and Karichalil (2002) argue that ownership increases the incumbents' ability to remain in place and lowers the likelihood of their departure. Furthermore, it is argued that ownership is a driver of long-term orientation and status endowment (amenity potential) of family CEOs (Demsetz and Lehn, 1985, and Le Breton-Miller and Miller, 2006), while some CEOs might be reluctant to relinquish their status (Sonnenfeld, 1988). A smooth phase-out may be facilitated when the predecessor finds other ways of satisfying his personal and psychological needs with a activities or a plan of a future outside the enterprise (Sharma et al., 2001).

Furthermore, a period of parallel activity might be favorable from a knowledge management perspective. The predecessor's knowledge of doing business in his particular enterprise is of idiosyncratic nature. The literature indicates that a close relationship and mutual respect between the successor and the predecessor may promote knowledge exchange and be vital in successions (Handler, 1990, Morris et al., 1997, Cabrera-Suárez et al., 2001, Dyck et al., 2002, and Le Breton-Miller et al., 2004). Furthermore and regarded from a resource-based and dynamic capabilities perspective, specialization of managerial skills to firm-specific needs may constitute an unique capability and a hard to imitate resource, which may be a source of competitive advantage which allows the respective firm to outperform its competitors (Barney, 1991, Castanias and Helfat, 1991, Teece et al., 1997, Helfat, 2000, Cabrera-Suárez et al., 2001, and Boeker and Karichalil, 2002).

Although there exists a large body of literature on successions, remarkably little research has been conducted (no study to our knowledge) explicitly on the activity of the departing CEO and the resulting performance impact. As this question is arguably very important for older practitioners seeking empirically supported advice for their family

enterprise, this omission becomes even more astonishing. This article addresses this gap in the literature by asking two main questions: What drives prolonged predecessor activity and what is the respective enterprise performance impact of prolonged predecessor activity?

III.   Theoretical Considerations and Derived Propositions

A.   *Categories and Definitions*

In the following, we shall briefly discuss the terminology and categories employed in the article, which, in general, follows the terminology and classifications employed in Ahrens and Woywode (2012) and Ahrens et al. (2012,b). To start with, this article focuses on owner-controlled family firms, thus firms with a "concentrated ownership control" attribute, which we take to be present if a maximum of three natural persons own more than 50% of the respective enterprise and at least one of these owners is a leading member of the executive board. Furthermore, we create the dimensions of the "role" of the predecessor, "human capital" of the successor, "origin" of the successors, and "nepotism", which serve as succession categories in the analysis to follow.

To be more specific, we categorize and distinguish between the following roles of the predecessors within their respective companies after the succession: *active & responsible owner*, for predecessors who hold shares and exercise leadership functions; *passive owner*, for predecessors who hold shares but exercise no leadership functions; *board member*, for supervisory board membership; *coach & consultant*, for a coaching or consulting role; *key account holder*, indicating the management of a special group of key customers; *special tasks*, for predecessors who support their expertise in special tasks (or/and manage them); *common employee*, for predecessors who adopt the role of a common employee; and finally, *other role*, if the role of the predecessor does not fall into the other categories. Furthermore, as some predecessors fulfill some roles simultaneously, a score of the predecessor's *degree of influence* is created, which sums up all the roles of the predecessor, but weights *active & responsible owner* by three, *board member* by two and all other roles by one.

Within the "origin" dimension we differentiate between the following successor backgrounds: *family*, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *enterprise*, for unrelated successors who were previously employees of the enterprise; *external*, for successors with no previous ties to the enterprise, and *hybrid*, for multiple successors with differing backgrounds.

The "human capital" dimension is mainly covered through the creation of a human capital score which serves as a proxy of the successor's true ability (see also Ahrens and Woywode, 2012, and Ahrens et al., 2012,b). In detail, the human capital score for each successor is derived from the sum of five elements, which includes the following indicator variables: (1) age above median (of the successors in the sample, proxy for general experience); (2) industry experience above median (proxy for industry related experience); (3) leadership experience (proxy for practical managerial skills); (4) merchant education, if the successor holds an university degree in business studies (or strongly

related field) or was educated at an university of cooperative education (proxy for theo-retical managerial skills); and (5) use of a business plan during the succession (proxy for professional managerial skills).

Following Murphy and Zábojník (2004), the choice of proxies reflects the idea that general managerial skills became more important for CEOs over the last three decades due to the progress in management science, corporate controlling and finance and other arts, which, if mastered by the CEO, contribute substantially to the CEO's ability to steer a company. Furthermore, Murphy and Zábojník (2004) argue that company specific knowledge has become more accessible to managers due to the progress of the digital age over the last 30 years, when compared to earlier decades. We argue that leadership experience, a degree in business studies and the ability to apply this knowledge using ad-vanced professional instruments, such as a business plan (which includes a strategic plan, but also an earnings forecast and a finance- and liquidity-plan), are acceptable proxies for such general managerial skills. An investment in "education in general management" is easier to obtain for more gifted and able individuals making it a valuable signal of higher ability (Spence, 1973, Arrow, 1973, and Spence, 1974), while we use the business plan indicator variable to ensure that the general managerial skills acquired are being used as opposed to being a signal only. Furthermore, the small business literature highlights the crucial role education in business studies and managerial skills for the success of small businesses (Ibrahim and Goodwin, 1986). This argumentation regarding education is in line with findings in the succession literature (Morris et al., 1997, and Le Breton-Miller et al., 2004).

In line with human capital theory we argue that productivity-augmenting investments in human capital can also take place in the post-education phase (Mincer, 1974, and Strober, 1990). Following this thought, we include three forms of experience as measures for CEO relevant human capital investments acquired through "on-the-job-training". To begin with, Mincer (1974) highlights that the time distribution of these investments cre-ates an age variation in earnings (known as the age profile) resulting in a positive corre-lation between age and earnings, which can arguably be seen as remuneration for higher ability due to experience. In this vein, we use age as a proxy for general experience which may in parts be relevant for the job of CEO.[8]

Arguably, a very relevant investment with respect to building up CEO relevant human capital is leadership experience. The succession literature highlights that proven skills, such as previous leadership experience, generate credibility and are vital in successions (Barach et al., 1988, Barach and Ganitsky, 1995, Chrisman et al., 1998, and Le Breton-Miller et al., 2004). In addition, we also include a company specific proxy for industry experience, which approximates potential advantages due to learning the specific "tricks of the trade" of the industry in which the respective enterprise operates. This allows us also to include external CEO successors into the company specific knowledge measure, which would not be possible by definition if we measured the experience within a re-

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[8]Mincer (1974) shows that this effect diminishes with higher age and eventually becomes negative, similar to an inverted u-shape. Furthermore, Miller (1991) highlights that seasoned CEOs may become "stale in the saddle" and less effective. However, the average age of the CEO successor falls into the increasing section of this inverted u-shape, which is why we neglect diminishing marginal effects in the higher ages.

spective enterprise. Finally, we work with a sum of the above five elements, because many combinations of the above proxies may lead to "Rome", id est a true higher ability as a CEO successor.

As nepotistic tendencies might lead to a prolonged activity by the predecessor, we also include a dimension which covers nepotism. In detail, we follow the measure derived in Ahrens et al. (20012,b) and distinguish between *strong nepotism* and *weak nepotism*. *Strong nepotism* refers to succession in which the predecessor only considers family members as successors. Furthermore, *weak nepotism*, is employed as a category for succession in which the predecessor also considers non-family members as successors, but decides to install a family member with a lower human capital score than the "average achievable" human capital score of managers available in the respective industry of his enterprise.

Put differently, this category measures the lack of favorable attributes of the successor, which the predecessor has accepted in the case of a family succession. Here, the term "average achievable" human capital score serves as a benchmark. It is created by making the assumption that there are no effects of nepotism when the enterprise is handed over to a non-family successor and by inferring that on average this level of human capital is achievable by all firms in this industry within the limits of a normal search for a non-family CEO successor.[9]

B. *Propositions: The Activity of the Predecessor*

Many family entrepreneurs wish to see family heirs steering the fortunes of their business and that the family wealth is secured and procured when they retire (Kerkhoff et al., 2004). In line with stewardship theories, if a family heir takes the new lead, then a predecessor may be intrinsically motivated to remain active in the enterprise as he derives utility or amenity potential from staying on board (Demsetz and Lehn, 1985, and Davis et al., 1997). Furthermore, it is well known that ensuring family leadership across generations is a central challenge that many family-owned businesses fail to overcome due to poorly managed successions (Morris et al., 1997, and Miller et al., 2003). Morris et al. (1997) argue that among the core triggering events, which are capable to destabilize an otherwise stable family enterprise system, are the decision to bring a family member into a senior position, to pass on the position as CEO and the founder's decision to disengage completely. Therefore, in order to ensure the prosperity of the business and a smooth succession, we suspect that predecessors tend to stay active more often in family successions as compared to external successions in which the predecessor is not intrinsically motivated.

PROPOSITION 1: *The likelihood of post-succession activity by the predecessor is higher in family successions as compared to external successions.*

Another angle of consideration is to ask whether the predecessor has children or not. Apart from the argument that a predecessor may be intrinsically motivated to guide and

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[9]For calculating the industry benchmarks we employ an aggregated version of ISIC industry classifications consisting of 6 categories (Appendix A2) as we only have 807 observations.

accompany his children into his footsteps, there are two further theoretical aspects which may lead to a prolonged activity by predecessors with children: Firstly, when compared to retirement, keeping an active role within the enterprise may ensure more income stability for the predecessor, which might be more important for predecessors which raise children as compared to predecessors with no children. Secondly, predecessors with younger children might possibly install interim managements, which they guide actively until the next family heir is old enough and experienced enough to become the new CEO. For these three reasons we argue that predecessors with children are more likely to retain an active role compared to predecessors with no children.

PROPOSITION 2:   *The likelihood of post-succession activity by the predecessor is higher for predecessors with children compared to predecessors without children.*

Among many others, one of the reasons why families hand over their firm to their kin is nepotistic preferences (Levinson, 1971, Beckhard and Dyer, 1983, and Barach et al., 1988). In turn, nepotistic predecessors, apart from the private benefits of seeing a family heir steering the fortunes of the former enterprise, might also derive utility from prolonging their activity within a family-steered enterprise. We therefore suspect that nepotistic successions positively increase the predecessor decision to stay on board.

PROPOSITION 3:   *The likelihood of post-succession activity by the predecessor is higher for nepotistic successions compared to successions without nepotistic traits.*

In a pioneer essay on the implications of knowledge distribution for economic theory Hayek (1945) argues that practically every individual is endowed with certain specific knowledge that he can make beneficial use of in gaining some advantage over all others. As a consequence certain decisions are thus left to this individual or require this individual's cooperation in order to access the specific knowledge. Translated to the family firm succession context, the predecessor's knowledge is intangible and often hard if not impossible to access, in other words tacit. However, for successors a transfer of knowledge, especially of tacit knowledge, is critical, because quite often the new CEO enters office at a disadvantage with regard to facts, trends, contacts, procedures and task-specific knowledge (Hambrick and Fukutomi, 1991). Murphy and Zábojník (2004) argue that the computer age has made firm specific knowledge more accessible, but we hypothesize that this argument does not hold for tacit knowledge. In businesses with a high degree of tacitness in terms of idiosyncratic knowledge, we hypothesize an implication of prolonged activity by the predecessor to transfer this knowledge in order to keep it accessible. As a proxy for high idiosyncratic and tacit knowledge, we employ the intangibles-to-sales ratio of the respective industry (at the two-digit ISIC level) as an indicator.

PROPOSITION 4:   *The likelihood of a post-succession activity of the predecessor is higher in industries with high tacitness as compared to industries with low tacitness.*

Furthermore, we suspect that the successor's human capital plays a major role in predecessor activity as the human capital of the successor is found to be positively related

to a smooth leadership transition and post-succession performance (Morris et al., 1997, Le Breton-Miller et al., 2004, Pérez-González, 2006, and Ahrens et al., 2012). Strong successors equipped with a high level of human capital possibly strive for independence, which results in calls for a clearly defined or reduced role of the predecessor (Handler, 1990) to prevent potential frustration (Dyck et al., 2002, and Le Breton-Miller et al., 2004). However, there are accounts that the most suitable and capable candidate is not chosen in all cases (Pérez-González, 2006, Dawson, 2011, and Ahrens et al., 2012). When the ability of the successor is limited, a prolonged activity by the predecessor can be regarded as a mediating period of adjustment and mentoring (Handler, 1990, Dyck et al., 2002, and Le Breton-Miller et al., 2004). Reflecting the above considerations, we suspect that higher human capital of the successor is negatively related to the likelihood of the predecessor to remain active.

PROPOSITION 5:   *The likelihood of post-succession activity by the predecessor is negatively related to the successor's human capital level.*

Arguably, there are two central aspects to succession processes in family-owned businesses: the transition of leadership and the transition of ownership (Le Breton-Miller et al., 2004). The transition of ownership has received substantial attention in the literature (Boeker and Karichalil, 2002). In line with an agency-theory perspective (Jensen and Meckling, 1976) it could be argued that strong ownership has an insulating effect on managers and their positions within firms. Ownership endows family CEOs with status and a long-term orientation (Le Breton-Miller and Miller, 2006), while the barriers to retirement for a departing CEO may include a substantial loss in terms of status or mission (Sonnenfeld, 1988, and Handler, 1990). Furthermore, Boeker and Karichalil (2002) argue that ownership increases incumbents' ability to remain in place and lowers the likelihood of their departure.[10] Reflecting the above theoretical argument, we suspect that if ownership is transferred to the successor this lowers the barriers to retirement of the predecessor and lowers the likelihood of post-succession activity by the predecessor.

PROPOSITION 6:   *The likelihood of post-succession activity by the predecessor is negatively related with enterprise ownership of the successor.*

We suspect that prolonged activity by the predecessor will reduce over time. More explicitly, if successions are not unplanned due to sudden death or illness of the predecessor, successions are usually not a static event but an evolutionary process in which the old executive phases out and his successor phases in (Handler, 1990). In addition to obvious biological reasons for a reduced role of the predecessor, it can be argued that once the predecessor steps aside he may become increasingly less connected to the beat of the market and the organization due to his reduced degree of involvement. Furthermore, there is evidence that a CEO's effectiveness may deteriorate over time, they may become "stale in the saddle" and their performance over time may follow an inverted u-shape,

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[10]The research of Boeker and Karichalil (2002) concentrates on founder CEOs in new ventures. We argue that there may be an analogy with our context.

thus some CEOs may even become impediments to change after they have passed the prime of their career (Hambrick and Fukutomi, 1991, Miller, 1991, and Virany et al., 1992, Henderson et al., 2006).

PROPOSITION 7:   *The likelihood of post-succession activity by the predecessor is negatively related to the time passed since the succession.*

C.   *Propositions: The Performance Impact of the Activity of the Predecessor*

The proposed reasons and circumstances which prevent the predecessor from "growing roses" and induce them to remain active are of manifold nature. Therefore, we also expect the effect of prolonged activity by the predecessor on enterprise performance to be related to diverse contingencies, especially the human capital and the origin of the successor.

From a theoretical perspective, it might be argued that a period of guidance and mentoring is generally in the first place helpful in many successions. From a resource-based perspective, the predecessor's firm-specific managerial skills and his tacit knowledge may constitute a source of competitive advantage (Castanias and Helfat, 1991, and Boeker and Karichalil, 2002). We argue that an information or skill gap between the predecessor and the successor may be gradually bridged in a phase of parallel activity and specific idiosyncratic knowledge or management techniques may be transferred, which could lead to a subsequent performance impact.

PROPOSITION 8:   *The performance impact of a post-succession activity of the predecessor is positive.*

However, we suspect that this primary effect is subject to diverse relations and contingencies. For example, if the human capital of the successor is low, then the predecessor's activity might compensate for the successor's shortages in management ability leading to a positive performance impact. For a strong and experienced successor an information or skill gap may be non-existent. Furthermore, successors often spark vital organizational change (Miller, 1993) and successors with high human capital have been reported as unleashing higher levels of change compared to successors with low human capital (Ahrens and Woywode, 2012). There may be many reasons why profound organizational change may spark resistance from the predecessor and lead to internal conflicts.[11] Furthermore, there are accounts in the literature that older CEOs may become impediments to change after the prime of their career (Virany et al., 1992). Furthermore, if the predecessor does not convey readiness to step aside in such conflicts and if the role definition (Lansberg, 1988, and Handler, 1990) is not clearly cut, then the successor might suffer from frustration and lower motivation, which may result in inferior enterprise performance (Dyck et al., 2002, Sharma et al., 2001, Sharma et al., 2003, and Le Breton-Miller et al.,

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[11] Among the reasons for resistance to change (Coch and French Jr., 1948) might be in this case differences in vision, leadership style, responsibility and emotional ties and past experiences, which may be supported by organizational inertial forces of structural and environmental embeddedness (Hannan and Freeman, 1977, and Hannan and Freeman, 1984).

2004). Collecting the above arguments into a proposition, we suspect that the interaction between high human capital and predecessor activity entails a negative performance impact.

PROPOSITION 9: *The interaction between a high human capital successor and predecessor activity entails a negative performance impact.*

Arguably, enterprise successors who previously served under the reign of the predecessor are in the weakest position to emancipate themselves in order to act as a catalyst for change and to manage potential conflicts with the predecessor effectively. Arguably, they may even have learned their key managerial skills within this enterprise and they potentially may be subject to emotional and organizational ties. Furthermore, their past subordinate position may involve them suffering deficits in respect from the predecessor, while a lack of mutual respect is known to be detrimental in successions (Handler, 1990, and Morris et al., 1997). By contrast, high human capital family successors may be capable of shielding the enterprise from conflicts by discussing them in conversations "over the kitchen table" within the ranks of the family[12], whereas high human capital external successors have no constraints due to ties to the organizational past or organizational relations, plus they might be equipped with superior knowledge and solutions from outside the realm of the enterprise. We therefore suspect that if the change, which high human capital successors are highly likely to spark, leads to conflicts with the predecessor, then these conflicts will be largest among high human capital enterprise successors, as compared to family or external successors.

PROPOSITION 10: *The triple interaction between family successor, high human capital successor and predecessor activity entails a positive performance impact.*

PROPOSITION 11: *The triple interaction between external successor, high human capital successor and predecessor activity entails a positive performance impact.*

IV. Sample Selection

Our data set is built on several pillars: (1) the Mannheim Enterprise Panel (MUP), (2) the Bureau van Dyjk Amadeus database (Amadeus), (3) the Hoppenstedt database, (4) the Creditreform solvency index information, (5) the German Bundesbank database, (6) standardized computer aided telephone interviews, (7) non-standardized direct interviews, and (8) web-searches.[13]

Our sample selection begins with an extraction of a population of owner-controlled enterprises from the MUP database. In detail, in order to extract the corporations we employ the following filter for the years 2002 to 2008:[14]

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[12]For example, Le Breton-Miller et al. (2004) provide a synthesis of predictors of successful successions which include, among others, a shared vision (Lansberg, 1999) and a close family relationship (Lansberg, 1988), which may also be a favorable surrounding for conveying knowledge (Cabrera-Suárez et al., 2001).

[13]The Mannheim Enterprise Panel is maintained by the Centre for European Economic Research (ZEW) and includes over 6 million enterprises. The Creditreform solvency index information is employed to approximate default probabilities from company ratings, while the German Bundesbank data are used to adjust for inflation. The data set was also employed in Ahrens et al. (2012), Ahrens and Woywode (2012), and Ahrens et al. (2012,b).

[14]We exclude earlier years because MUP data from earlier than 2002 are less complete and reliable.

1) 30 to 1,000 employees, and

2) going concern, and

3) possessing the concentrated ownership control attribute.

A second filter is applied to identify and extract succession events.[15]

We gather financial data and impute missing values using the following hierarchy: 1. MUP information, 2. Amadeus information, 3. Creditreform solvency index information, 4. Hoppenstedt information, and 5. web-searches. In addition to the sample group, a control group of 187,388 company-year observations is employed using the Amadeus database.[16] By employing Bundesbank information on inflation we adjust and harmonize all euro values in the sample and control group to 07/2009 euros.

The sample companies are contacted devising a standardized computer-aided telephone interview. Furthermore, we required each interviewee to suit the following criteria:

1) the interviewee is a successor, and

2) the interviewee is a leading member of the executive board, and

3) the interviewee holds an ownership fraction of the enterprise, and

4) the succession took place between the years 2002 and 2008.[17]

This procedure yields a total sample of 804 observations of CEO successions. The interview includes the following information nexi for our research objective: (a) succession type, (b) human capital of the successor, and (c) enterprise performance. The succession type nexus delivers information on prolonged activity by the predecessor, which includes his new role (e.g. active & responsible owner, passive owner, board member, coach & consultant, key account holder, special tasks, employee, or other) and the successor's origin (e.g. family, enterprise or external).

The successor's human capital is measured using proxies derived from the second information nexus of the interview which includes information on the successor's (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism.

Information on the enterprise performance are derived by employing classical accounting indicators such as profit margin (PM), number of employees and credit rating score measured in the succession year and 2009. We flank these accounting variables with additional information on the state of the company, which include unexpected post-succession financing requirements and perceived pre-succession investment delays. The data set is analyzed using the STATA 12 software.

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[15]We refer to appendix A1 for specific information.

[16]The control group enterprises are required to be of a size between 30 up 1,000 employees and the accounting data cover the same time horizon (2002 to 2009) as the sample group. Furthermore, we excluded unconsolidated sister statements (Amadeus consolidation code U2) and duplicates.

[17]In detail, the year in which the successor was appointed as a leading member of the executive board.

Besides the 804 standardized interviews, we also record 20 successors and two experts using non-standardized in-depth interviews. These in-depth interviews are unrepresentative, but provide an additional source for the interpretation of the empirical findings, which may be difficult to install using only standardized interviews.[18] The in-depth interviews were transcribed and evaluated employing ATLAS.ti.

V.   Data Analysis

A.   Summary Statistics

Table 1 provides a summary of the observed successions which we categorize via predecessor activity and via industry clusters.[19]

To start with, an initial observation of the cross table 1 reveals the fact that a prolonged predecessor activity in the aftermath of a CEO succession is indeed a very common phenomenon in enterprises with concentrated ownership and control. In 510 successions, comprising 63.2% of the observed 807 successions, the former CEO stays active in a minor or major role. The lowest activity rate can be observed in the wholesale & retail industry where a majority of 58.7% of the predecessors still keep a role within their enterprise. Interestingly, in 55.4% of the observed successions the predecessor is reported to be among the owners of the enterprise. By contrast, only in 26.6% (or in 215) of the successions the predecessor withdraws completely from the enterprise and is reported to be retired. The highest predecessor retirement rate of 29.1% can be found in the business services industry. We count 82 successions or 10.2% where the predecessor has deceased. Overall, we track 323 successions in the manufacturing sector, 141 in the business services sector, 126 in the wholesale & retail industry, 114 in the construction industry, 73 in the consumer services areas and only 30 successions in other, not generally classifiable, industries.[20]

The roles a preceding CEO can fulfill after a CEO succession are highly diverse. In this respect it seems important to differentiate between roles with high impact and involvement and minor roles more related to soft advisory positions. Table 2 serves as an outlook in this respect and presents the several predecessor roles across the industry clusters.

Overall, it is striking to observe that in 72.4% or 369 of 510 successions, the majority of the predecessors who remain active fulfill a leading role which includes keeping an ownership share while exercising leadership functions.[21] Interestingly, in the business service sector even 80.0% of the active predecessors are observable in this category,

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[18]For example, these interviews cover and explore motivations, expectations and visions, but also discuss post-succession corporate changes and the co-operation and role of the predecessor. Furthermore these interviews cover aspects such as the influence of the leadership style, and the successor's relations to the second-row management and employees in the transition phase.

[19]To create the industry clusters, we employ aggregations of the International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations. We present a detailed industry classification key for the ISIC aggregation in the appendix A2.

[20]For further initial descriptive statistics on the data set we refer to Ahrens et al. (2012).

[21]For the interested reader, this category is also included as a control in the regressions of Ahrens et al. (2012).

TABLE 1—CLASSIFICATION AND DISTRIBUTION OF THE PREDECESSORS' ROLES

Industry	Net sample of successions	General role of predecessor			Predecessor is shareholder
		Deceased	Retired	Stays active	
	(1)	(2)	(3)	(4)	(5)
1. Manufacturing	323	33	86	204	173
	(40.0)	(40.2)	(40.0)	(40.0)	(38.7)
	[100.0]	[10.2]	[26.6]	[63.2]	[53.6]
2. Construction	114	15	32	67	59
	(14.1)	(18.3)	(14.9)	(13.1)	(13.2)
	[100.0]	[13.2]	[28.1]	[58.8]	[51.8]
3. Business services	141	5	41	95	85
	(17.5)	(6.1)	(19.1)	(18.6)	(19.0)
	[100.0]	[3.5]	[29.1]	[67.4]	[60.3]
4. Consumer services	73	8	18	47	43
	(9.0)	(9.8)	(8.4)	(9.2)	(9.6)
	[100.0]	[11.0]	[24.7]	[64.4]	[58.9]
5. Wholesale & retail	126	18	34	74	68
	(15.6)	(22.0)	(15.8)	(14.5)	(15.2)
	[100.0]	[14.3]	[27.0]	[58.7]	[54.0]
6. Other	30	3	4	23	19
	(3.7)	(3.7)	(1.9)	(4.5)	(4.3)
	[100.0]	[10.0]	[13.3]	[76.7]	[63.3]
Total	807	82	215	510	447
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	[100.0]	[10.2]	[26.6]	[63.2]	[55.4]

Note: The net sample of observed successions is reported in column 1. Columns 2 to 4 display the general role of the preceding CEO. The role of the predecessor is categorized into: *Deceased*, for predecessors who died (column 2); *Retired*, if the predecessor has retired (column 3); and *Stays active*, for predecessors who remain active in a leading or minor position within their company (column 4). Column 5 displays whether the predecessor is reported to be an owner or to hold shares after the succession. The industries are clustered using aggregated ISIC Rev. 3.1 classifications. For a detailed overview of the aggregation key, we refer to the appendix. The fraction of respective predecessors' roles as a percentage of the absolute amount of the net sample of observed successions (column 1) or of the absolute amount of observed predecessors' roles per predecessor's role type (columns 2-5) is displayed in parentheses. The fraction of respective predecessors' roles as a percentage of the absolute amount of observed successions per industry cluster is displayed in square brackets.

whilst in the manufacturing industry only one third stay active in this role. The second most prominent category is a prolonged membership of the supervisory board, which is an activity pursued by 30.6% (or 156) of the predecessors after a succession and is especially popular with 37.3% of the observed successions being within the construction industry. Furthermore, predecessors who take the position of a key account holder or manager appear, compared to the other industries, also more often within the construction industry. In general, the position of a key account manager receives a notable degree of popularity among the preceding CEOs, as 15.5% (or 79 cases) of the predecessors are

TABLE 2—CLASSIFICATION AND DISTRIBUTION OF ACTIVE PREDECESSORS' ROLES

Industry	Active total	Active & responsible owner	Passive owner	Board member	Coach & consul-tant	Key account holder	Special tasks	Common employee	Other role
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Manufacturing									
	204	136	37	61	10	31	46	13	32
	(40.0)	(36.9)	(47.4)	(39.1)	(45.5)	(39.2)	(44.2)	(43.3)	(42.1)
	[100.0]	[66.7]	[18.1]	[29.9]	[4.9]	[15.2]	[22.5]	[6.4]	[15.7]
2. Construction									
	67	46	13	25	0	18	17	6	6
	(13.1)	(12.5)	(16.7)	(16.0)	(0.0)	(22.8)	(16.3)	(20.0)	(7.9)
	[100.0]	[68.7]	[19.4]	[37.3]	[0.0]	[26.9]	[25.4]	[9.0]	[9.0]
3. Business services									
	95	76	9	27	6	13	15	4	16
	(18.6)	(20.6)	(11.5)	(17.3)	(27.3)	(16.5)	(14.4)	(13.3)	(21.1)
	[100.0]	[80.0]	[9.5]	[28.4]	[6.3]	[13.7]	[15.8]	[4.2]	[16.8]
4. Consumer services									
	47	35	8	15	2	5	7	3	9
	(9.2)	(9.5)	(10.3)	(9.6)	(9.1)	(6.3)	(6.7)	(10.0)	(11.8)
	[100.0]	[74.5]	[17.0]	[31.9]	[4.3]	[10.6]	[14.9]	[6.4]	[19.1]
5. Wholesale & retail									
	74	58	10	24	4	10	14	2	12
	(14.5)	(15.7)	(12.8)	(15.4)	(18.2)	(12.7)	(13.5)	(6.7)	(15.8)
	[100.0]	[78.4]	[13.5]	[32.4]	[5.4]	[13.5]	[18.9]	[2.7]	[16.2]
6. Other									
	23	18	1	4	0	2	5	2	1
	(4.5)	(4.9)	(1.3)	(2.6)	(0.0)	(2.5)	(4.8)	(6.7)	(1.3)
	[100.0]	[78.3]	[4.3]	[17.4]	[0.0]	[8.7]	[21.7]	[8.7]	[4.3]
Total	510	369	78	156	22	79	104	30	76
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	[100.0]	[72.4]	[15.3]	[30.6]	[4.3]	[15.5]	[20.4]	[5.9]	[14.9]

Note: The number of observations of predecessors (the previous CEO) who remain active per industry is reported in column 1. Columns 2 to 9 display the specific roles of the predecessors within their respective companies after the succession. The roles of the predecessor are categorized into: *Active & responsible owner*, for predecessors who hold shares and exercise leadership functions (column 2); *Passive owner*, for predecessors who hold shares but exercise no leadership functions (column 3); *Board member*, if the predecessor remains a member of the supervisory board (column 4); *Coach & consultant*, if the predecessor serves in a coaching or consulting role (column 5); *Key account holder*, for predecessors who manage a special group of key customers (column 6); *Special tasks*, if the predecessor supports the enterprise with his expertise in special tasks or manages them (column 7); *Common employee*, for predecessors who take the role of a common employee (column 8); and *Other role*, if the role of the predecessor can not be categorized and is reported as "other" (column 9). Multiple indications are allowed. The industries are clustered using aggregated ISIC Rev. 3.1 classifications. For a detailed presentation of the aggregation key, we refer to the appendix. The fraction of respective predecessors' roles as a percentage of the absolute amount of observed active predecessors (column 1) or of the absolute amount of observed predecessors' roles per predecessors' role type (columns 2-9) is displayed in parentheses. The fraction of respective predecessors' roles as a percentage of the absolute amount of observed active predecessors per industry cluster is displayed in square brackets.

reported to serve in similar positions within their enterprises. In this vein, but from an internal perspective, 20.4% of the predecessors fulfill special tasks within the organization they formerly headed.

Most notably, a fraction of 15.3% keep ownership shares in their enterprise without

fulfilling any role within their enterprise. However, such a passive role is only observable in 9.5% of the predecessors within the business service sector. Interestingly, at 4.3% we observe surprisingly low rates of a coaching and consulting role of the predecessor, which is even lower than the role as a common employee (5.9%). Furthermore, 14.9% or 76 cases report serving in functions or roles unsuited to the categorization offered.

B.   Proposition Testing: The Activity of the Predecessor

Following these initial cross tables, the next question that springs to mind concerns the factors which drive a prolonged predecessor activity. With regard to this question we shall carefully advance the ideas brought forward in propositions 1 to 7, which circulate around the potential drivers of post-succession predecessor activity, by employing a simple maximum likelihood probit regression. In detail, the devised index model reads:

$$(1) \qquad\qquad Y = \delta c_i + X_i \beta + \varepsilon_i \qquad \textit{Probit models (table 3)}$$

Y denotes the dependent variable which is the indicator variable for the activity of the predecessor, δ is an array of coefficients of interest according to propositions 1 to 7, X_i is an array of controls and ε_i denotes the error term.[22] The variables of interest are oriented towards the propositions and embrace the successor's origin, the children structure of the predecessor, nepotism, tacitness, the successor's human capital, ownership by the successor and the years passed since the succession.

In detail, the controls include: (a.) company characteristics, id est enterprise scale (measured by the natural logarithm of the number of employees), enterprise performance in the succession year (we use default probability measured via the Creditreform solvency index), the number of executives reported to be steering the company, and the company age (used as a proxy for tradition); and (b.) industry controls. We offer an overview of the results in table 3.

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[22]This notation is an abbreviation and used in this article for the reader's convenience. We draw attention to the fact that the probit model requires the effects of x to go through the index of $x\beta$, id est: $\Pr(Y = 1|X) = \Pr(Y^* > 0) = \Phi(X\beta)$, where Φ is the cumulative distribution function of the standard normal distribution. In the following we use the abbreviation index model and simply refer to probit.

TABLE 3—SUCCESSION CHARACTERISTICS AND ACTIVITY OF PREDECESSOR

Panel	Probit regression dependent variable: active predecessor					
A. Successor attributes	(1)	(2)	(3)	(4)	(5)	(6)
Family CEO	0.36***					0.38**
	(0.123)					(0.177)
Enterprise CEO	0.31**					0.14
	(0.151)					(0.213)
Ownership		-0.58***	-0.57***	-0.59***	-0.71***	-0.72***
		(0.110)	(0.110)	(0.110)	(0.151)	(0.153)
Human capital *(score)*		-0.12***	-0.12***	-0.07	-0.16***	-0.12**
B. Children structure		(0.044)	(0.044)	(0.051)	(0.059)	(0.062)
Son(s) only			0.26			
			(0.175)			
Daughter(s) only			0.36*			
			(0.200)			
Mixed children			0.33**			
C. Nepotism			(0.165)			
Strong nepotism				0.03		
				(0.195)		
Weak nepotism				0.25**		
D. Knowledge transfer proxies				(0.124)		
Dynamism					-0.04	-0.04
					(0.087)	(0.087)
Capital intensity					0.09	0.10
					(0.190)	(0.191)
Knowledge intensity					0.06	0.07
					(0.123)	(0.124)
Tacitness (intangibles-sales ratio)					0.47**	0.45**
E. Company controls					(0.189)	(0.190)
Ln employees *(number)*	0.09	0.02	0.03	0.02	-0.01	0.01
	(0.087)	(0.089)	(0.089)	(0.088)	(0.119)	(0.120)
Default probability	-0.06	-0.06	-0.05	-0.06	-0.09*	-0.09*
	(0.036)	(0.037)	(0.039)	(0.037)	(0.048)	(0.049)
Executives *(number)*	0.09	-0.06	-0.05	-0.02	-0.08	-0.02
	(0.088)	(0.095)	(0.096)	(0.098)	(0.129)	(0.133)
Company age *(years)*	-0.00***	-0.00***	-0.00***	-0.00***	-0.00*	-0.00**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
F. Industry controls	√	√	√	√	√	√
Years since succession	-0.10***	-0.09***	-0.09***	-0.09***	-0.09***	-0.09***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.034)	(0.034)
Observations	747	747	747	747	465	465
Pseudo R^2	0.05	0.07	0.08	0.08	0.12	0.13

Note: A legend is presented separately.

Legend table 3: The dependent variable is an indicator equal to one if the predecessor remains active after the succession within his company and zero otherwise.

In detail, successor variables denote: *Family CEO*, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Enterprise CEO*, for unrelated successors who previously worked for the enterprise; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; and *Human capital (score)* is the successor's human capital score derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism.

The predecessor's children structure variables embrace: *Son(s) only* is an indicator equal to one if the predecessor's children are male only; *Daughter(s) only* is an indicator equal to one if the predecessor's children are female only; and *Mixed children* is an indicator equal to one if among the predecessor's children include both daughter(s) and son(s).

The nepotism variables describe: *Strong nepotism* is an indicator equal to one if the predecessor did not consider non-family members as successors; and *Weak nepotism* is an indicator equal to one if the succession is not categorized in the strong nepotism category and a family successor with lower human capital, compared to the average human capital of non-family successors within the industry of the company, is installed as successor.

The variables addressing knowledge transfer are designed as follows: *Dynamism* is the sum of three elements, which includes: (1) an indicator for the absolute number of new firms in the respective industry and year (using Eurostat data for 2008 and 2009 for Germany); (2) an indicator for the start-up ratio of the respective industry and year (using Eurostat data for 2008 and 2009 for Germany); (3) and an indicator for the employee (per company) growth per industry and year (using Amadeus data for 2002 until 2009 for Germany). If the respective industry value (at the two-digit ISIC level) is equal to or above the overall median, the respective indicator equals one; *Capital intensity* is an indicator equal to one if the total assets over operating revenue ratio per industry (using Amadeus Data from 2002-2009 for Germany at the two-digit ISIC level) is equal to or above the overall median value; *Knowledge intensity* is composed of the sum of three elements including: (1) an indicator for employee costs per employee at the industry level (using Eurostat data from 2002-2008 for Germany); (2) an indicator for the research and development expenditure over operating revenue ratio (using COMPUSTAT data for EU 15 countries from 2002 to 2009); and (3) an indicator for the average non-family supply of CEO human capital per industry (using the sample data). If the respective value of the industry (at the two-digit ISIC level) is equal to or above the overall median, the respective indicator equals one; *Tacitness (intangibles-sales ratio)* is an indicator equal to one if the average intangibles over operating revenue ratio per industry (using COMPUSTAT data for EU 15 countries from 2002 to 2009) is equal to or above the overall median.

Company level controls include: *Ln employees* refers to the natural logarithm of the number of employees in the succession year; *Executives* displays the number of executives in the succession year; and *Default probability* is default probability in the succession year derived from the Creditreform solvency index. *Company age* is the age of the company in the succession year. Industry level controls are indicators equal to one if the respective category according to the ZEW industry classification (see Appendix) is met. *Years* is the number of years passed since the succession. All values are displayed in 07/2009 euros. The table presents estimated changes in probabilities devising a maximum-likelihood probit model. The stars display significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

The results of table 3 reveal several clear patterns. To begin with, column 1 highlights that family and enterprise successions significantly increase the likelihood of observing prolonged activity by the preceding CEO (family coefficient 0.36, significant at the one percent level; enterprise coefficient 0.31, significant at the five percent level) as compared to external and hybrid successions and robust to the inclusion of an array of firm and industry controls.[23] We interpret this finding as supportive of proposition 1 and suspect that the predecessor derives utility from staying active in the case of family or enterprise successions and that he also might be motivated intrinsically to ensure the success of a family or enterprise succession. From the evidence in column 1 (and 6) we conclude that we cannot reject proposition 1 on the basis of these results.

Column 2 of table 3 advances propositions 5 and 6, which address the ownership and the human capital dimensions. Both successor ownership (coefficient -0.12, significant at the one percent level) and the human capital of the successor (coefficient -0.58, significant at the one percent level) significantly lower the likelihood of prolonged predecessor activity even after controlling for firm and industry effects. Regarding the ownership structure we interpret this result as evidence that successor ownership lowers the barriers

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[23]The significance vanishes for the case of enterprise succession when including further variables, as can be observed in column 6 of table 3.

to retirement for the predecessor. Concerning the human capital we read the results as follows: High human capital successors may become involved into conflicts with the predecessor since they induce more corporate changes (Ahrens and Woywode, 2012) which may lead to a reduced likelihood of predecessor activity. In addition, the predecessor may have more trust in an able successor which may foster his decision to step aside. By contrast, low human capital successors may welcome prolonged activity as a period of mentoring and adjustment. Furthermore, these findings remain robust to the inclusion of various other variables as can be seen in the regressions 2 to 6. We infer that propositions 5 and 6 cannot be rejected on the basis of these results and interpret these findings as strong evidence in favor of propositions 5 and 6.

Column 3 of table 3 is dedicated to test proposition 2 which postulated that predecessors with children are more likely to prolong their activity. We split the children structure and find some evidence in favor of this proposition, but find that this relationship is most pronounced when the predecessor has daughters (coefficient 0.33, significant at the five percent level). For mixed children the coefficient is 0.36 and significant at the 10% level, while the coefficient is insignificantly positive for predecessors with male children as compared to no children. We speculate that the reasons for the prolonged activity may be the need to ensure income stability when having children, the guidance of interim management until the children are old and experienced enough to take over the lead. In addition, we suspect that the peculiar prolonged activity which occurs when the predecessor has female children may be explained by sociological biases towards male successors which induce a longer (possibly unnecessary) guidance of female family CEO successors by the predecessor (see also Ahrens et al., 2012,b). In general, we find that the results are weakly supportive of proposition 3 and that proposition 3 cannot be rejected on the basis of these results.

In proposition 3 we argued that nepotistic traits may also possibly drive longer activity by the preceding CEO. We subject this proposition to a closer look in column 4 of table 3. We employ a twofold approach and differentiate between *strong nepotism* and *weak nepotism*. We find that in successions which can be characterized as weakly nepotistic prolonged predecessor activity is significantly more likely (coefficient 0.25, significant at the five percent level) compared to successions without nepotistic traits, whereas only an extremely weak (coefficient 0.03, insignificant) relationship is observable for strongly nepotistic successions compared to successions without nepotistic traits. This leads us to reject and refine proposition 3: "The likelihood of a post-succession activity of the predecessor is higher for *weakly* nepotistic successions as compared to successions without nepotistic traits." We conclude that our results in column 4 of table 3 are in line with the refined version of proposition 3.

We furthermore argue that one reason for predecessor activity might be the need for knowledge transfers between the successor and the predecessor, which might be especially relevant when tacit knowledge has to be transferred (proposition 4). As we lack detailed data on the degree of need for knowledge transfers on the enterprise level, we advance this idea at the two-digit ISIC industry level with four proxies which are reported in column 5 of table 3.

Dynamism, the first knowledge transfer proxy explores the idea that if the industry entails a lot of start-ups in absolute and relative terms, but also high growth (in terms of employees) then it is likely that the knowledge needed to start a business within this sector is easily transferable and possibly also subject to frequent updates. In turn, this might make prolonged predecessor activity less necessary when regarded from a knowledge transfer perspective, as the preceding CEO quickly becomes less effective due to the high dynamism (Henderson et al., 2006). However, such a relation is not observable at significant levels from our data and the proxies we use: the coefficient of dynamism is weakly negative and highly insignificant. We further explore the idea that the *Capital intensity* proxy might lead to a higher likelihood of prolonged predecessor activity due to the potential specific knowledge related to capital intense assets.[24] Again, the direction of the coefficient seems to be correct, but is insignificant, which leads us to reject this speculation. In addition, we pursue the thought that in highly knowledge intense industries prolonged predecessor activity is more likely because enterprises and processes tend to be more complicated and difficult to explain and transfer.[25] However, the coefficient of *Knowledge intensity*, as measured by our proxies, points in the right direction, but remains insignificant.[26]

The last knowledge transfer proxy refers to cases where the knowledge transfer is likely to entail an idiosyncratic or tacit component, which might make predecessor activity necessary in order to keep this knowledge accessible and transferable. We suspect that intangible assets are a source of such tacit and difficult to transfer knowledge, thus we employ the intangibles over operating revenue ratio per industry as a proxy for *Tacitness*. As the regressions 5 and 6 show, we observe that a high intangibles to operating revenue ratio at the industry level is significantly positively related (coefficients are 0.47 and 0.45 respectively, significant at the five percent level) to the likelihood of the predecessor remaining active. We interpret this result as evidence that in these cases the prolonged predecessor activity is driven by knowledge transfer and accessibility motivations. We conclude that proposition 4 cannot be rejected on the basis of these results.

The final aspect with respect to a prolonged preceding CEO activity which we would like to highlight is our observation that activity reduces significantly (coefficient -0.09, at the one percent level) with time passed since the succession event. We suspect that, in addition to obvious biological constraints, this observation is driven by the tendency of the CEO to become increasing less informed and connected to the beat of the market and organization when they step aside, whilst the new CEO becomes increasingly self-reliant. Furthermore, this result is in line with the argument for the "phasing-in and phasing-out process" described in the literature (Handler, 1990). To sum up, it can be said that this is evidence in favor of proposition 7 and that we cannot reject proposition 7 on the basis of these results.

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[24]We calculate an industry's capital intensity in the following way: total assets over operating revenue per enterprise.

[25]To approximate the knowledge intensity of an industry we used the following proxies: educational and training costs per employee, employee costs per employee, research and development expenditure over operating revenue ratio, and the average human capital of non-family CEO successors.

[26]We also present the above proxies in a deconstructed form in the appendix A2 in table A2, thus without aggregating them to the "dynamism" and "knowledge intensity" constructs, but the individual proxies also remain insignificant.

The next question that springs to mind is whether there are pronounced differences with regard to these results across the different roles the predecessors take. To address this question, we devise maximum likelihood probit regressions using the model of regression 6 of table 3, but change the dependent variable according to the respective role. The results are presented in table 4.

Columns 1 to 3 of table 4 address the likelihood of prolonged ownership by the predecessor. The likelihood of predecessor ownership combined with an executive role is significantly reduced by successor ownership, the successor's human capital, company age and time passed since the succession, mirroring the results of table 3, whereas interestingly capital intensity drives this likelihood. We suspect that capital intense firms are more difficult for successors to acquire while capital intensity also might go along with the need for knowledge transfers due to complicated assets, leading to prolonged predecessor activity. Remarkably, column 3 highlights that starkly different drivers are at work for the likelihood of passive ownership by the predecessor. A high default probability leads to a significant and considerably lower likelihood of passive predecessor ownership (coefficient -0.57, significant at the five percent level), whilst higher human capital is positively related to the likelihood of observing passive predecessor ownership. These findings are in line with the interpretation that the predecessors try to avoid uncertainty with regard to the future value of their investment, while they could also explain why high industry dynamism leads to significantly lower likelihood (-0.23, significant at the five percent level) of passive ownership by the predecessor.

Furthermore, we observe that family CEO successions significantly (at the five percent level) drive the likelihood of supervisory board membership (coefficient 0.45), and the roles *key account holder* (coefficient 0.56) and *special tasks* (coefficient 0.52). Supervisory board membership is significantly more likely in enterprises larger with respect to the number of employees (coefficient is 0.38, significant at the one percent level) and executives (coefficient is 0.32, significant at the five percent level), which is in line with our previous findings. Interestingly, high dynamism goes along with a significantly reduced likelihood of supervisory board membership (-0.18, significant at the 10% level) and the *key account holder* role (-0.28, significant at the five percent level). This is possibly because the knowledge of the preceding CEO loses value more quickly in a highly dynamic context. To sum up, the results are generally in line with our previous findings from table 3, although we observe some heterogeneity between the diverse roles a predecessor can take. However, we draw attention to the fact that the interview allowed multiple predecessor roles to one predecessor, therefore we refrain from putting too much emphasis on the results of table 4.

Now that there is some light shed on the drivers of predecessor activity in general and also with respect to some of the prominent roles a predecessor can take after a succession, the next obvious question that stems directly from these findings is: what is the enterprise performance impact of prolonged predecessor activity? This is possibly most relevant to practitioners when they have to ask themselves: "Should I stay on board?" We shall address this question and the propositions 8 to 11 which revolve around the performance impact of prolonged predecessor activity in the next section.

TABLE 4—SUCCESSION CHARACTERISTICS AND PREDECESSOR'S ROLES

	Role of the active predecessor within his enterprise					
	Owner (share-holder)	Active & responsible owner	Passive owner	Board member	Key account holder	Special tasks
A. Successor attributes	(1)	(2)	(3)	(4)	(5)	(6)
Family	0.19	0.17	0.07	0.45**	0.56**	0.52**
	(0.173)	(0.172)	(0.230)	(0.203)	(0.277)	(0.240)
Enterprise	0.10	0.11	-0.01	-0.06	0.20	0.09
	(0.208)	(0.203)	(0.278)	(0.248)	(0.340)	(0.293)
Ownership	-0.59***	-0.50***	-0.05	-0.13	-0.08	-0.31*
	(0.141)	(0.136)	(0.181)	(0.151)	(0.191)	(0.165)
Human capital *(score)*	-0.09	-0.16***	0.16*	0.11*	0.05	0.05
B. Knowledge transfer proxies	(0.060)	(0.059)	(0.081)	(0.068)	(0.085)	(0.075)
Dynamism	-0.04	0.09	-0.23**	-0.18*	-0.28**	-0.02
	(0.084)	(0.084)	(0.115)	(0.093)	(0.119)	(0.113)
Capital intensity	0.21	0.36**	-0.32	0.35*	-0.25	-0.47**
	(0.179)	(0.174)	(0.227)	(0.195)	(0.235)	(0.212)
Knowledge intensity	0.04	-0.11	0.20	0.04	0.10	0.13
	(0.118)	(0.117)	(0.151)	(0.129)	(0.161)	(0.143)
Tacitness (intangibles-sales ratio)	0.34*	0.10	0.29	0.14	0.14	0.23
C. Company controls	(0.182)	(0.177)	(0.228)	(0.193)	(0.244)	(0.224)
Ln employees *(number)*	0.09	-0.05	0.24	0.38***	-0.12	0.15
	(0.116)	(0.114)	(0.148)	(0.124)	(0.176)	(0.144)
Default probability	-0.17**	-0.10	-0.57**	-0.12	0.04	0.02
	(0.082)	(0.063)	(0.259)	(0.121)	(0.051)	(0.051)
Executives *(number)*	-0.10	-0.18	0.20	0.32**	0.10	0.27*
	(0.125)	(0.122)	(0.168)	(0.133)	(0.180)	(0.144)
Company age *(years)*	-0.00**	-0.00***	0.00	-0.00	0.00	0.00
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
D. Industry controls	√	√	√	√	√	√
Years since successions	-0.08***	-0.06*	-0.06	0.03	-0.04	0.01
	(0.032)	(0.032)	(0.044)	(0.036)	(0.046)	(0.041)
Observations	465	465	465	465	465	465
Pseudo R^2	0.10	0.09	0.12	0.07	0.08	0.07

Note: The dependent variable is an indicator equal to one if the respective predecessor role is met and zero otherwise. In detail, successor variables denote: *Family CEO*, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Enterprise CEO*, for unrelated successors who previously worked for the enterprise; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; and *Human capital (score)* is the successor's human capital score derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism. The variables addressing knowledge transfer are designed as follows: *Dynamism* is the sum of three elements, which includes: (1) an indicator for the absolute number of new firms in the respective industry and year (using Eurostat data for 2008 and 2009 for Germany); (2) an indicator for the start-up ratio of the respective industry and year (using Eurostat data for 2008 and 2009 for Germany); (3) and an indicator for the employee (per company) growth per industry and year (using Amadeus data for 2002 until 2009 for Germany). If the respective industry value (at the two-digit ISIC level) is equal or above the overall median, the respective indicator equals one.; *Capital intensity* is an indicator equal to one if the total assets over operating revenue ratio per industry (using Amadeus Data from 2002-2009 for Germany at the two-digit ISIC level) is equal to or above the overall median value.; *Knowledge intensity* which is composed of the sum three elements including: (1) an indicator for employee costs per employee at the industry level (using Eurostat data from 2002-2008 for Germany); (2) an indicator for the research and development expenditure over operating revenue ratio (using COMPUSTAT data for EU 15 countries from 2002 to 2009); and (3) an indicator for the for the average non-family supply of CEO human capital per industry (using the sample data). If the respective value of the industry (at the two-digit ISIC level) is equal to or above the overall median, the respective indicator equals one; *Tacitness (intangibles-sales ratio)* is an indicator equal to one if the average intangibles over operating revenue ratio per industry (using COMPUSTAT data for EU 15 countries from 2002 to 2009) is equal to or above the overall median. Company level controls include: *Ln employees* refers to the natural logarithm of the number of employees in the succession year; *Executives* displays the number of executives in the succession year; and *Default probability* is default probability in the succession year derived from the Creditreform solvency index. *Company age* is the age of the company in the succession year. Industry level controls are indicators equal to one if the respective category according to the ZEW industry classification (see Appendix) is met. *Years* is the number of years passed since the succession. All values are displayed in 07/2009 euros. The table presents estimated changes in probabilities devising a maximum-likelihood probit model. The stars display significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

C. Proposition Testing: The Performance Impact of Predecessor Activity

We begin our performance analysis by presenting a picture of the status quo of the enterprise performance in the succession year. It is a matter of fact that many of the enterprises we observe are not traded publicly, thus our analysis lacks market-based performance data such as market-to-book rations. Therefore, we predominantly rely on accounting variables, which are arguably more backward-orientated than market based performance evaluations. We are aware that our performance measurement can thus only be second-best compared to approaches using both market- and accounting-based variables. To take into account these issues, we flank the traditional accounting values with further information on the state of the company, exempli gratia financing requirements and perceived investment delays, such that we argue that the performance measurement is sufficient for the demand with regard to our research objective.

Our performance analysis relies on the use of profit margins (PM). We argue that profit margin is a simple and straightforward performance indicator and a very practical benchmark when comparing efficiency. In addition, PM by definition pairs values from the same time horizons: the numerator (earnings before taxes - Amadeus item 33) and the denominator (operating revenue - Amadeus item 24) refer to accruals from the same time horizon. One disadvantage of PM is that the efficiency of assets in use is not reported (Barber and Lyon, 1996).[27] We are also interested in how the companies perform relative to their industry peers (at the two digit-ISIC level) in the succession year. To pursue this idea, we employ industry adjustments using a control group of 187,388 company-year observations of enterprises of the same size drawn from the Amadeus database. In detail, the industry adjustments are created by a subtraction of the median PM of the accordant year and industry (at the two digit-ISIC level) from the PM value of the respective sample enterprise. Thus, the industry-adjusted PM is indicative of how the succession company performs relative to its respective industry median in the succession year. Furthermore, in order to prevent our regressions and results being influenced by extremes (or outliers), we winsorize the PM values at the 0.025 level. Apart from PM, we also visualize the size of the enterprises in the succession year by presenting the number of employees and sales. The result, a picture of the performance of the enterprises in the succession year, is presented in table 5.

Interestingly, table 5 gives rise to the conjecture that there are only very few significant differences between enterprises in which the preceding CEO remains active compared to the average succession. In the succession year the average succession of the data set investigated has a sales umbrella of 10.4 million euros, a profit margin of 5.7%, and approximately 80 employees, while the average enterprise in which the predecessor remains active earns 11.5 million euros with a profit margin of 5.9% and counts roughly 81 employees in the succession year. It is in line with intuition that the resulting differences, as reported in column 7 of table 5, are not anywhere near significant levels. However, with one exception: with respect to the *investment delay* indicator, which equals one if

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[27]In this respect return on account (ROA) is an interesting alternative proxy. But it does not come without its own drawbacks: assets are normally measured at historic costs, whereas earnings refers to the present time horizon. Furthermore, one might argue that idle or recently acquired assets may blur the accuracy of performance measurement via ROA.

TABLE 5—ENTERPRISE PERFORMANCE IN THE SUCCESSION YEAR AND PREDECESSOR ACTIVITY

	All	Active total	Active & responsible owner	Passive owner	Board member	Key account holder	(2)-(1)	(4)-(3)
							Predecessor roles / Mean comparison / Difference in means	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Operating revenue	10.4	11.5	11.4	15.8	15.8	8.8	1.1	4.4
(in mil. euros)	(0.61)	(0.89)	(0.76)	(4.33)	(2.43)	(1.25)	(1.08)	(4.39)
Profit margin	5.7	5.9	6.2	4.3	6.2	6.7	0.2	-1.9**
(PM) (%)	(0.27)	(0.35)	(0.43)	(0.77)	(0.68)	(0.94)	(0.45)	(0.88)
Industry-adjusted	2.9	3.0	3.3	1.4	3.5	3.6	0.1	-1.9**
PM (%)	(0.27)	(0.36)	(0.43)	(0.78)	(0.70)	(0.93)	(0.45)	(0.89)
Employees	80.3	81.2	80.8	96.1	93.9	64.8	0.9	15.3
(number)	(2.89)	(3.53)	(4.34)	(9.68)	(6.64)	(3.86)	(4.56)	(10.61)
Investment delay	20.5	13.4	10.9	22.7	12.7	15.8	-7.1***	11.8**
(%)	(1.47)	(1.55)	(1.67)	(4.88)	(2.72)	(4.21)	(2.13)	(5.15)
Hidden financing	10.3	8.9	6.8	16.9	7.1	13.9	-1.5	10.1**
requirement (%)	(1.07)	(1.26)	(1.31)	(4.30)	(2.06)	(3.92)	(1.66)	(4.49)

Note: The performance indicators presented are: *Operating revenue*: operating revenue in the succession year; *Profit margin (PM)*: earnings before taxes divided by operating revenue in the succession year; *Industry-adjusted PM*: the subtraction of the control group median PM (drawn from the Amadeus database) of the respective year and industry (two-digit ISIC) from the sample PM value; and *Employees*: the number of employees in the succession year. The additional indicators signal: *Investment delay* is an indicator equal to one if the successor believes that investments were delayed before the succession; *Hidden financing requirements* is an indicator equal to one if considerable unexpected financing requirements occurred in the aftermath of the succession. All values are displayed in 07/2009 euros. The stars display (Welch-Satterthwaite) significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

the successor believes that investments were delayed before the succession, we observe a highly significant difference suggesting that investment delays occur 7.1 percentage points more often in average successions as compared to successions in which the predecessor still fulfills a role. We interpret this observation in the following way: firstly, we suspect that this difference is driven by cash-in and milking behavior before the predecessor sells his share and retires, but secondly this is also sociologically driven, as the successor might for various reasons not want to blame the predecessor in a pronounced way for potential omissions while he is still active in the enterprise.

Predecessor activity in the supervisory board occurs more often in larger enterprises, i.e. with 15.8 million euros sales, 6.2% profit margin and approximately 94 employees on average, as compared to the average of observed successions. We can also compare cases where predecessors just keep an ownership share (*passive owner*) with cases where the preceding CEO still fulfills an executive plus a shareholding role (*active & responsible owner*). We find it remarkable to observe pronounced differences between them, as is reported in column 8 of table 5. While enterprises in the *passive owner* predecessor category are bigger (4.4 million euros and around 15 employees on average) than enterprises in the *active & responsible owner* predecessor category, we observe that the *passive owner* category entails -1.9 percentage points lower industry-adjusted profit margins (significant at the five percent level) and is infected by a 11.8 percentage points higher rate of investment delays (significant at the five percent level) and a 10.1

percentage points higher indication rate of (hidden) financing requirements (significant at the five percent level) in the successions year as compared to enterprises where the predecessor remains active in an executive and shareholding role. These results seem to indicate that a predecessor with an active & responsible role seems to go along with well managed succession cases. Note furthermore, that compared to the overall sample enterprises where the predecessor remains active in a key account holding role are smaller with only 8.8 million euros sales and 65 employees. We speculate that these enterprises because of their size might have an increased need for the prolonged predecessor activity as they might be not as capable and efficient in replacing all of the former CEOs functions when compared to larger enterprises.

We now move forward to investigate performance development using a differential performance methodology and a Huber-White robust ordinary least squares regression (OLS) in order to address propositions 8 to 11 which are directed at the performance impact of prolonged CEO activity. The data at hand allows us to measure performance twice, in the succession year and in the year 2009 and we focus on profit margin as our main indicator for efficiency and enterprise performance. To start with, PM is potentially influenced by various trends and firm attributes. However, since we employ a differential measure, we by construction control for all time-invariant firm attributes which could drive enterprise performance. We also address fears that our performance measure, earnings before taxes divided by operating revenue multiplied by 100 (PM), is affected by trends due to the decline and growth of industries by using industry-adjusted differential performance (Barber and Lyon, 1996). Furthermore, we also introduce control-group-matched performance adjustments of the industry-adjusted PM, in order to pay attention to potential mean reversion due to transitory components in accounting values and to prevent our measure capturing general performance trends due to pre-succession performance (Barber and Lyon, 1996). In addition and inspired by the recent literature on successions and corporate performance (Villalonga and Amit, 2006, and Pérez-González, 2006), we incorporate a set of control variables for enterprise attributes in our regressions, i.e.: size (sales), momentum (e.g. industry-adjusted profit margin), default probability and ownership. In addition, we excluded roughly 1% (4 observations) as outliers due to high values using studentized residuals, Cook's D, DFITS and leverage to residuals squared plot inspections.

Differential industry-adjusted PM and differential industry- and performance-adjusted PM are calculated with adjustments derived from a control group of 187,388 company-year observations of enterprises of the same size in the Amadeus database. Following the methodological literature of Barber and Lyon (1996) and the article of Pérez-González (2006) on successions, we create the performance-adjustments by arranging the industry-adjusted PM of the control group companies into deciles in each year. By matching the industry-adjusted PM of each sample firm with the according control group decile in the year of the succession, the relevant control decile of peers with the same performance level is identified for each enterprise in the sample group. The median industry-adjusted PM of enterprises in the matched decile and year is then subtracted from the industry-adjusted PM of the sample group enterprise yielding industry- and performance-adjusted

PM (abnormal performance).

We present the results of this procedure applied in an OLS regression with differential abnormal performance as a dependent variable in table 6, which directly addresses propositions 8 to 11.

Legend table 6: The dependent variables are the differences in industry- and performance-adjusted profit margin (PM) in columns 1 to 4 and differences in industry-adjusted profit margin (PM) in columns 5 to 8. The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM is PM less the median PM of the accordant year and industry (two-digit ISIC) of a control group (from the Amadeus database); Performance-adjustments are designed by sorting the industry-adjusted values of a control group into deciles and matching the individual industry-adjusted PM values of the sample with the accordant control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control.

Independent variables are: *Active* indicates post-succession predecessor activity; *Company age* is the age of the company in years; *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *External* indicates if a successor had no previous ties to the enterprise; *Human capital score (HCS)* is derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism; *Nepotism strong* indicates if the predecessor only considered family members as successors; and *Nepotism weak* indicates if the succession is not categorized into the strong nepotism category and a family successor with lower human capital, compared to the average human capital of non-family successors within the industry of the company, is installed as a successor.

Controls are: *Ln sales* (size) is the natural logarithm of sales in the year of the succession; *Ind.-adj. PM* (momentum) is the industry-adjusted ratio earnings before taxes divided by operating revenue in the succession year; *Ind.- & perf.-adj. PM* (momentum) is industry- and performance-adjusted PM in the succession year; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* represents probability of default based on the Creditreform solvency-index score of the enterprise in the year of the succession; *Executives* displays the number of executives in the succession year; *Working relation* is an indicator equal to one if the successor perceives the working relations with the predecessor as good; *Investment delay* is an indicator variable equal to one if an investment delay is perceived; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; and *Years* is the time elapsed in years since the succession.

Interactions between variables are marked via stars *. Significances are displayed within the table via: * ten percent, ** five percent and *** one percent. The values in parentheses display Huber-White robust standard errors.

TABLE 6—OLS-REGRESSION ANALYSIS - PREDECESSOR ACTIVITY AND ENTERPRISE PERFORMANCE

	Δ Ind.- & perf.-adj. PM				Δ Ind.-adj. PM			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active	-0.29	2.22**	3.25***	3.15***	-0.20	2.31**	3.31***	3.20***
predecessor	(0.503)	(0.992)	(1.233)	(1.204)	(0.497)	(0.977)	(1.212)	(1.192)
Company age		0.01	0.01	0.01		0.01	0.01	0.01
		(0.010)	(0.010)	(0.010)		(0.010)	(0.010)	(0.009)
Company age*		-0.02	-0.02	-0.02*		-0.02	-0.02*	-0.02*
active		(0.011)	(0.011)	(0.011)		(0.011)	(0.011)	(0.011)
Human capital		0.84***	0.82***	0.78***		0.86***	0.83***	0.78***
score (HCS)		(0.260)	(0.284)	(0.295)		(0.261)	(0.283)	(0.294)
Human capital*		-0.83**	-1.90***	-1.87***		-0.80**	-1.82***	-1.78***
active		(0.336)	(0.506)	(0.510)		(0.332)	(0.484)	(0.489)
Family			-0.59	0.33			-0.55	0.35
			(0.877)	(1.346)			(0.854)	(1.309)
External			-0.74	-0.72			-0.58	-0.56
			(0.891)	(0.898)			(0.882)	(0.888)
Family*active			-1.20	-4.39*			-1.19	-4.43*
			(1.342)	(2.391)			(1.338)	(2.352)
External*active			-1.03	-1.04			-1.17	-1.18
			(2.040)	(2.060)			(2.063)	(2.080)
Family*HCS*			1.25**	1.75***			1.23**	1.73***
active			(0.515)	(0.608)			(0.496)	(0.590)
External*HCS*			1.42**	1.42**			1.36**	1.36**
active			(0.677)	(0.681)			(0.681)	(0.685)
Nepotism				-3.92*				-3.66*
strong				(2.074)				(1.983)
Nepotism				-0.53				-0.58
weak				(1.485)				(1.413)
Nepotism				4.59*				4.50*
strong*active				(2.488)				(2.381)
Nepotism				2.58				2.67
weak*active				(2.068)				(2.001)
Ln sales	-0.23	-0.14	-0.17	-0.10	-0.22	-0.15	-0.17	-0.11
	(0.245)	(0.251)	(0.251)	(0.254)	(0.238)	(0.245)	(0.245)	(0.248)
Ind.-adj.	0.13**	0.12**	0.12**	0.12**	-0.21***	-0.22***	-0.22***	-0.22***
PM	(0.058)	(0.060)	(0.059)	(0.059)	(0.040)	(0.041)	(0.038)	(0.038)
Ind.- & perf.-	-0.34*	-0.33*	-0.31	-0.30	-	-	-	-
adj. PM	(0.193)	(0.189)	(0.185)	(0.181)	-	-	-	-
Ownership	0.14	0.24	0.24	0.32	0.08	0.21	0.19	0.27
	(0.433)	(0.439)	(0.430)	(0.435)	(0.430)	(0.436)	(0.430)	(0.435)
Default	-0.04	-0.07	-0.11	-0.11	0.03	-0.00	-0.03	-0.03
probability	(0.070)	(0.079)	(0.080)	(0.079)	(0.066)	(0.077)	(0.079)	(0.078)
Executives	-0.15	0.06	-0.13	-0.20	-0.18	0.07	-0.10	-0.17
	(0.329)	(0.358)	(0.367)	(0.376)	(0.330)	(0.363)	(0.378)	(0.388)
Working	0.32	0.07	0.10	0.27	0.24	-0.01	0.02	0.18
relations	(0.548)	(0.532)	(0.566)	(0.546)	(0.544)	(0.524)	(0.554)	(0.538)
Investment	0.44	0.33	0.28	0.35	0.42	0.30	0.27	0.34
delay	(0.442)	(0.449)	(0.459)	(0.457)	(0.430)	(0.438)	(0.443)	(0.442)
Financing	0.59	0.39	0.46	0.40	0.88	0.66	0.72	0.67
requirements	(0.689)	(0.710)	(0.718)	(0.724)	(0.690)	(0.709)	(0.720)	(0.725)
Years	0.07	0.07	0.09	0.12	-0.11	-0.11	-0.10	-0.07
	(0.112)	(0.116)	(0.116)	(0.112)	(0.108)	(0.111)	(0.111)	(0.107)
Observations	391	383	383	383	391	383	383	383
R^2	0.04	0.07	0.09	0.11	0.10	0.14	0.15	0.17

Note: A legend is presented separately.

The results are striking. What is obvious in the first place, is that the performance impact of prolonged predecessor activity is highly heterogeneous and contingency dependent, which is mirrored in the insignificant single coefficient of *Active* in column 1 and 5 of table 6. Remarkably, as soon as we introduce the relevant contingencies, the coefficient turns positive and becomes highly significant as can be seen in columns 2 to 4 (and columns 6 to 8 for industry-adjusted performance only) of table 6. As all coefficients of the *active* variable are positive, ranging between 2.22 (column 2) and 3.25 (column 3) percentage points higher industry- and performance-adjusted PM, and significant even after controlling for industry- and performance trends and including an array of several firm level controls, we interpret this as evidence in favor of proposition 8 which postulates a positive impact of predecessor activity on enterprise. However, we stress that this finding is highly context-specific and only valid under certain contingencies, especially regarding the human capital (proposition 9) of the successor. One of the CEO successors (13) interviewed in-depth noted: *"But for the time being I still have to make use of it [the activity of the predecessor] and I also need it. It relieves you of incredible amounts of the burden one bears as a successor if you know there is somebody watching over you, who does not say anything, but who would get involved at the right moment. This helps me hugely and so I could manage these mergers in a very relaxed and laid-back fashion."*

The contextuality of the impact of prolonged predecessor activity with respect to human capital can be seen most clearly in columns 2 and 6 of table 6. Here the coefficient of *active* is 2.22 and significant at the five percent level, while the interaction term *human capital score*active* is -0.83 and significant at the five percent level, which we take as evidence in favor of proposition 9. Roughly speaking, we interpret this in the following way: the impact of prolonged predecessor activity is 2.22 percentage points increased differential industry- and performance-adjusted profit margin, which then decreases by -0.83 percentage points of differential industry- and performance-adjusted PM per human capital score point. Thus if we take the average successor who has a human capital score of 1.81, the sum performance impact of prolonged predecessor activity is 0.72 increased difference in industry- and performance-adjusted profit margin. We assume that this finding might be explained in the following way: for successors with lower levels of human capital there is a higher demand for knowledge transfer from and support of the predecessor leading to positive performance effects of predecessor activity in these cases. One of the CEOs (4) who took part in the in-depth interviews noted on: *"My father remained active for 2 or 3 more years and we shared our office. Actually, I have learned a lot from him during this time."* Another CEO (7) interviewed said: *"This is why I am very grateful: for many years I could gain experience by being in office together with him [father], the experience which I have today."* On the contrary, successors with high human capital have a lower need for knowledge transfer and the preceding CEO may even become a barrier to change, leading to internal conflicts and a reduced performance impact of prolonged predecessor activity. Again we quote a CEO successor (23) who took part in an in-depth interview: *"I say this very openly, and at first I thought it [the prolonged activity of the predecessor] was a great help, but it turned out to be a great obstacle. [...] If you change the things that he [the predecessor] introduced, he feels*

as if you are stepping on his toes. And these issues are there." From a more general point of view, column 2 and 6 of table 6 indicate that proposition 9, which postulates a negative interaction between prolonged predecessor activity and high human capital of the successor, cannot be rejected on the basis of these results.

Furthermore, we speculated in propositions 10 and 11, that when high human capital successors initiate change processes, the external and family successor have the best cards to buffer conflicts with the predecessor, either by superior family access and relations or due to their superior external point of view and outside knowledge. In contrast, enterprise successors who potentially learned and served under the reign of the previous CEO might be in the most difficult position to master potential conflicts and to emancipate themselves. This idea is explored in the regressions 3 and 7 of table 6. Here both triple interaction terms *family*human capital score*active* and *external*human capital score*active* have positive and significant coefficients (1.25 and 1.42 respectively), which are however smaller in absolute terms than the coefficient of the *human capital score*active* interaction (-1.90).[28] This shows that high human capital family and high human capital enterprise successors seem to be capable in shielding some of the negative influences of the *human capital score*active* interaction. We conclude that propositions 10 and 11 cannot be rejected on the basis of these results. Employing regressions 2 and 3 of table 6, we furthermore present a visualization of the cumulative performance effects of prolonged predecessor activity along the human capital dimension and differentiated across the successor's origin dimension in figure 1. The figure highlights the general effect, but also casts light on the heterogeneity across the successor's origin dimension with respect to subsequent post-succession performance impact.

The pattern observable in figure 1 can be seen as a justification of the "phasing-in" and "phasing-out" argumentation (Handler, 1990), because as the successor increasingly acquires key knowledge and human capital, the preceding CEO increasingly becomes obsolete (Miller, 1991, and Henderson et al., 2006) or even an obstacle (Hambrick and Fukutomi, 1991) with respect to abnormal performance.

In column 4 and 8 of table 6 we furthermore address the idea that prolonged predecessor activity might also buffer a potential negative performance impact due to lower successor human capital in nepotistic successions. Mirroring results reached by Ahrens et al. (2012), we find that strong nepotism (strictly limiting the successor pool to family members) is highly detrimental to firm performance, leading to a -3.92 reduced and significant difference in industry- and performance-adjusted profit margin, but very interestingly, in cases of strong nepotism in which the predecessor still accompanies the successor, the performance impact is buffered as the positive and significant interaction *nepotism strong*active* highlights (coefficient 4.59). For weak forms of nepotism however, we do not observe a significant relationship. Furthermore, it is very interesting to observe that once we control for nepotism, the *family*active* interaction term wildly jumps to a significant negative coefficient of -4.39. We interpret this such that in many family successions a prolonged predecessor activity buffers potential deficits of the successor's abilities, but that in family successions where this is not necessary a prolonged

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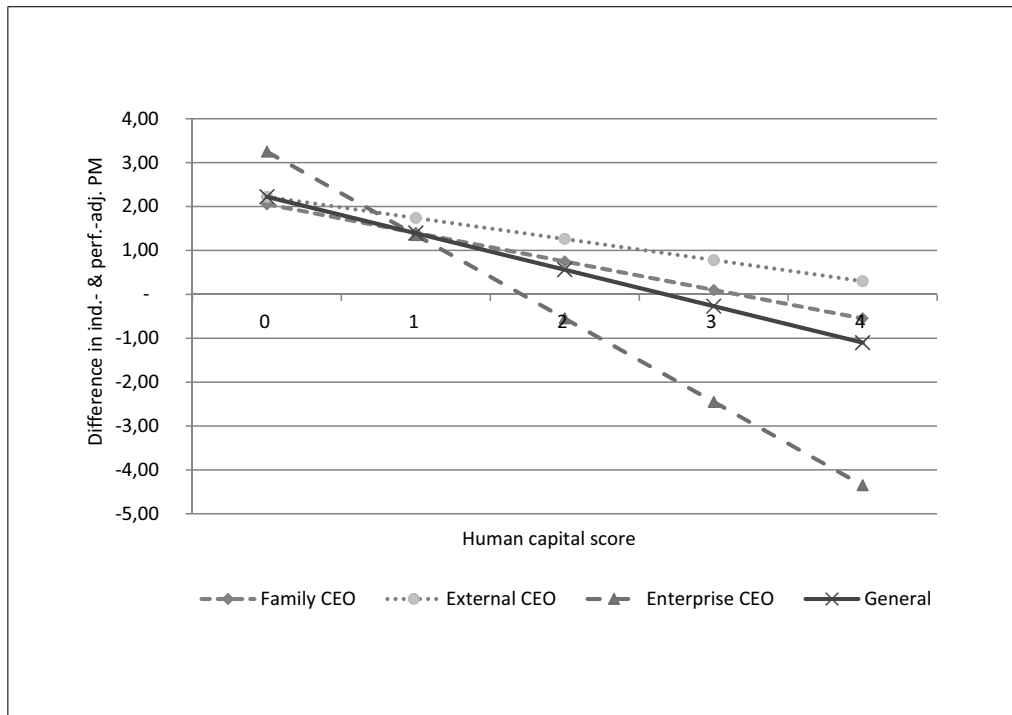[28] All interaction terms have sufficient observations.

FIGURE 1. SUCCESSOR'S HUMAN CAPITAL AND PERFORMANCE IMPACT OF PREDECESSOR ACTIVITY

predecessor activity entails a strongly harmful effect with respect to firm performance. Here continuing incumbency of the predecessor is dysfunctional for the organization, because openness and responsiveness to change stimuli are potentially diminished (Hambrick and Fukutomi, 1991) or in the phrase coined by Kets de Vries (1985): "Sometimes the same creative energy that drives an entrepreneur has its source in destructive internal needs that can ruin a career or a company." In the same vein, Schulze et al. (2001) point out that a too heartfelt concern for the enterprise's prospects may cause some CEOs to remain in office long after they have ceased to be effective, harming firm performance. For family successions, our results above are clear support for the advice that once the successor has an adequate level of human capital or ability, the predecessor should step aside and decrease his activity and influence inside the family firm. One of the interviewed CEO successors (3) noted: *"I think, in the end one very important point was the ability to relinquish. I believe my predecessor thought about this aspect very intensively, [...], and when the time had come, he simply let go."*, while another CEO successor mentioned: *"It was often the case that I said: "I will change this and that and this is the way I am planning to do it." He [the predecessor] often replied that he used to know one or two things about this, but that it was high time for him to have a guided tour through the company to know again what is going on. And that is how it was, but he realized it."*

Furthermore, we also address concerns that the *active* variable might be endogenous

(Murphy and Zimmermann, 1993), i.e. that the difference in enterprise performance might have an effect on the prolonged predecessor activity, by employing a two stage least squares instrumental variables (2SLS-IV) methodology. To be more specific, our OLS model of table 6 may be supposed to suit the class of endogenous indicator variable models (Heckman, 1978) and reads:

(2) $\qquad Y = \delta\alpha + X\beta + \varepsilon \qquad$ *Endogenous indicator variable model*

Here, Y denotes the dependent variable which is the difference in industry- and performance-adjusted profit margin, δ is the coefficient of the endogenous indicator variable for activity α of the predecessor, X is an array of controls with population parameters β, and ε denotes the error term, while Cov $(\alpha, \varepsilon) \neq 0$. The idea is that if, for example, a negative relationship between the difference in enterprise performance and preceding CEO activity exists, id est the predecessor is more likely to leave when he sees that the performance of his enterprise is secured and good, then the OLS estimator will underestimate the true effect of prolonged predecessor activity on enterprise performance, because the effects in both directions (activity leading to performance versus performance leading to inactivity) are confused with each other. This is not too far-fetched, as there is evidence in the literature which suggests that founder-CEOs are more likely to leave when performance is good, thus they may want to leave their companies in "good shape" (Adams et al., 2009). If this is the case, a factoring out of the effect of differential performance on prolonged CEO activity via an IV methodology should yield a larger positive effect of prolonged predecessor activity as estimated through OLS.

As an instrument for the predecessor activity we employ an indicator variable *death* which is equal to one if the succession occurred due to the death or serious disease of the predecessor. The intuition for this instrument is straightforward, as it can be assumed in successions which occur for these reasons that the predecessors are inactive. Furthermore, the instrument should be uncorrelated with differential performance, except through the independent variables in the first stage. It seems very unlikely that the death or disease of the predecessor is influenced by differential performance. Death or disease of the predecessor should be exogenous. In the other causal direction, the sudden death of a manager in control could lead to turbulence in the succession year and thereby affect differential performance. However, because our regressions control for the succession year performance, we argue that this issue is still acceptable. Furthermore, we point out that the death of the predecessor may be correlated with the corporate age and thereby affect firm performance through the current evolutionary stage of the firm. But again, since we include the *corporate age* variable in the following regressions, we find that this issue has limited importance. Overall, we argue that our instrument is of acceptable, but not perfect quality. Furthermore, we also need instruments for the interaction terms of the *active* variable. Therefore, we generate artificial additional instruments by interacting the *death* variable with counterparts of the interaction terms of the *active* variable, for example *death*human capital score* or *death*corporate age* and include them in the first stage regressions. In table 7 we present the results of the second stage of a 2SLS-IV

using the above described instruments.

TABLE 7—IV-2SLS-REGRESSIONS - PREDECESSOR ACTIVITY AND ENTERPRISE PERFORMANCE

Variables	Δ Ind.- & perf.-adj. PM			Δ Ind.-adj. PM		
	(1)	(2)	(3)	(4)	(5)	(6)
Active(IV:Death)	0.68	3.68**	4.53**	0.77	4.16**	4.98***
(predecessor)	(0.760)	(1.589)	(1.839)	(0.696)	(1.632)	(1.916)
Company age		0.02*	0.02		0.03**	0.02*
		(0.011)	(0.013)		(0.011)	(0.012)
Company age*Active(IV:Death)		-0.03**	-0.03*		-0.04**	-0.04**
		(0.017)	(0.018)		(0.017)	(0.018)
Human capital score (HCS)		0.94**	0.94**		0.98**	0.98**
		(0.459)	(0.454)		(0.453)	(0.450)
Human capital*Active(IV:Death)		-0.93	-0.99		-0.93	-0.97
		(0.713)	(0.700)		(0.695)	(0.685)
Family			0.79			0.76
			(1.227)			(1.211)
External			0.41			0.37
			(0.648)			(0.648)
Family*Active(IV:Death)			-1.20			-1.16
			(1.773)			(1.757)
Controls	√	√	√	√	√	√
Observations	391	383	383	391	383	383
R^2	0.03	0.06	0.05	0.09	0.12	0.12

Note: The table displays a Huber-White robust instrumental variables two stage least squares regression (IV-2SLS). The dependent variables are the difference in industry- and performance-adjusted profit margin (PM) in columns 1 to 3 and the difference in industry-adjusted profit margin (PM) in columns 4 to 6. The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM is PM less the median PM of the accordant year and industry (two-digit ISIC) of a control group (from the Amadeus database); Performance-adjustments are designed by sorting the industry-adjusted values of a control group into deciles and matching the individual industry-adjusted PM values of the sample with the accordant control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control. Independent variables are: *Active(IV:Death)* refers to the activity of the predecessor which is instrumented in the first stage regression using *Death* of the predecessor as an exogenous instrument; *Company age* is the age of the company in years; *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *External* indicates if a successor had no previous ties to the enterprise; and *Human capital score (HCS)* is derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism. Controls are: *Ln sales* (size) is the natural logarithm of sales in the year of the succession; *Industry-adjusted PM* (momentum) is the industry-adjusted ratio earnings before taxes divided by operating revenue in the succession year; *Industry- and performance-adjusted PM* (momentum) is industry- and performance-adjusted PM in the succession year (only in the regression in columns 1 to 3); *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* represents probability of default based on the Creditreform solvency-index score of the enterprise in the year of the succession; *Executives* displays the number of executives in the succession year; *Investment delay* is an indicator variable equal to one if an investment delay is perceived; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; and *Years* is the time elapsed in years since the succession. Interactions between variables are marked via stars *. Significances are displayed within the table via: * ten percent, ** five percent and *** one percent. The values in parentheses display Huber-White robust standard errors.

It is remarkable to observe that after factoring out the effect of performance on activity via a 2SLS-IV, we find that the effect of prolonged predecessor activity seems to be roughly one percentage point of differential industry- and performance-adjusted profit margin higher compared to the OLS regressions in table 6. Furthermore, it is interesting

to observe that the coefficients of *Active(IV:Death)* (column 2 of table 7: 3.68) remain significant at the five percent level even after including various controls, while the same pattern regarding the heterogeneity of the performance effect of prolonged predecessor activity with respect to the successor's human capital becomes visible. Unfortunately, we do not have enough different instruments to replicate column 3 of table 6, so our analysis mainly builds on a comparison of column 2 of table 6 and 7 respectively. We visualize this comparison in figure 2.

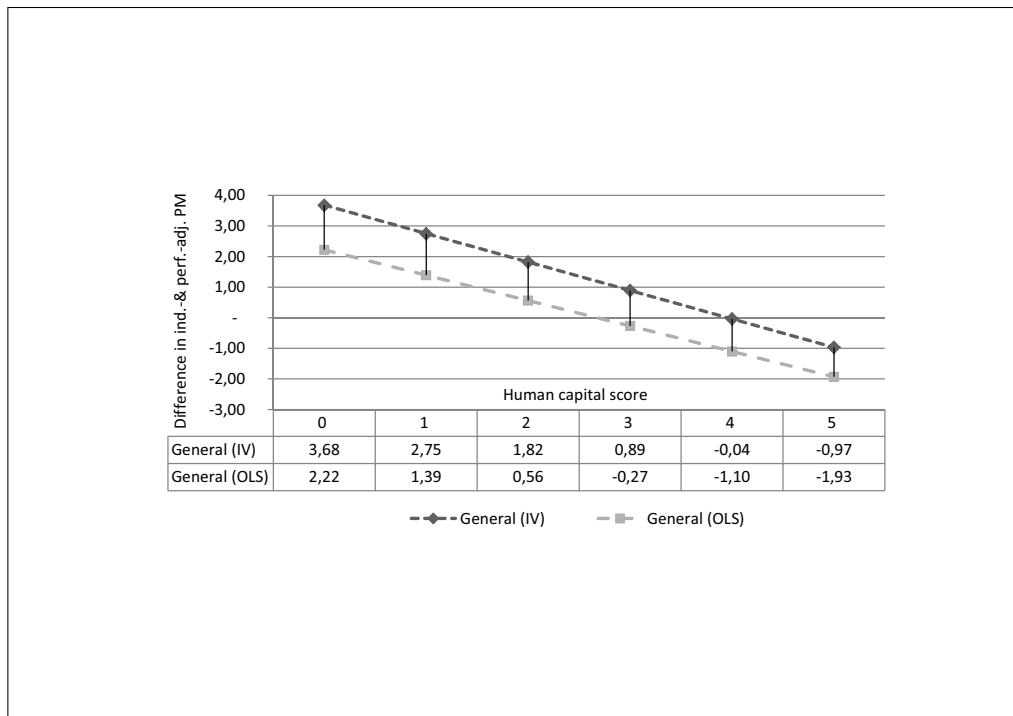|	Human capital score					
	0	1	2	3	4	5
General (IV)	3,68	2,75	1,82	0,89	-0,04	-0,97
General (OLS)	2,22	1,39	0,56	-0,27	-1,10	-1,93

FIGURE 2. COMPARISON OF OLS (TABLE 6) AND 2SLS-IV (TABLE 7) RESULTS

As can be seen in figure 2, the 2SLS-IV results suggest that the true effect of predecessor activity is slightly more positive as suggested by OLS results, thus we take this indication into account when interpreting the OLS results.

Furthermore, we address reservations that a general indicator for prolonged predecessor activity is not sufficient to cover all of the relevant heterogeneity, especially with respect to the specific role a predecessor can fulfill. However, as highlighted before, within some of the role categories our observations run pretty low and furthermore, the indication of multiple roles is possible, which blurs and smudges the potential performance differences of a differentiation of the predecessors' roles. Nevertheless, we shall still address this idea in the appendix table A3, but we refrain from putting too much emphasis on any results we reach due to the limitations highlighted. In order to over-

come the issues regarding the number of observations and the indication of multiple roles in table A3, we weighted the predecessor's roles and by summing up the weighted roles for each predecessor we create a degree of influence score for each predecessor. By pursuing this approach, we dramatically increase the number of observations for our regressions and approximately capture the (formal) intensity of the activity of the predecessor instead of just his activity. The degree of influence score is then employed within Huber-White robust OLS models similar to columns 1 to 4 of table 6. The regression results are presented in table 8.

Column 1 of table 8 shows that no significant effect of the degree of influence of a prolonged predecessor activity is visible without controlling for its highly heterogeneous and context-dependent nature, which is a very similar result to the general predecessor activity in table 6. But as soon as we interact the degree of influence with other variables, especially the successor's human capital score, a positive and significant effect per degree of influence (coefficient 0.58, significant at the five percent level) becomes visible. As column 2 of table 8 highlights, this positive effect is contrasted by the negative and significant interaction between human capital score and the degree of influence score (coefficient -0.22, significant at the one percent level). This interaction term can quickly gain in magnitude, for example for a degree of influence score of two and a successors human capital score of two the effect would already be a -0.88 percentage points reduced difference in industry- and performance-adjusted profit margin. Furthermore, it is interesting to observe that high human capital family successors seem to be capable of shielding parts of the negative effects of the negative interaction between human capital score and degree of influence, as the triple interaction term *family*human capital score*degree of influence* is positive and significant (coefficient is 0.35 at the five percent level, column 3 of table 8). Interestingly, this "shielding" effect even seems to increase slightly with the degree of influence of the predecessor, as the positive and significant coefficient (0.07, significant at the one percent level) of *family*human capital score*degree of influence*^{2} in column 5 of table 8 shows. Furthermore, column 4 of table 8 highlights another feature of the predecessor's degree of influence in family successions, when we control for nepotism, the *family*degree of influence* interaction turns negative and significant (-1.14, significant at the 10% level). This highlights that in family successions the degree of influence of the predecessor has more positive effects in nepotistic successions (coefficient of *nepotism strong*degree of influence* is 1.23 and significant at the five percent level) as compared to family successions without nepotistic traits. This finding is similar to the findings of column 4 of the table and highlights that once the successor has reached a sufficient level of human capital to steer the fortunes of the enterprise, the predecessor is best advised to reduce his degree of influence in order to maximize enterprise performance. This is also mirrored in a statement from another of the CEO successors (11) who took part in the in-depth interview: *"Then you ask yourself: who is calling the shots here, it is us or him [the predecessor]? This inevitably happens, because you say A and the senior says B. You have to find a consensus and sometimes you argue out the differences on the backs of the employees."* We visualize this aspect by depicting the results of regression two of table 8 in a three-dimensional diagram including differential

TABLE 8—OLS-REGRESSION - DEGREE OF PREDECESSOR INFLUENCE AND PERFORMANCE

Dependent variable:	Δ Industry- & performance-adjusted PM				
Variables	(1)	(2)	(3)	(4)	(5)
Degree of influence	-0.03	0.58**	0.95**	0.97**	0.86*
(predecessor)	(0.115)	(0.256)	(0.462)	(0.465)	(0.459)
Degree of influence^2					-0.01
					(0.072)
Company age		0.00	0.01	0.00	0.00
		(0.009)	(0.009)	(0.009)	(0.009)
Company age*Degree of influence		-0.00	-0.00	-0.00	-0.00
		(0.003)	(0.003)	(0.003)	(0.003)
Human capital score (HCS)		0.81***	0.78***	0.81***	0.88***
		(0.261)	(0.290)	(0.310)	(0.313)
Human capital*Degree of influence		-0.22***	-0.49***	-0.50***	-0.41***
		(0.083)	(0.155)	(0.158)	(0.130)
Family			-0.35	0.35	0.66
			(0.856)	(1.341)	(1.345)
External			-0.13	-0.13	-0.11
			(0.886)	(0.893)	(0.896)
Family*Degree of influence			-0.43	-1.14*	-0.96*
			(0.434)	(0.602)	(0.516)
External*Degree of influence			-0.30	-0.30	0.17
			(0.613)	(0.617)	(0.484)
Family*HCS*Degree of influence			0.35**	0.46***	
			(0.150)	(0.166)	
External*HCS*Degree of influence			0.29	0.29	
			(0.189)	(0.190)	
Family*HCS*Degree of influence^2					0.07***
					(0.024)
External*HCS*Degree of influence^2					0.02
					(0.027)
Nepotism strong				-3.85**	-3.87**
				(1.883)	(1.885)
Nepotism weak				-0.17	-0.22
				(1.438)	(1.430)
Nepotism strong*Degree of influence				1.23**	1.19**
				(0.529)	(0.503)
Nepotism weak*Degree of influence				0.53	0.49
				(0.435)	(0.419)
Controls	√	√	√	√	√
Observations	391	383	383	383	383
R^2	0.04	0.07	0.08	0.11	0.11

Note: The dependent variable is the difference in industry- and performance-adjusted profit margin (PM). The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM is PM less the median PM of the accordant year and industry (two-digit ISIC) of a control group (from the Amadeus database); Performance-adjustments are designed by sorting the industry-adjusted values of a control group into deciles and matching the individual industry-adjusted PM values of the sample with the accordant control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control. Independent variables are: *Degree of Influence (predecessor)* is a score of the predecessor's influence consisting of a weighted sum of all predecessor roles; *Degree of influence^2* is the degree of the predecessor's influence squared; *Company age* is the age of the company in years; *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *External* indicates if a successor had no previous ties to the enterprise; *Human capital score (HCS)* is derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism; *Nepotism strong* indicates if the predecessor only considered family members as successors; and *Nepotism weak* indicates if the succession is not categorized into the strong nepotism category and a family successor with lower human capital, compared to the average human capital of non-family successors within the industry of the company, is installed as successor. Controls are: *Ln sales* (size) is the natural logarithm of sales in the year of the succession; *Industry-adjusted PM* (momentum) is the industry-adjusted ratio earnings before taxes divided by operating revenue in the succession year; *Industry- and performance-adjusted PM* (momentum) is industry- and performance-adjusted PM in the succession year; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* represents probability of default based on the Creditreform solvency-index score of the enterprise in the year of the succession; *Executives* displays the number of executives in the succession year; *Working relation* is an indicator equal to one if the successor perceives the working relations with the predecessor as good; *Investment delay* is an indicator variable equal to one if an investment delay is perceived; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; and *Years* is time elapsed since the succession in years. Interactions between variables are marked via stars *. Significances are displayed within the table via: * ten percent, ** five percent and *** one percent. The values in parentheses display Huber-White robust standard errors.

abnormal performance, the degree of the predecessor's influence, and the human capital score of the predecessor in figure 3.
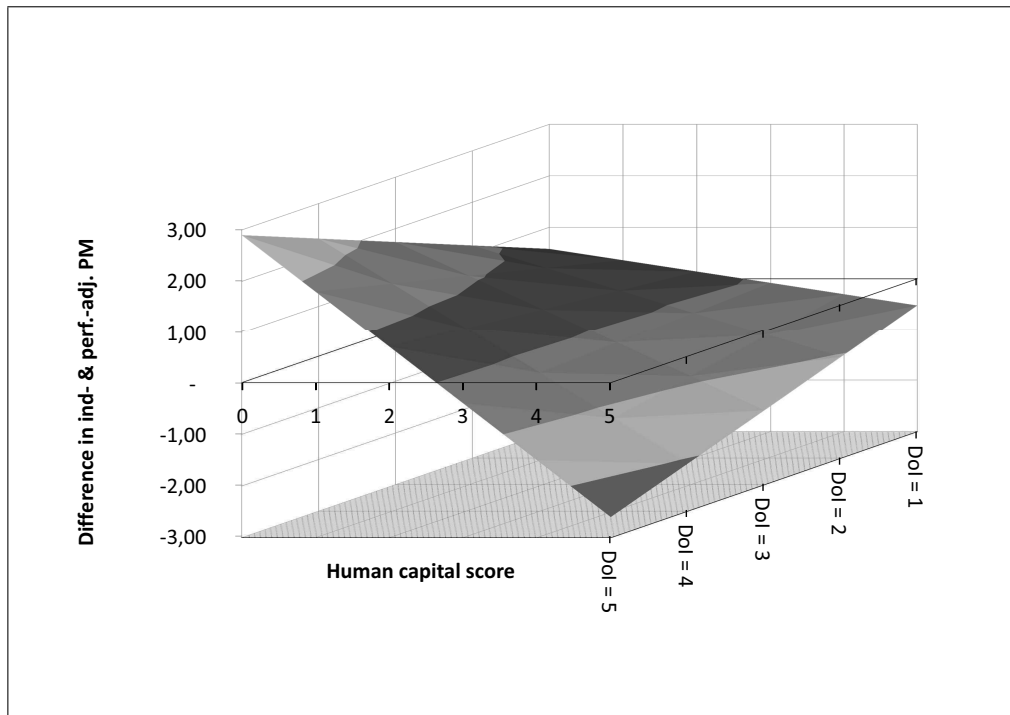

FIGURE 3. SUCCESSOR'S HUMAN CAPITAL, PREDECESSOR'S DEGREE OF INFLUENCE (DoI) AND PERFORMANCE

It is interesting to observe that figure 3 reveals the same general pattern as figure 1: a positive abnormal performance impact of predecessor activity diminishes with the increasing human capital score of the successor and eventually turns negative. Figure 3 now adds another aspect to this finding: the negative relationship between human capital score and predecessor activity is amplified and increased in magnitude with an increasing degree of influence of the predecessor. If the successor is equipped with very low level of human capital, a high degree of influence of the predecessor leads to a higher abnormal performance as compared to a low degree of predecessor influence. In contrast, if the successor has high levels of human capital, a high degree of predecessor influence leads to lower (more negative) abnormal performance as compared to a low degree of predecessor influence.

Overall, the results of this picture support the theoretical arguments for a "phasing-in" and "phasing-out" period (also known as the "succession dance", Handler, 1990), which allows the successor to gradually catch up with the incumbent's knowledge while the predecessor's activity shields the enterprise from the reducing knowledge and ability gaps of the successors. Once the successor has acquired a sufficient level of ability, our

results indicate that the predecessor is best advised to minimize his influence and activity in order to maximize enterprise performance. Again, we quote one interesting passage of the in-depth interviews with CEO successors (13): *"And even if he leaves the enterprise, I will certainly ask his advice on important decisions: The intuition of an entrepreneur, who for thirty years has steered his company, is quite different from the normal intuition. And that is why, thank goodness, he is still on board."* However, the predecessor might want to avoid becoming an impediment to post-succession enterprise change, or to coin it in the spirit of Campbell's book *The Hero with a Thousand Faces* (1949): the hero of today has to avoid becoming the tyrant of tomorrow.

VI. Conclusion

Our results provide evidence that the likelihood of a prolonged predecessor activity in CEO successions in family firms is significantly driven by family successions and successions flavored with nepotistic traits. This is possibly because predecessors, in addition to their private benefits from seeing a family heir steering the fortunes of their former enterprise, derive positive utility from prolonged activity within kin-steered enterprises. Furthermore, predecessors are significantly more likely to stay on board if they have children and this relationship is most pronounced for daughters. We suspect that this observation may be explainable by an intrinsic motivation to guide one's children into one's footsteps and a heartfelt wish to ensure a smooth family succession, a possible need to guide an interim management until the next family generation is old and experienced enough to become the new CEOs, and furthermore an increased need for income stability when raising children.

Interestingly, in industries with high levels of tacit knowledge (we employ the intangibles-sales ratio as a proxy), we also observe a significantly higher likelihood of activity by the preceding CEO. We suspect this observation may be explainable by the need for knowledge transfer between the successor and the predecessor, and furthermore, the need to keep idiosyncratic knowledge accessible. This observation is also in line with our evidence suggesting that the human capital score of the successor significantly negatively influences the likelihood of predecessor activity. We interpret this in the following way: when the ability of the successor is still limited, prolonged activity by the predecessor may be helpful as a period of adjustment, guidance and mentoring, but when the successor has strong capabilities he will strive for independence and the predecessor's activity becomes unnecessary if not an impediment to post-succession change. In addition, we find that successor ownership significantly decreases the likelihood of predecessor activity. This is in line with arguments which attach an insulating effect to (predecessor) ownership or, due to the status which ownership entails, a barrier to retirement. Furthermore, in line with intuition we observe that the years passed since the succession and corporate age significantly negatively affect the likelihood of predecessor activity. The above results are robust to the inclusion of an array of firm- and industry-level controls.

What might be most relevant to practitioners is the performance impact of the activity of the preceding CEO. Here we observe a highly ambivalent picture, which reveals a very clear pattern on a second viewing. Our results indicate that prolonged predecessor activ-

ity entails a significant positive impact on differential industry- and performance adjusted profit margins (Barber and Lyon, 1996), but there exists a significant negative interaction with the level of human capital and the predecessor's activity with respect to differential abnormal performance. Therefore, the overall performance impact diminishes with increased successor human capital and eventually turns negative for high levels of successor human capital. The above results of our Huber-White robust OLS regressions are robust to the inclusion of commonly used controls regarding enterprise size, momentum, ownership structure, and time and also further indicators of the state of the company and the working relations between successor and predecessor.

We interpret these findings as evidence that if an information or skill gap between the successor and predecessor exists, a phase of parallel activity, where management techniques and idiosyncratic knowledge are transferred, is vital for enterprise performance. This is especially the case if the human capital score of the predecessor is low and a prolonged predecessor activity shields the enterprise from the (arguably reducing) deficits of the successor. However, for strong and able successors an information or skill gap is potentially non-existent, while high human capital successors often spark vital organizational change (Miller, 1993, and Ahrens and Woywode, 2012). In such cases the continuing incumbency of the predecessor may be dysfunctional for the organization, because openness and responsiveness to change stimuli may be potentially diminished (Hambrick and Fukutomi, 1991, and Virany et al., 1992) and profound organizational change may for many reasons spark the resistance of the predecessor and lead to internal conflicts. Furthermore, if the preceding CEO omits to signal a willingness to clear out of the way in such conflicts and if the roles are not really defined (Handler, 1990), the successor might suffer from frustration and lower motivation leading to inferior performance (Dyck et al., 2002, Sharma et al., 2001, Sharma et al., 2003, and Le Breton-Miller et al., 2004). This is mirrored in the negative and significant performance impact of prolonged predecessor activity when the successor has high levels of human capital. Among the robustness checks we also employ a 2SLS-IV which reveals that the effect of performance on predecessor activity leads to an underestimation of the effect of predecessor activity on performance by roughly one percentage point of differential industry- and performance-adjusted profit margin, while on average the general heterogeneous pattern described above remains valid.

Furthermore, we find evidence that external and family successors seem to be capable of shielding against some of the negative influence of the *successor human capital*predecessor activity* interaction on differential abnormal performance as compared to enterprise successors, which as former veterans of the preceding CEO arguably have the hardest task in introducing change and avoiding internal conflicts. However, when we control for nepotism, it becomes visible that for family successions many of the positive influences of predecessor activity are due to "shielding effects" in order to avoid negative performance effects of successors with growing, but low human capital, while in non-nepotistic succession with arguably strong successors the predecessor's activity entails a significant negative effect on differential abnormal performance.

In addition, we also cast light on the degree of the predecessor's influence on differ-

ential abnormal performance. Remarkably, we find the same pattern as in the regressions including simply the predecessor's activity except that it seems to be amplified by an increasing degree of influence of the predecessor, which is robust to the inclusion of an array of controls. For low human capital successors a high degree of predecessor influence entails more positive and significant effects on differential industry- and performance-adjusted profit margins, as compared to a low degree of predecessor influence. By contrast, for successors with strong human capital a high degree of predecessor influence is related to much worse negative and significant effects on differential abnormal performance as compared to a low degree of predecessor influence.

Overall, our results highlight the potential positive role of a period of parallel activity with respect to knowledge transfers, especially if the successor's ability is still limited. A smooth "phasing-in" and "phasing-out" process, sometimes also referred to as the "succession dance" (Handler, 1990), which is dynamically guided by and oriented at the current level of ability of the successor seems to play a key role in unleashing a maximum performance in successions. One of the interviewed CEO successors (12) noted: *"In any case, what my father should be grated as a very positive trait, is that whenever my duties and responsibilities in the company gained weight, he accordingly and increasingly reduced his [responsibility]."* However, if the successor is already equipped or has reached a higher level of ability, the preceding CEO is perhaps best advised to minimize his influence and role and to avoid the hubris of king Jemshíd.

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APPENDIX

A1.　Detailed Sample Selection Information

This section is provided for the reader's convenience and is similar to Ahrens et al. (2012), Ahrens and Woywode (2012), and Ahrens et al. (2012,b) who employed a very similar data set. The second filter for the gross sample selection from the Mannheim Enterprise Panel (MUP) is composed in the following way. We suspect a succession event to have taken place, if between the years 2002 and 2008:

1) a leading member of the executive board resigned, or

2) a new leading member of the executive board was appointed, or

3) a previous owner reduced his share, or

4) a new or previous owner (a natural person) increased his share, and

5) one of the previous owners and leading members of the executive board was over 55 years old.

The age criterion raises the chance of observing normal successions caused by old age and the natural person criterion separates out takeovers by other companies (legal entities) from the sample, such that the observed population of the sample companies keeps the "concentrated ownership control" attribute. Furthermore, all enterprises which ceased to exist or went through a re-establishment are unobserved, which introduces a survivorship bias to our sample. As a consequence, we point out that our findings

are limited to the selected sample of surviving enterprises and are of reduced holistic representativeness. Nevertheless, these constraints only impose minor restrictions on this article's research goals.

Applying both filters to the MUP database yields a total gross sample of 14,250 enterprises, which is categorized according to the International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations as serving as a basis for standardized computer-aided telephone interviews. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are excluded. In addition, enterprises for which no telephone number is available in the MUP database are dropped (less than one percent).

The gross sample of 14,250 enterprises is contacted by the Center for Evaluation and Methods (CEM) using a standardized computer aided interview (ZEW-Unternehmensbefragung "Generationenwechsel Mittelstand", 2010).

A2. Additional Tables

In table A1 we present the industry classification key which we employed for the industry cluster aggregation (Table A1 is taken from Ahrens et al., 2012).

TABLE A1—INDUSTRY CLASSIFICATION KEY

ZEW industry key	ISIC Rev. 3.1 code	ISIC Rev. 3.1 industry description
	(1)	(2)
1. Manufacturing	D	Manufacturing
2. Construction	F	Construction
3. Business services	K	Real estate, renting and business activities (without ISIC 70: real estate activities)
	O	Other community, social and personal service activities (only ISIC 90: sewage and refuse disposal, sanitation and similar activities)
4. Consumer services	H	Hotels and restaurants
	K	Real estate, renting and business activities (only ISIC 70: real estate activities)
	M	Education
	N	Health and social work
	O	Other community, social and personal service activities (only ISIC 92: recreational, cultural and sporting activities and ISIC 93: other service activities)
5. Wholesale & retail	G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
6. Other	I	Transport, storage and communication
	J	Financial intermediation

Note: For each aggregated industry cluster the key in form of the ISIC Rev. 3.1 code (column 1) and its description (column 2) is reported. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are not included. ISIC industry categories with no observations are not displayed.

TABLE A2—DISAGGREGATED KNOWLEDGE TRANSFER PROXIES AND ACTIVITY OF PREDECESSOR

Panel	Probit regression dependent variable: active predecessor										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
A. Knowledge transfer proxies at the two-digit industry level											
Absolute new firms	-0.03			0.03							-0.03
	(0.121)			(0.126)							(0.164)
Start-up ratio		0.07		0.13							0.26
		(0.133)		(0.138)							(0.311)
Employee growth			-0.18	-0.21*							-0.09
			(0.111)	(0.119)							(0.181)
Total assets-sales ratio					-0.15					0.04	0.00
					(0.127)					(0.195)	(0.205)
Research & development expenses-sales ratio						-0.19				-0.06	0.00
						(0.136)				(0.155)	(0.176)
Tacitness (intangibles-sales ratio)							0.14			0.47**	0.44**
							(0.126)			(0.192)	(0.195)
CEO human capital score								-0.18		0.12	0.25
								(0.314)		(0.552)	(0.588)
Employment costs per employee									0.08	0.28	0.34
									(0.142)	(0.214)	(0.223)
B. Controls											
Successor attributes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Company level	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry level	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Years	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	747	747	747	747	747	489	587	747	701	465	465
Pseudo R^2	0.08	0.08	0.08	0.08	0.08	0.11	0.10	0.08	0.09	0.13	0.13

Note: A legend is presented separately.

Legend table A2: The dependent variable is an indicator equal to one if the predecessor remains active after the succession within his company and zero otherwise.

The variables of interest are the disaggregated elements of the knowledge transfer proxies per industry (at the two-digit ISIC level) used in table 3 and include: *Absolute new firms*, an indicator equal to one if the absolute number of new firms in the respective industry and year (using Eurostat data for 2008 and 2009 for Germany) if higher than or equal to the overall median of new firms per industry; *Start-up ratio* an indicator equal to one if the ratio of new firms to the total population of firms per industry category (using Eurostat data for 2008 and 2009 for Germany) is higher or equal to the overall median of the start-up ratio per industry; *Employees growth* is an indicator equal to one if the employee growth (per company) per industry and year (using Amadeus data for 2002 until 2009 for Germany) is higher than the overall median industry employee growth at the industry level; *Total assets-sales ratio* is an indicator equal to one if the total assets over operating revenue ratio per industry (using Amadeus Data from 2002-2009 for Germany) is greater than or equal to the overall median total assets-sales ratio at the industry level; *Research & development expenses-sales ratio* is an indicator equal to one if the research and development expenditure over operating revenue ratio (using COMPUSTAT data for EU 15 countries from 2002 to 2009) of the industry is higher than or equal to the overall median research & development expenses-sales ratio at the industry level; *Tacitness (intangibles-sales ratio)* is an indicator equal to one if the average intangibles over operating revenue ratio per industry (using COMPUSTAT data for EU 15 countries from 2002 to 2009) is equal to or above the overall median intangibles-sales ratio at the industry level; *CEO human capital score* is an indicator equal to one if the average non-family supply of CEO successor human capital per industry (using the sample data and the ZEW industry classification) is greater than or equal to the median non-family CEO successor human capital at the industry level; *Employment costs per employee* is an indicator equal to one if the employee costs per employee at the industry level (using Eurostat data from 2002-2008 for Germany) is greater than or equal to the median employee costs per employee at the industry level.

Controls include: *Family CEO*, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Enterprise CEO*, for unrelated successors who previously worked for the enterprise; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Human capital (score)* is the successor's human capital score derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism; *Ln employees* refers to the natural logarithm of the number of employees in the succession year; *Executives* displays the number of executives in the succession year; *Default probability* is default probability in the succession year derived from the Creditreform solvency index; and *Company age* is the age of the company in the succession year. *Industry level* controls are indicators equal to one if the respective category according to the ZEW industry classification (see appendix table A1) is met. *Years* is the number of years passed since the succession. All values are displayed in 07/2009 euros. The table presents estimated changes in probabilities devising a maximum-likelihood probit model. The stars display significances at: * ten percent, ** five percent and *** one percent. The values in parentheses display the standard errors.

Table A2 presents the disaggregated elements of the knowledge intensity proxies "dynamism" and "knowledge intensity" of table 3. An inspection of the results from table A2 yields that the individual proxies are, excluding the proxy for tacitness, all insignificant. Apart from tacit knowledge, this leads us to reject any proposed relations between the likelihood of the activity of the predecessor and the devised knowledge transfer proxies.

Table A3 shows a differentiation of the predecessor's roles with respect to their performance impact. In detail, we employ the same model as in column 4 of table 6, but vary the roles of the predecessor.

In general table A3 shows some heterogeneity between the predecessor roles with respect to their performance impact, especially with respect to the interactions with the successor's human capital score. However, since the interview allows predecessors to indicate multiple roles and because the observations in some of the role categories are rather low, we refrain from emphasizing these results and present them mainly for the sake of completeness.

TABLE A3—OLS-REGRESSION ANALYSIS - PREDECESSOR ROLES AND ENTERPRISE PERFORMANCE

	Owner (share-holder)	Active & responsible owner	Passive owner	Board member	Key account holder	Special tasks
Predecessor roles [Role]			Dependent variable: Δ Ind.- & perf.-adj. PM			
Variables	(1)	(2)	(3)	(4)	(5)	(6)
[Role]	2.50**	2.86**	1.04	5.97*	2.92	0.20
(predecessor)	(1.139)	(1.127)	(2.119)	(3.041)	(2.333)	(1.387)
Company age	0.01	0.00	-0.00	-0.00	-0.01	-0.01
	(0.009)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)
Company age*[Role]	-0.02*	-0.01	-0.02	-0.02*	-0.01	0.02
	(0.010)	(0.009)	(0.021)	(0.012)	(0.023)	(0.014)
Human capital score (HCS)	0.61**	0.59*	0.30	0.39	0.36	0.30
	(0.285)	(0.307)	(0.238)	(0.254)	(0.242)	(0.260)
Human capital*[Role]	-1.66***	-1.22***	-1.80*	-2.87**	-2.26*	-0.94
	(0.510)	(0.463)	(1.015)	(1.172)	(1.284)	(0.588)
Family	-0.27	0.25	-0.28	0.21	0.12	0.29
	(1.190)	(1.080)	(0.980)	(1.117)	(1.059)	(1.061)
External	-0.81	0.46	-0.24	0.26	0.15	0.38
	(0.827)	(0.858)	(0.702)	(0.719)	(0.693)	(0.740)
Family*[Role]	-3.59	-3.11	-4.50	-8.71**	-5.84*	-2.03
	(2.548)	(2.815)	(3.698)	(3.847)	(3.443)	(2.671)
External*[Role]	-0.65	-1.10	-3.85	-3.84	col.	-2.02
	(2.052)	(2.137)	(5.232)	(3.480)	col.	(2.481)
Family*HCS*[Role]	1.79***	1.16*	2.80**	3.54***	2.82*	0.81
	(0.654)	(0.678)	(1.350)	(1.320)	(1.537)	(0.988)
External*HCS*[Role]	1.39**	0.60	3.21*	2.23*	0.93	1.03
	(0.692)	(0.696)	(1.734)	(1.268)	(0.789)	(0.681)
Nepotism strong	-2.95*	-2.38*	-1.72	-2.80**	-1.97	-1.99
	(1.605)	(1.400)	(1.221)	(1.321)	(1.307)	(1.349)
Nepotism weak	-0.04	-0.01	0.41	-0.05	0.15	0.26
	(1.278)	(1.119)	(1.043)	(1.194)	(1.129)	(1.113)
Nepotism strong*[Role]	3.61	2.67	3.09*	6.70***	4.38*	1.42
	(2.323)	(2.486)	(1.800)	(1.861)	(2.478)	(1.791)
Nepotism weak*[Role]	2.06	1.87	1.92	3.39*	2.14	-0.12
	(2.115)	(2.301)	(2.666)	(1.970)	(2.030)	(1.836)
Controls	√	√	√	√	√	√
Observations	383	383	383	383	383	383
R^2	0.10	0.08	0.11	0.11	0.08	0.07

Note: The dependent variable is the difference in industry- and performance-adjusted profit margin (PM). The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM is PM less the median PM of the accordant year and industry (two-digit ISIC) of a control group (from the Amadeus database); Performance-adjustments are designed by sorting the industry-adjusted values of a control group into deciles and matching the individual industry-adjusted PM values of the sample with the accordant control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control. Independent variables are: *[Role] (predecessor)* is a flexible indicator equal to one if the role of the predecessor in the respective column is met; *Company age* is the age of the company in years; *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *External* indicates if a successor had no previous ties to the enterprise; *Human capital score (HCS)* is derived from the sum of five proxy elements: (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism; *Nepotism strong* indicates if the predecessor only considered family members as successors; and *Nepotism weak* indicates if the succession is not categorized into the strong nepotism category and a family successor with lower human capital, compared to the average human capital of non-family successors within the industry of the company, is installed as successor. Controls are: *Ln sales* (size) is the natural logarithm of sales in the year of the succession; *Industry-adjusted PM* (momentum) is the industry-adjusted ratio earnings before taxes divided by operating revenue in the succession year; *Industry- and performance-adjusted PM* (momentum) is industry- and performance-adjusted PM in the succession year; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* represents probability of default based on the Creditreform solvency-index score of the enterprise in the year of the succession; *Executives* displays the number of executives in the succession year; *Working relation* is an indicator equal to one if the successor perceives the working relations with the predecessor as good; *Investment delay* is an indicator variable equal to one if an investment delay is perceived; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; and *Years* is the time elapsed in years since the succession. Interactions between variables are marked via stars *. Significances are displayed within the table via: * ten percent, ** five percent and *** one percent. The values in parentheses display Huber-White robust standard errors.

Chapter 3

Gender Preferences in CEO Successions in Family Firms: Family Characteristics and Human Capital of the Successor

By Jan-Philipp Ahrens, Andreas Landmann, and Michael Woywode *

We investigate labor market constraints in CEO succession contests devising an unique data set on CEO successions in enterprises with concentrated ownership and control. We find that a preference for male family heirs limits labor market selectivity: Family successions are significantly more likely to occur when a son is among the predecessor's children as compared to daughters. Sons among the children increase the likelihood of nepotistic successions, while in turn female family successors are equipped with higher human capital due to tougher selectivity criteria. Furthermore, the regional industry supply of CEO resources influences the observed human capital of installed successors.
(JEL: G30, J13, J24, L26, M51)
Keywords: CEO succession, family firms, family characteristics, human capital, promotion decisions.

I. Introduction

The recent economic literature on ownership and control reports that around the world most firms are controlled by families, founders or their heirs (La Porta et al., 1999, and Faccio and Lang, 2002). One of the most perilous moments in course of family- and in particular owner-controlled firms are CEO successions, as only 30% of these firms survive past the lifespan of their founders (Sonnenfeld and Spence, 1989).

This circumstance has led to a growing attention to the post-succession period in family firms in the firm performance literature, which highlights imperfections in the CEO successor labor market contests leading to subsequent performance declines (Pérez-Gonzalés, 2006, Bennedsen et al., 2007, and Ahrens et al., 2012). The concentration of ownership and control opens a leeway for the controlling majority, often the parting CEO, to pursue private benefit maximization instead of profit maximization (Fama and Jensen, 1983, and Demsetz 1983). In the case of a CEO succession this pursuit takes the form of biases towards and favoritism of family members, while such nepotistic tendencies or even primogeniture can have detrimental effects for the family firm and firm performance (Pollak, 1985, Bloom and Van Reenen, 2007, and Ahrens et al., 2012).

At the core of this imperfection is the preference or wish of the parting CEO to see a family heir to steer the fortunes of the family enterprise or even of his oeuvre, which leads to a constraint of the successor pool to family members only (id est persons related to the parting CEO by either blood or marriage). However, in the light of the recent literature on U.S. family structures ("The Demand for Sons", Dahl and Moretti, 2008) the question remains whether this is the complete story, or phrased differently: Is there a second constraint within the family successor pool which further reduces the successor pool towards male-family successors? As a consequence, if nepotistic successions occur more often among male successors, then the reduced selectivity of these CEO succession contests should be mirrored in a lower ability of male family CEO successors as compared to female family CEO successors. In this article we try to identify potential forces among the family, firm and industry characteristics which lead to cases of nepotism in CEO successions. We harness an unique data set which covers 804 CEO successions between 2002 and 2008 in German family firms with concentrated ownership and we differentiate between strong forms and weak forms of nepotism. Our results indicate that the occurrence of both forms of nepotism is significantly driven by the presence of male children among the predecessor's children which is robust to the inclusion of various controls and is indicative for a gender preference of the predecessor.

The single pieces of evidence taken alone will not allow us to make a point, but bringing them together they deliver a clear picture: Family entrepreneurs seem to prefer male family successors over female family successors. When the predecessor has at least one son and one daughter, a male family successor is chosen in 79% of the family successions. In addition, if the predecessor has only sons, a male family successor is chosen in 94% of the family successions, whereas if the predecessor has only daughters, a male family successor is still chosen in 21% of the family successions. The presence of sons among the predecessor's children significantly (at the one percent level) increases the probability to observe a family succession. This finding is robust to the inclusion of firm

and industry level controls. Furthermore, our results on the family structure of family firm entrepreneurs hint at strategic behavior to increase the number of children until at least one son is born.[1]

Interestingly, on average female family successors are equipped with significantly (at the five percent level) higher levels of human capital as compared to male family successors. For example, female family CEO successors are nearly eleven years older (significant at the five percent level) compared to male family heirs. These differences also become visible when contrasting post-succession performance developments: the profitability in terms of profit margin reduces by -7.4% in male family successor led enterprises, while it increases by 14% in female family successor steered enterprises. This difference-in-differences remains robust when controlling for industry and performance trends. The observed human capital of the successors is significantly negatively related (at the one percent level) to a family origin of the successor, indicating nepotistic tendencies. In addition, our results show that the observed human capital score of the installed CEO successor is significantly and positively related to the average regional industry supply of CEO human capital. These results are robust to the inclusion of various controls.

The main finding of this article is that there seems to be a further constraint of the CEO labor market in the case of successions in family firms due to the preferences for sons. Our results highlight the fact that in enterprises with concentrated ownership control, such as family firms, the preferences of the predecessor play a crucial role in the observed human capital of the installed CEO successor and the subsequent performance of the enterprise. The article is designed in the following way: Section II gives a literature overview and is followed by the theoretical section III. Section IV gives information on the sample. Section V is dedicated to the data analysis. It begins with a brief descriptive overview, followed by a proposition testing. Section VI discusses the main results and offers a conclusion.

II.   Related Literature

CEO succession have been studied extensively by various scholars leading to a many-chromatic literature strand. This article focuses on potential constraints of the CEO successor labor market with a particular attention on the family structure of the predecessor and the gender of the successor. Therefore, the main literature strands related to this article are the theory of the firm, the economic contest literature and the recent economic literature on family structures.

The question whether gender preferences matter has been raised quite early, as for the analysis of individual behavior gender preferences might be of importance (Ben-Porath and Welch, 1976). Two articles of Dahl and Moretti (2004, 2008) find evidence which supports the notion that parents in the U.S. slightly favor boys over girls. For example, they report that women with first-born daughters are significantly more likely to become divorced and significantly less likely to be shotgun married, as compared to women with

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[1]It might be interesting to validate this finding using another data set.

first-born sons (Dahl and Morretti, 2008). Furthermore, they find that this gender bias due to the strong preferences of men to have sons, while women only seem to have slight preferences of daughters over sons (Dahl and Moretti, 2008). Fathers are reported to spend more time with their sons (Morgan et al., 1988, and Lamb, 1997). While the labor market behavior of married men seems to be largely inflexible to family size (Angrist and Evans, 1998), there is evidence that the labor supply and wage rates of men raise more with the event of having a son as compared to having a daughter (Lundberg and Rose, 2002). Interestingly, the article of Dahl and Moretti (2008) also highlights that fertility rates in families with a first-born girl are significantly higher as compared to family with a first-born sons.[2]

As many family firms are steered by male CEOs, we speculate that gender preferences might also find their way into CEO succession contests and decisions. For example, Bennedsen et al. (2007) report that the decision to appoint a family CEO successor is significantly higher when the first-born is a boy. There is also evidence in the financial economics literature. Using data of 90 family firms in Thailand, Bertrand et al. (2008) show that the sons of founders crowd out the ownership and control right of other family members, which is most evident when the founder has perished. Furthermore, they highlight that a relative larger number of sons among the children of the founder is negatively correlated with lower firm-level performance, while no such correlation could be found for the number of daughters.

It is argued in the literature that among the reasons for such negative performance outcomes are constraints in the CEO succession contest which curb the natural selectivity of CEO labor market (Pérez-González, 2006, Bennedsen et al., 2007, and Ahrens et al., 2012).[3] Installing such constraints becomes possible, because in family firms one often finds unity of ownership and control allowing the departing CEO to enforce his own preferences and private benefits, while such a pursuit potentially imposes agency costs on minority shareholders, as highlighted in the respective ownership and control literature (Jensen and Meckling, 1976, Fama, 1980, Demsetz and Lehn, 1985, Shleifer and Vishny, 1986, Johnson et al., 2000, Demsetz and Villalonga, 2001, Dyck and Zingales, 2004, and Villalonga and Amit, 2006). In CEO succession contests one possible constraint is restricting the pool of contestants to the family. Such restrictions adversely affect the labor market contest leading to a lower ability of the winning candidate compared to an unrestricted candidate field, as the contest's structure and the available pool of contestants are decisive for its outcome (Konrad, 2009). In turn, a lower ability of favored CEO successors can lead to lower post-succession enterprise performance, as has been reported by Pérez-González (2006) and Ahrens et al. (2012). The question whether potential gender preferences also induce observable favoritism (or even nepotism) and human capital effects in CEO successions has to the best of our knowledge not yet been addressed directly in the literature.

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[2] For the United States there is some evidence which suggests that the intensity of these parental gender preferences declined over the last decades, possibly due to changes in societal gender system (Pollard and Morgan, 2002).

[3] CEO successions can also be understood as career ladder contests (Fama, 1980, Lazear and Rosen, 1981, Rosen, 1986, and Ahrens et al., 2012).

III.   Theoretical Section

A.   *Categories and Definitions*

The aim of this article is to explore the influence of gender preferences in CEO successions in enterprises with "concentrated ownership control" (or family firms), which are defined for the purposes of this article as follows:

DEFINITION 1:   *An enterprise with concentrated ownership control is present if a maximum of three natural persons own more than 50% of the enterprise and at least one of these owners is a leading member of the executive board.*

Furthermore, in this article the attribute *family* is attached to successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise, while the *non-family* attribute applies to all other successors. To assess the human capital of the respective successors, we employ the human capital construct previously employed by Ahrens and Woywode (2012). This construct is defined as the sum of five proxy elements: (1) age above median (proxy for general experience), (2) industry experience above median (proxy for industry related experience), (3) leadership experience (proxy for practical managerial skills), (4) merchant education, if the successor holds an university degree in business studies (or strongly related field) or was educated at an university of cooperative education (proxy for theoretical managerial skills), and (5) use of a business plan during the succession (proxy for professional managerial skills). The human capital score mirrors a thought brought forward by Murphy and Zábojník (2004) who argue that managerial skills have gained more importance for CEOs over the last three decades. This is due to the progress in computerization, corporate controlling and finance, and other arts which, if mastered by the CEO, increase a CEO's ability to steer a company and make specific knowledge more accessible than in earlier decades. In addition, the human capital score also reflects the notion of the human capital theory that productivity-enhancing investments take place in the education and post-education phase (Mincer, 1974 and Strober 1990).[4]

In addition, we address potential biases of the predecessors in favor of specific groups of CEO successors. Following this idea, we apply a dual approach by distinguishing between *strong nepotism* and *weak nepotism* which we define for purposes of this article as follows:

DEFINITION 2:   *Strong nepotism is present if the predecessor only considers family members as successors.*

DEFINITION 3:   *Weak nepotism is present if the predecessor also considers non-family members as successors, but decides to install a family member with a human capital score lower than the average achievable human capital score of managers available in the respective industry of his enterprise.*

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[4]For a more detailed introduction and explanation of the human capital score we refer to Ahrens and Woywode (2012).

In other words, weak nepotism is measured via the amount of the successor's human capital which predecessors are willing to give up in order to see a family heir steering the fortunes of their family business. In order to be able to measure any allowance or discount in human capital, we have to determine a benchmark for the average achievable managerial human capital. Our benchmark is designed as follows: By assuming that no nepotism is at work in succession in which the company was not handed over to a family CEO, we infer that an able successor was chosen in these cases. Therefore, we take the mean human capital score of the CEOs per industry of only these cases as a benchmark.[5]

B. *Derived Propositions*

Using the definitions of the previous section, we derive propositions which are presented in the following. Apart from strictly excluding non-family successors from the succession contest (strong nepotism), there may also be weak forms of nepotism, and the constraints they impose on the succession contest are likely to have an impact on the contest outcome. Thus, assuming that some family heirs are preferred by their predecessors despite the availability of a better candidate (weak nepotism), then the impact of such nepotistic tendencies is likely to be mirrored in a lower average human capital of family successors.

PROPOSITION 1: *The successor's human capital is likely to be lower among family CEO successors as compared to the average human capital of successors.*

In addition to the wish of seeing a family heir to steer the fortunes of ones oeuvre, we assume that a "*demand for sons*" (Dahl and Moretti, 2008), thus gender preference of the predecessor, is likely to find its way into CEO successor decisions, which might be particularly true for owner controlled family firms which allow the pursuit of private benefit maximization. Therefore and possibly due to the societal gender system and general socialization, we suspect that many family firm patriarchs wish their son(s) to follow in their footsteps.

PROPOSITION 2: *Predecessors show a preference of male family heirs as CEO successors.*

As a potential consequence of the pursuit of preferences or favoritism in CEO successions are contest constraints, we argue that the predecessors' wish for sons as successors fuels tolerance of a lower human capital of the successor (weak nepotism) and might even lead to an exclusion of non-family successors from the succession contest (strong nepotism).

PROPOSITION 3: *If the predecessor has male children this increases the likelihood of nepotism in successions.*

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[5]We assume that the mean human capital score of all non-family successors per industry in the sample is a sufficient proxy on the external supply of CEO human capital and assume that this level of human capital is attainable by all companies in their respective industry within the boundaries of a standard search for a non-family CEO successor. To calculate the industry means, we employ the rather broad Centre for European Economic Research industry classification consisting of six general industry categories, as we have only 804 observations.

However, we suppose that predecessors might be unwilling to accept any amount of lower human capital arbitrarily, but that they might compare their heirs to the external CEO labor market and will not allow an exaggerated mismatch in ability. Thus, we suspect that the supply of human capital, in terms of the average available managerial human capital in the respective industry of the succession enterprise, will be positively related to the human capital of the successor installed.

PROPOSITION 4: *The family successors' human capital is positively related to the level of average achievable CEO human capital in the respective industry of the enterprise.*

IV. Sample Selection

In this article we revisit the data set of Ahrens and Woywode (2012). The data set for this article relies on the following sources: (a) the Mannheim Enterprise Panel (MUP), (b) the Bureau van Dyjk Amadeus database (Amadeus), (c) the Hoppenstedt database, (d) the Creditreform solvency index information, (e) German Bundesbank information, (f) standardized computer aided telephone interviews (ZEW-Unternehmensbefragung "Generationenwechsel Mittelstand", 2010), (g) non-standardized direct interviews and (h) web-searches. Overall, we observe 804 CEO successions in German family enterprises with concentrated ownership and control with a size of 30 to 1,000 employees, which took place between 2002 and 2008.[6]

V. Data Analysis

A. Summary Statistics

A first inspection of the data set shows that female CEO successions occur more often in family successions, a quarter of the family successions are female family CEO successions, whereas a fifth of all successions are female CEO successions. The fact that there are much fewer female successions already hints at a potential preference of male over female successors.[7] Overall, female family CEO successions occur relatively often in the consumer services sector (32.4% of female family successors, and 30.9% of female successors), as opposed to lower relative rates in the manufacturing sector (20.5% of female family successors, and 16.4% of female successors.).[8]

We theorize that a wish for a male successor might play a key role in the choice of a successor. Thus, we start by categorizing the children structure of the predecessors into: (a) male children only, (b) female children only, (c) mixed children, and (d) no children. The summary statistics of this categorization which are presented in table 1 already reveal interesting results.

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[6]For further information on the sample selection, we refer to Ahrens and Woywode (2012).

[7]It might also be that female successions occur less often because of gender differences in the CEO labor supply. However, due to the size of the difference, we believe that it is unlikely that labor supply can exclusively explain the difference.

[8]For additional summary statistics we refer to the appendix A1.

TABLE 1—CHILDREN STRUCTURE OF THE PREDECESSOR AND SUCCESSIONS

Variable	Total	Male only	Female only	Mixed	No children	Gender unknown	Ratio (2) to (3)	Ratio (4) to (2)&(3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Type of succession								
1. Family	455	141	58	249	2	5	2.43	1.25
	(57.81)	(64.68)	(49.15)	(65.70)	(3.45)	(35.71)		
	[100.00]	[30.99]	[12.75]	[54.73]	[0.44]	[1.10]		
2. Non-family	332	77	60	130	56	9	1.28	0.95
	(42.19)	(35.32)	(50.85)	(34.30)	(96.55)	(64.29)		
	[100.00]	[23.19]	[18.07]	[39.16]	[16.87]	[2.71]		
Difference		7.8**	-5.3**	15.6***				
(1-2)		*(3.2)*	*(2.6)*	*(3.6)*				
Total	787	218	118	379	58	14	1.85	1.13
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)		
	[100.00]	[27.70]	[14.99]	[48.16]	[7.37]	[1.78]		
B. Gender of family CEO successor								
3. Male family CEO	336	131	12	191	1	1	10.92	1.34
	(75.68)	(93.57)	(21.43)	(78.93)	(50.00)	(25.00)		
4. Female family CEO	108	9	44	51	1	3	0.20	0.96
	(24.32)	(6.43)	(78.57)	(21.07)	(50.00)	(75.00)		
Difference in class (3-4)		87.14	-57.14	57.86				
Total	444	140	56	242	2	4	2.50	
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)		
	[100.00]	[31.53]	[12.61]	[54.50]	[0.45]	[0.90]		
C. Intensity of nepotism								
5. Nepotism	363	112	40	204	2	5	2.80	1.34
	(46.12)	(51.38)	(33.90)	(53.83)	(3.45)	(35.71)		
	[100.00]	[30.85]	[11.02]	[56.20]	[0.55]	[1.38]		
5a. Strong nepotism	52	17	4	31	0	0	4.25	1.48
	(6.61)	(7.80)	(3.39)	(8.18)	(0.00)	(0.00)		
	[100.00]	[32.69]	[7.69]	[59.62]	[0.00]	[0.00]		
5b. Weak nepotism	311	95	36	173	2	5	2.64	1.32
	(39.52)	(43.58)	(30.51)	(45.65)	(3.45)	(35.71)		
	[100.00]	[30.55]	[11.58]	[55.63]	[0.64]	[1.61]		
6. Family no nepotism	92	29	18	45	0	0	1.61	0.96
	(11.69)	(13.30)	(15.25)	(11.87)	(0.00)	(0.00)		
	[100.00]	[31.52]	[19.57]	[48.91]	[0.00]	[0.00]		
7. Non-family	332	77	60	130	56	9	1.28	0.95
	(42.19)	(35.32)	(50.85)	(34.30)	(96.55)	(64.29)		
	[100.00]	[23.19]	[18.07]	[39.16]	[16.87]	[2.71]		
Difference		-0.6	-8.5**	7.3				
(5-6)		*(5.4)*	*(3.9)*	*(5.8)*				
Difference		8.8***	-6.2**	18.9***				
(5-7)		*(3.3)*	*(2.6)*	*(3.7)*				
Total	787	218	118	379	58	14	1.85	1.13
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)		
	[100.00]	[27.70]	[14.99]	[48.16]	[7.37]	[1.78]		

Note: The predecessor's children structure is categorized in columns 2 to 6 in: *Male only* for predecessors with one or more sons; *Female only* for predecessors with one or more daughters; *Mixed* for predecessors with both one or more sons and one or more daughters; *No children* for predecessor without children; and *Gender unknown* for predecessors with children whose gender was not indicated in the interview. The successions are clustered according to the following categories: *Family*, if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Non-family*, if a successor is not related to one of the three persons owning more than 50% of the enterprise; *Male family CEO* is an indicator equal to one if a male family successor was chosen; *Female family CEO* is an indicator equal to one if a female family successor was chosen; *Nepotism* includes all successions which fall either into the strong or weak nepotism category; *Strong nepotism* refers to successions in which non-family CEOs were not considered as successors; *Weak nepotism* includes non-strong nepotism successions in which a family successor with a lower human capital than the average of the non-family CEO successors of the respective industry was installed; and *Family no nepotism* presents family successions in which no nepotism was observed. The fraction of observations as a percentage of the absolute amount of the observations per children structure category is displayed in parentheses. The fraction of observation as a percentage of the absolute amount of observations: (a) per succession type (panel A), (b) per gender (panel B), or (c) per nepotism category (panel C) is shown in square brackets. Standard errors are reported in italics.

The patterns in table 1 suggest that family entrepreneurs seem to prefer male successors to steer the fortunes of their family enterprise. This becomes clear by inspecting some basic numbers (panel A): When we compare family to non-family successions, the "male children only" category has a 7.8 percentage points higher share (significant at the five percent level) within the family category as compared to the non-family category, while the "'female children only" category has -5.3 percentage points lower share (significant at the five percent level) in the family category as compared to the non-family category. Furthermore, cases where the predecessor has at least one son and one daughter have a 15.6 percentage points higher share (significant at the one percent level) among family successions as compared to non-family successions. Interestingly, predecessors who have exclusively sons hand their enterprises in 64.7% to family heirs, whereas predecessors who have exclusively daughters only do so in 49.2% of the cases.

Column 7 of panel A reveals another striking insight. Seen from a biological point of view, the ratio "male children only" to "female children only" (column 7) should be near 1, as the likelihood of giving birth to a girl is (roughly) as high as for a son. Such a result is in tendency observable for the non-family successions with a ratio of 1.28. However, the ratio is 2.43 for family successions, a finding which is very unlikely to be caused by biological randomness. This hints that the predecessors tried to obtain a son strategically by increasing the number of children until they had a son, which leads to reduced observations of the "female children only" category. This peculiar result alone might be interpreted as indication of a preference of sons as successors, as the ratio "male children only" to "female children only" is 1.85 over the total sample.

Within the family succession category (panel B) another interesting finding underlines the preference for male successors: If the predecessor has only male children, in 93.6% of the cases a male family CEO is installed, whereas if the predecessor has only female children, then the decision in favor of a female family CEO is only observed in 78.6% of cases. Furthermore, if the children structure is "mixed" a male family CEO is installed in 78.9% of cases. Column 8 highlights another finding: statistically, the probability of remaining within the category "female only" or "male only" reduces by each additional child after the first child, while the chances of following the "mixed" category increase. Thus, the ratio of "mixed" to "female only" plus "male only" (column 8) is indicative for the number of total children (and thus the attempts to have a son). When we apply this intuition, we observe that predecessors who install a male family CEO are more likely to have more children (ratio 1.34) as compared to cases where a female family CEO is installed (ratio 0.96). From a more general point of view, bringing the individual pieces of evidence from panel A and B together, the overall picture is supportive of proposition 2.

In proposition 3 we speculate that the wish of some predecessors to install a male family heir as CEO successor might also boost nepotistic tendencies. In panel C of table 1 we advance this idea. Overall, within the "male children only" category 51.4% of the successions entailed nepotistic traits, while within the "female children only" category this was the case in only 33.9% of the successions.[9] It is worth noting that the "male-

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[9]This finding is mirrored in the significant differences in shares within the children structure categories across the

children only" to "female children only" ratio (trying to obtain a son) increases with the intensity of nepotism and is highest for strong nepotism (4.25, column 7, panel C), while the same is true for the "mixed children" to "male-children only" plus "female children only" ratio (indicative for the number of children) which is also highest for strong nepotism (1.48, column 8, panel C). We conclude that proposition 3 cannot be rejected on the basis of these initial observations. Overall, we find that predecessors strategically tried to obtain a son, while this behavior positively correlates with the intensity of nepotism.

However, if we observe nepotism less often among female family CEOs as table 1 suggests, then this is likely to have a positive impact on the human capital of female family heirs. Figure 1 presents a visualization of the allowances in family CEO human capital against the average achievable human capital across the industry dimension.
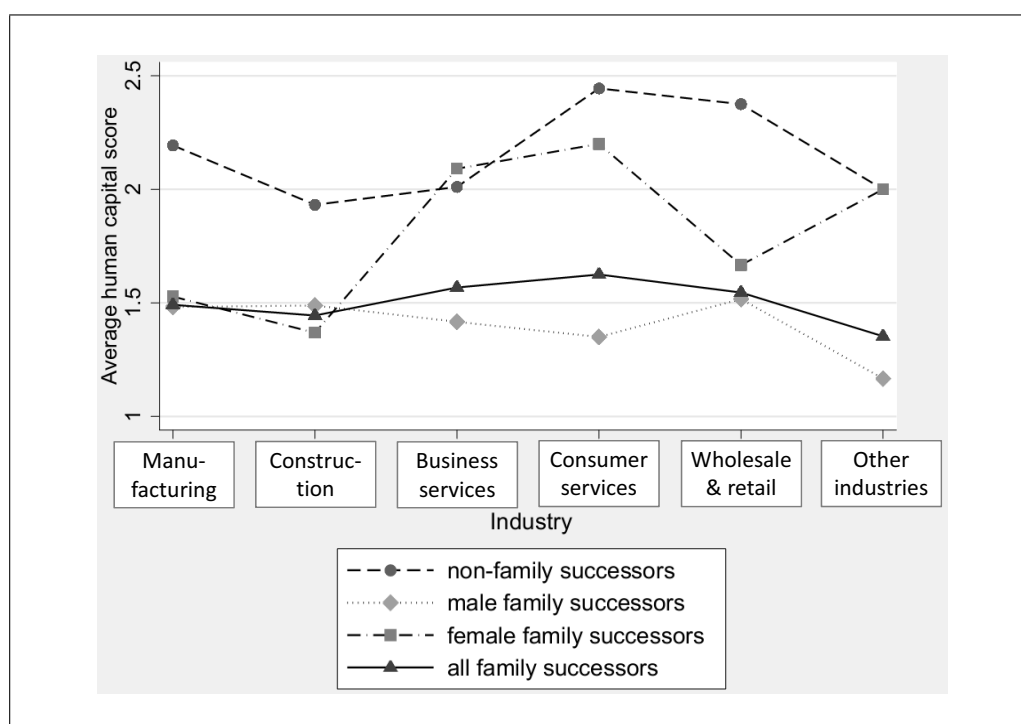

FIGURE 1. HUMAN CAPITAL OF CEO SUCCESSORS PER INDUSTRY

As we can see from figure 1, the average human capital of family successors is lower across the industries as compared to non-family successors, which is indicative for propo-

nepotism dimensions: The "male children only" category has an 8.8 percentage points higher share (significant at the one percent level) among the nepotistic family succession category (row 5) when compared with the non-family category (row 7). In contrast, the "female children only" category has a -6.2 percentage points lower share (significant at the five percent level) among the nepotistic family successions category as compared to the non-family category (and -8.5 percentage points, significant at the five percent level, when nepotistic family successions are compared to non-nepotistic family successions in row 6 in panel C).

sition 1.[10] In figure 1 it is important to note that the discount of human capital among female family successors is much lower in many industries. In the business service sector, female family CEO successors are even equipped with a higher endowment of human capital than non-family successors on average. This indicates that favoritism occurs less frequently among female CEO successors, which is weakly indicative for proposition 3 and also indicates that the predecessors seem to prefer sons, rather than daughters, as successors.

Table 2 presents the human capital elements and the succession characteristics in more detail.

The results in table 2 show that female family successors are in some areas equipped with significantly higher human capital. Female family successors benefit from significantly higher age (10.9 percentage points, significant at the five percent level) and are 11.5 percentage points more often equipped with a merchant education (significant at the five percent level) when compared to male family successors. With regard to the other human capital proxies, the evidence is mixed and insignificant. Furthermore, on average the predecessor stays active in a leading and shareholding position more often in female family successions as compared to successions of male family successors, which potentially mirrors a lack of confidence in the successor. In reading the results from table 2 it is important to contrast the post-succession performance developments. The average profitability in terms of profit margin reduces by -7.4% for male family successors, while female family CEO manage to increase profit margin by 14%, even though they are subject to stronger gravitational forces towards the mean as they on average inherit more profitable enterprises in the successions year as compared to male heirs. This difference-in-differences remains robust when controlling for industry and performance trends, however it is not significant.[11] Overall, the human capital score reports that the share of high human capital female family successors is 11.9 percentage points higher (significant at the five percent level) as compared to male family successors.

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[10] We excluded cases of strong nepotism in this figure.

[11] The performance is measured between the succession year and the year 2009. This entails the advantage to automatically cancel out time-invariant firm characteristics driving performance. Profit margin (PM) might be subject to industry trends. Hence, we introduce industry adjustments, which are calculated by subtraction of the median PM of the accordant year and industry (at the two-digit ISIC code level) of a control group (from the Amadeus database) of 187,388 company-year observations. PM is calculated by dividing earnings before taxes (Amadeus item 33) by operating revenue (Amadeus item 24) and a multiplication by 100. We required all industry categories in the control group to include at least five observations per year and industry. We employ two-digit industry controls because Richard N. Clarke (1989) shows that the difference between two-digit and four-digit SIC controls is marginal. Furthermore, we also attempt to eliminate outliers by winsorizing the unadjusted PM values at the 0.025 level and take into account the influence of performance trends due to pre-succession performance by introducing performance adjustments employing performance peer groups (Barber and Lyon, 1996). We design the peer groups for the performance adjustments by dividing the industry-adjusted values of the control group into deciles for each accounting period. By matching the industry-adjusted profit margin of each sample firm with the accordant control group decile in the year of the succession, the relevant control group is identified for each enterprise. The median PM of the relevant control group and year is then used as a control for the PM observations of the sample group (see also Ahrens and Woywode, 2012).

TABLE 2—SUMMARY STATISTICS OF FEMALE AND MALE SUCCESSION CHARACTERISTICS

Variable	Succession type				Difference of means (3) and (4)
	Family	Female family	Male Family	Non-family	
	(1)	(2)	(3)	(4)	(5)
Use of business plan (%)	46.8	43.5	47.3	58.5	-3.8
	(2.34)	(4.79)	(2.73)	(2.64)	(5.51)
High experience - age (%)	29.0	38.0	27.1	47.9	10.9**
	(2.13)	(4.69)	(2.43)	(2.68)	(5.28)
Merchant education (%)	38.0	46.3	34.8	36.7	11.5**
	(2.28)	(4.82)	(2.60)	(2.58)	(5.48)
High experience - industry (%)	35.8	40.7	35.4	47.0	5.3
	(2.25)	(4.75)	(2.61)	(2.68)	(5.42)
Leadership experience (%)	9.0	5.6	9.2	38.1	-3.7
	(1.34)	(2.21)	(1.58)	(2.6)	(2.72)
High human capital (%)	49.7	59.3	47.3	65.3	11.9**
	(2.34)	(4.75)	(2.73)	(2.55)	(5.48)
Predecessor active (%)	47.5	53.7	45.8	43.3	7.9
(shareholder & executive)	(2.34)	(4.82)	(2.72)	(2.66)	(5.54)
Unplanned succession (%)	8.1	12.0	7.2	10.4	4.9
	(1.29)	(3.15)	(1.41)	(1.64)	(3.45)
Operating revenue (in mil. euros)	10.5	8.1	11.1	10.5	-3.1*
(succession year)	(0.97)	(0.98)	(1.24)	(0.83)	(1.58)
Employees (number)	78.6	68.3	80.1	86.9	-12.7*
(succession year)	(3.64)	(4.60)	(4.61)	(5.38)	(6.51)
Profit margin (PM) (%)	6.8	7.1	6.8	5.3	0.3
(succession year)	(0.47)	(1.10)	(0.53)	(0.42)	(1.22)
Δ Profit margin (PM) (%)	-0.3	1.0	-0.5	0.80	1.5
	(0.36)	(1.07)	(0.39)	(0.35)	(1.14)
Δ Industry-adjusted PM (%)	-0.1	0.9	-0.2	0.9	1.1
	(0.38)	(1.06)	(0.41)	(0.33)	(1.14)
Δ Industry- and	1.4	2.9	1.1	1.7	1.8
performance-adjusted PM (%)	(0.33)	(1.02)	(0.36)	(0.32)	(1.08)
Years since succession (years)	3.6	3.8	3.6	3.4	0.2
	(0.09)	(0.19)	(0.11)	(0.11)	(0.22)

Note: The table presents succession characteristics in the succession year and the subsequent performance development between the succession year and the year 2009 (Δ). Successions are categorized into: *Family*, for successors who are related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise (column 1); *Female family*, for female family successors (column 2); *Male family*, for male family successors (column 3); and *Non-family*, for successors who are unrelated to the three persons owning more than 50% of the enterprise (column 4). *Use of business plan* is an indicator variable equal to one if a business plan was used during the succession. *High experience - age* is an indicator equal to one if the successor's age is higher or equal to the median age of the successors of the sample in the succession year. *Merchant education* is an indicator variable equal to one if the successor studied business studies at university or attended an university of cooperative education. *High experience - industry* is an indicator equal to one if the successor's industry experience is higher or equal to the median industry experience of the successors of the sample in the succession year. *Leadership experience* is an indicator variable equal to one if the successor benefits from previous executive board experience. *High human capital* of the successor is a score derived from the sum of the five elements age, industry experience, leadership experience, merchant education, and professionalism to serve as a proxy for ability. *Predecessor active (shareholder & executive)* refers to an indicator equal to one if the predecessor still holds shares and remains operatively active in a leading position. *Unplanned succession* indicates if the succession was unplanned due to death or disease of the predecessor. *Profit margin (PM)* is earnings before taxes divided by operating revenue in the succession year. *Operating revenue* is operating revenue in the succession year. *Employees* is the number of employees in the succession year. *Industry-adjusted PM* is PM less the median PM of the accordant year and industry (two-digit ISIC), *Industry- and performance-adjusted PM* is industry-adjusted PM less the median industry-adjusted PM of the relevant performance control group. Performance control groups are designed by sorting the industry-adjusted values of the variables of the control group enterprises into deciles and matching the industry-adjusted values of the variable in the sample with the accordant control group decile in the year of the succession. The median of the relevant variable in the respective decile and year is then employed as a control. *Years since succession* is the time elapsed in years since the succession. All values are displayed in 07/2009 euros. The stars display significances (Welch-Satterthwaite test) at: * ten percent, ** five percent, and *** one percent. Standard errors are reported in parentheses.

B. Proposition Testing

We begin by testing proposition 1 and apply an ordered logistic regression model on the observed human capital score (HCS) of the successors in order to address concerns that allowances in successor human capital (weak nepotism) could also be driven by variables other than family membership.[12] Our linear index model reads as follows:

$$(1) \qquad Y = \alpha_i + \delta f_i + X_i\beta + \varepsilon_i \qquad \textit{Ordered logistic model (table 3)}$$

Here, Y denotes the human capital score, α_i is the intercept, δ is the coefficient of interest (in this case f_i is the variable for the succession type, e.g. family versus non-family), X_i is an array of controls with a vector of coefficients β, and ε_i denotes the error term.[13] In order to take into account that not all firms attract the same number and quality of potential successors, our controls include company characteristics and industry controls.

Our results of the ordered logit regressions mirror the intuition derived from figure 1. Overall, they highlight that family heirs are significantly more likely to have a lower human capital score, which can be seen in columns 1 to 3 of table 3. In detail, column 3 of table 3 entails a highly significant negative coefficient for family CEOs (-0.806) even after the inclusion of various company and industry controls. We interpret this finding as evidence for proposition 1 and conclude that proposition 1 cannot be rejected on the basis of these results.

However, as column 1 shows, the coefficient for the average achievable human capital (industry wide supply of CEO resources) is insignificant. This leads us to refine proposition 4 towards the idea that successor human capital is positively related to the average *regionally* achievable human capital per industry. Pursuing this thought, we split our benchmark on the average achievable CEO human capital into four geographical regions.[14] As can be observed in columns 2 and 3 of table 3, we find support for the refined version of proposition 4: Higher levels of the successor's human capital are significantly more likely (coefficient 1.114, significant at the five percent level) if the average achievable CEO human capital in the enterprise's region and industry is higher. This finding is robust to the inclusion of various controls.

It can be observed in column 3 of table 3 that good quality of the predecessor's succes-

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[12]We exclude all cases of strong nepotism from these regressions, as the allowances in human capital are related to the weak nepotism category, which by definition 3 excludes cases of strong nepotism.

[13]We highlight at this point that this is an abbreviation, as both logit and the probit require the effects of x to go through the index of $x\beta$. For logit models this is $\Pr(Y = 1|X) = \Pr(Y^* > 0) = \exp(X\beta)/[1 + \exp(X\beta)]$ and for probit models $\Pr(Y = 1|X) = \Pr(Y^* > 0) = \Phi(X\beta)$, where Φ is the cumulative distribution function of the standard normal distribution. In the following we use the abbreviation index model and simply refer to probit and logit.

[14]We use four geographical regions as it is reasonable and convenient to split Germany into the clusters north, central (or west), south and east, as each of these clusters has at least one large metropolitan area while at the same time the clusters have approximately the same size. In detail, we use the German postal code to distinguish between (1) eastern Germany with national postal codes starting with 0 and 1, (2) northern Germany with national postal codes starting with 2 and 4, (3) central Germany with national postal codes starting with 3, 5 and 6, and (4) southern Germany with national postal codes starting with 7, 8, and 9.

TABLE 3—WEAK NEPOTISM AND HUMAN CAPITAL OF SUCCESSORS

	Human capital score of CEO			Family CEO (Artifact test)		
	(1)	(2)	(3)	(4)	(5)	(6)
A. Variables of interest						
Family CEO	-0.880***	-0.883***	-0.806***			
(indicator)	(0.142)	(0.145)	(0.190)			
Industry-wide supply of	0.644			1.196***		0.938
CEO resources (score)	(0.415)			(0.381)		(1.491)
Regional industry supply of		0.704***	1.114**		0.236	
CEO resources (score)		(0.249)	(0.413)		(0.216)	
B. Company level variables						
Ln operating revenue			-0.018	-0.070	-0.047	-0.186**
(euros)			(0.108)	(0.071)	(0.072)	(0.078)
Employees			0.001	-0.001*	-0.001*	-0.001
(sum)			(0.001)	(0.001)	(0.001)	(0.001)
Default probability			0.153	-0.077	-0.059	-0.085
(percent)			(0.137)	(0.095)	(0.095)	(0.097)
Financing requirements			0.267	-0.392*	-0.400*	-0.366*
(indicator)			(0.284)	(0.204)	(0.207)	(0.208)
Investment delays			0.534**	-0.733***	-0.740***	-0.851***
(indicator)			(0.237)	(0.160)	(0.163)	(0.167)
Good succession planning			-0.538**	0.291*	0.232	0.225
(indicator)			(0.217)	(0.149)	(0.152)	(0.154)
C. Industry level variables						
Construction			0.294			0.029
(indicator)			(0.282)			(0.399)
Business services			0.230			-0.915***
(indicator)			(0.280)			(0.302)
Consumer services			0.035			-0.682
(indicator)			(0.389)			(0.495)
Wholesale & retail trade			0.025			-0.025
(indicator)			(0.253)			(0.349)
Number of observations	694	666	469	492	469	492
Pseudo R^2	0.0183	0.0210	0.0420	0.0820	0.724	0.1283

Note: The dependent variable is human capital score in columns 1-3 and family CEO successor (an indicator variable equal to one for family CEO successors) in column 4 to 6. Human capital score is a proxy of ability derived from the sum of the five elements age, industry experience, leadership experience, merchant education, and professionalism. The variables of interest are: *Family CEO* is an indicator equal to one if the successor is related to one of the three natural persons owning more than 50% of the enterprise by either marriage or blood, *Industry-wide supply of CEO resources* is the mean human capital score per industry of non-family successors, and *Regional industry supply of CEO resources* is the mean human capital score per industry and regional cluster of non-family successors. Company variables include: *Ln operating revenue* is the natural logarithm of operating revenue, *Employees* is the sum of employees, *Default probability* is derived from the Creditreform solvency index, *Financing requirements* equals one if unexpected financing requirements occur during a succession, *Investment delay* equals one if necessary investments were delayed before the succession, *Good succession planning* equals one if the predecessor's succession planning was perceived by the successor to be good. Industry level variables are indicators equal to one if the respective category according to the ZEW industry classification is met (see appendix A2). The values of the regressors refer to the succession year. All euro values are harmonized to 07/2009 euros. The stars display significances at the * ten percent, ** five percent, and *** one percent level. The table presents estimated changes in probabilities devising a maximum-likelihood ordered logit model (columns 1-3) and a maximum likelihood probit model (columns 4-6). The values in parentheses display the standard errors.

sion planning seems to be negatively related (the coefficient is -0.538, significant at the five percent level) to the probability of installing a successor with high human capital. Interestingly, investment delays are significantly positively related to the successor's human capital level (0.534, significant at the five percent level). We interpret this finding in the following way: The leadership ability required for a successor to steer an enterprise if a succession is well-planned is not as high as if the succession is more complicated due to cash-in behavior by the predecessor leading to soaring and unsolved issues in the enterprise's foresight.

In columns 4 to 6 of table 3 we address concerns that the effect of the family variable on the human capital score could be affected by artifacts, because the mean external supply of human capital might reduce the likelihood of seeing a family successor and increase the human capital of the successor. We investigate this issue using a simple probit model on the likelihood of observing a family CEO successor including the same array of controls. By inspecting the results, we reject the articulated concern. We observe the exact opposite: The likelihood to see a family heir even increases with the mean of externally available human capital across the industries (in column 4 the coefficient is 1.196, significant at the one percent level).[15] From the results of this artifact test we infer that the discount on human capital score of family heirs is explainable to a great extent by preferences to install family heirs.[16]

As a next step, we test proposition 2 using a probit index model, which reads as follows:

$$(2) \qquad Y = \alpha_i + \delta c_i + X_i \beta + \varepsilon_i \qquad \textit{Probit model (table 4)}$$

Here, Y indicates a family succession, α_i is the intercept, δ is the coefficient of interest (here c covers the children structure of the predecessor, e.g. son(s) vs. no son(s)), X_i is an array of controls with the vector of coefficients β, and ε_i denotes the error term. The idea is that, given the predecessor has children, the predecessor's preference for sons should be mirrored in a significantly higher likelihood to observe a family CEO if a son is among the children. Thus, the regressions are restricted to predecessors with children.

The results provide a clear picture. The presence of one or more sons significantly increases the likelihood to observe a family succession as compared to predecessors with one or more daughters and no sons (the coefficient of the son(s) indicator in column 6 is 0.51, significant at the one percent level). This result remains robust to inclusion of company and industry characteristics and is indicative for predecessors' preference for male family heirs as CEO successors which is in line with proposition 2. Furthermore, in columns 4 to 6 of table 4 we observe that family successors are less likely in some industries. Especially in the business services sector we find a highly significant and negative

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[15]This significance vanishes when introducing industry controls in column 6 of table 3.

[16]As another robustness check, we included profit margin as a direct performance measure into our regressions. It turned out to have no significant effect, but introduced a selection bias due to missing observations. Thus, we excluded this measure from our regressions and refer to default probability, investment delay and financing requirements as proxies for firm performance and state of the firm.

TABLE 4—PROBIT: FAMILY SUCCESSION DECISIONS OF PREDECESSORS WITH CHILDREN

	Dependent variable: Family Succession Indicator					
Variable	(1)	(2)	(3)	(4)	(5)	(6)
A. Variables of interest						
Son(s) only	0.40***			0.52***		
	(0.14)			(0.19)		
Daughter(s) only		-0.40***			-0.52***	
		(0.14)			(0.19)	
Mixed children	0.43***	0.03		0.50***	-0.02	
	(0.13)	(0.11)		(0.17)	(0.14)	
Son(s) among children			0.42***			0.51***
			(0.13)			(0.16)
B. Company level variables						
Ln sales				-0.21***	-0.20***	-0.21***
(Euro)				(0.08)	(0.08)	(0.08)
Employees				-0.00	-0.00	-0.00
(number)				(0.00)	(0.00)	(0.00)
Default probability				0.02	0.03	0.03
(percent)				(0.08)	(0.08)	(0.08)
Financing requirements				-0.57***	-0.57***	-0.57***
(indicator)				(0.21)	(0.21)	(0.21)
Investment delay				-0.91***	-0.92***	-0.92***
(indicator)				(0.15)	(0.15)	(0.15)
Predecessor active				-0.19	-0.19	-0.19
(indicator)				(0.13)	(0.13)	(0.13)
Unplanned succession				-0.26	-0.26	-0.26
(indicator)				(0.25)	(0.25)	(0.25)
Avg. regional human capital				-0.20	-0.20	-0.20
supply (score)				(0.29)	(0.29)	(0.29)
C. Industry level variables						
Construction				-0.28	-0.28	-0.28
(indicator)				(0.20)	(0.20)	(0.20)
Business services				-0.98***	-0.98***	-0.98***
(indicator)				(0.19)	(0.19)	(0.19)
Consumer services				-0.32	-0.32	-0.33
(indicator)				(0.27)	(0.27)	(0.27)
Wholesale & retail trade				0.31	0.31	0.31
(indicator)				(0.19)	(0.19)	(0.19)
Number of observations	715	715	715	521	521	521
Pseudo R^2	0.01	0.01	0.01	0.14	0.14	0.14

Note: The dependent variable is equal to one if the successor is related by marriage or blood to at least one of the three persons owning more than 50% percent of the enterprise. Variables of interest include: *Son(s) only* is an indicator for predecessors with one or more sons, *Daughter(s) only* is an indicator for predecessors with one or more daughters, *Mixed* is an indicator for predecessors with both one or more sons and one or more daughters, and *Son(s) there* is an indicator equal to one if among the predecessor's children there is at least one son. Controls include: *Ln sales*, the natural logarithm of operating revenue, *Employees*, is the number of employees, *Default probability* is derived from the Creditreform solvency index, *Financing requirements* equals one if unexpected financing requirements occur during a succession, *Investment delay* equals one if necessary investments were delayed before the succession, *Predecessor active* is an indicator variable equal to one if the predecessor still holds shares of the enterprise and remains operatively active in a leading position, *Unplanned succession* is an indicator equal to one if the successions is unplanned due to death or heavy disease of the predecessor, *Regional industry supply of CEO resources* is the mean non-family human capital score per industry and regional cluster (derived from the proxies age, industry experience, leadership experience, merchant education, and professionalism). Industry indicators according to the ZEW industry classification are included (see appendix A2). The values of the regressors refer to the succession year. All values are deflated to 07/2009 euros. The stars display significances at the * ten percent, ** five percent, and *** one percent level. The table present estimated changes in probabilities devising a probit (maximum-likelihood) model. Standard errors are reported in parentheses.

coefficient -0.98. We also find evidence that enterprise size in terms of sales reduces the likelihood of family CEO successors (-0.21, significant at the one percent level). In addition, we observe negative coefficients of investment delay (-0.92, significant at the one percent level) and financing requirements (-0.57, significant at the 10% level) which mirrors a "cuckoo's egg behavior" in the sense that companies with a questionable outlook are family-outsourced like a cuckoo's egg by choosing non-family successors.

As a last step it remains to search for the drivers of nepotism and to address proposition 3 which postulates that the presence of male heirs plays a major role in this respect.

$$(3) \qquad Y = \alpha_i + \delta c_i + X_i \beta + \varepsilon_i \qquad \textit{Probit models (table 5)}$$

Within the two probit index models Y indicates weak nepotism (or strong nepotism respectively), α_i is the intercept, δ is the coefficient of interest (here c_i circulates around the children structure of the predecessor), X_i is an array of controls with a vector of coefficients β, and ε_i denotes the error term. The array of controls includes company characteristics and industry controls. All regressions are limited to successions where the family structure permitted a potential succession by close family heirs. The results are presented in table 5.

The results of the direct probit regressions of table 5 are striking. They offer strong evidence in favor of proposition 3. The presence of a son among the children of the predecessor significantly increases the probability of weak nepotism (0.65, significant at the one percent level, column 2) as compared to predecessors with daughters only. The same relationship is observable for strong nepotism (0.51, significant at the ten percent level in column 4). We conclude that proposition 3 cannot be rejected on the basis of these results.[17]

From these findings we conclude that in enterprises with concentrated ownership and control the installation of a successor is strongly affected by the preferences and behavior of the predecessor.

C. Discussion

We point out that the regression results we found may be subject to omitted variable issues. In particular, it would be very interesting to evaluate how the gender of the pre-

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[17]Furthermore, as can be seen from the regression in columns 1 to 4, on average we find a negative marginal effect of size on the likelihood to observe nepotistic successions for small companies (until roughly three million euros), which is mirrored in the strongly positive, but insignificant coefficient of "ln sales(below 15)". This effect is in line with intuition: When companies become too small, they might be unattractive to externals. Above three million euros, this effect vanishes and size tends to have a null impact on the likelihood of strong nepotism. With respect to weak nepotism, columns 1 and 2 show that weak nepotism is significantly less likely (at the one percent level) in the construction (-0.51) and business services (-0.87) sector, as compared to the manufacturing sector. Interestingly, there are no significant deviations towards strong nepotism across the industries as all industry indicators remain insignificant and of low magnitude. Sudden and unplanned successions, which occur due to disease or death of the predecessor, increase the likelihood of succession in accordance with our definition of strong nepotism (0.56, significant at the five percent level). We suspect that this result is not due to favoritism or biased succession contests, but rather due to time constraints in cases of unplanned situations, which potentially render non-family successions void.

TABLE 5—DRIVERS OF NEPOTISM - PROBIT REGRESSIONS

	Weak nepotism		Strong nepotism	
	(1)	(2)	(3)	(4)
A. Variables of interest				
Son(s) only (indicator)	0.59***		0.52*	
	(0.167)		(0.298)	
Daughter(s) and son(s) (indicator)	0.69***		0.50*	
	(0.153)		(0.282)	
Son(s) amongst children (indicator)		0.65***		0.51*
		(0.146)		(0.274)
B. Company level variables				
Ln operating revenue (euros)	-0.10	-0.10	-0.11	-0.11
	(0.103)	(0.103)	(0.159)	(0.159)
Ln sales (below 15) (indicator)	3.44	3.29	4.50	4.50
	(4.653)	(4.657)	(5.844)	(5.844)
Ln sales (above 15) (euros)	-0.24	-0.23	-0.31	-0.31
	(0.317)	(0.317)	(0.399)	(0.399)
Employees (sum)	0.00	0.00	0.01**	0.01**
	(0.002)	(0.002)	(0.003)	(0.003)
Employees squared (sum)	1.12e-6	9.98e-7	-8.09e-6	-8.08e-6
	(2.08e-6)	(2.08e-6)	(5.46e-6)	(5.45e-6)
Default probability (percent)	0.00	-0.01	0.11	0.11
	(0.083)	(0.083)	(0.070)	(0.070)
Unplanned (indicator)	-0.31	-0.30	0.56**	0.56**
	(0.227)	(0.227)	(0.256)	(0.256)
C. Industry level variables				
Construction (indicator)	-0.51***	-0.50***	0.18	0.18
	(0.167)	(0.166)	(0.250)	(0.249)
Business services (indicator)	-0.87***	-0.86***	0.02	0.02
	(0.176)	(0.176)	(0.254)	(0.253)
Consumer services (indicator)	-0.33	-0.33	0.02	0.02
	(0.243)	(0.244)	(0.351)	(0.351)
Wholesale & retail trade (indicator)	-0.11	-0.11	0.17	0.17
	(0.161)	(0.161)	(0.240)	(0.240)
Other (indicator)	-0.34	-0.34	0.19	0.18
	(0.280)	(0.280)	(0.412)	(0.412)
Observations	557	557	597	597
Pseudo R^2	0.0717	0.0709	0.0673	0.0673

Note: The dependent variable is weak nepotism in columns 1 and 2 (an indicator variable equal to one if a family CEO with human capital lower than the average human capital of non-family successors in the industry of his enterprise was installed), and strong nepotism in columns 3 and 4 (an indicator variable equal to one if exclusively family members were considered as successors). The variables of interest are: *Son(s) only* is an indicator equal to one if all the predecessor's children are male, *Daughter(s) and son(s)* is an indicator equal to one if the predecessor's children are mixed, and *Son(s) amongst children* is an indicator equal to one if among the predecessor's children there is at least one son. Company variables include: *Ln operating revenue* is the natural logarithm of operating revenue of the succession year, *Ln sales (below 15)* is an indicator equal to one if sales is smaller than fifteen million euros, *Ln sales (above 15)* displays the effect of *Ln sales* above fifteen million euros, *Employees* is the sum of employees, *Employees squared* is the sum of employees squared, *Default probability* is derived from the Creditreform solvency index, and *Unplanned* is an indicator equal to one if the succession was due to unplanned disease or death of the predecessor. Industry level variables are indicators equal to one if the respective category according to the ZEW industry classification (see appendix A2) is met. The values of the regressors refer to the succession year. All values are displayed in 07/2009 euros. The stars display significances at the * ten percent, ** five percent, and *** one percent level. The table presents estimated changes in probabilities devising a maximum likelihood probit model. The values in parentheses display the standard errors.

decessor affects the observed patterns.[18] Furthermore, the question remains how much of the observed pattern is due to gender preferences of the predecessor as compared to gender differences in CEO labor supply. However, the fact that in unplanned family successions the female succession rate jumps to 35.1% is indicative that the predecessors' preferences play a major role in the otherwise lower female succession rate.[19] We believe that in particular the family patterns observed in table 1 are indicative for a gender preference of the predecessor. Generally, it would be of value to test our propositions using another succession sample to exclude a potential sample bias.

VI.   Conclusion

Our results provide evidence that the labor market selectivity in CEO successions in family firms with concentrated ownership control is constrained due to gender preferences of the preceding CEO. We differentiate between strong nepotism and weak nepotism in successions and find that the occurrence of both forms is significantly driven by the presence of sons among the predecessor's children, which is robust to the inclusion of various controls. Interestingly, the predecessors' preference of male family successors leads in turn to the observation that female family successors are equipped with better levels of human capital as compared to male family successors. Furthermore, successions of female family successors are less often biased by nepotism as compared to male family successions.

These results highlight that in enterprises with concentrated ownership control such as family firms, the preferences of the predecessor, exemplia gratia preferences for family heirs or for male successors, play a crucial role in the successor selection process. They influence the succession contest's outcome with respect to the human capital level of the successor and subsequent enterprise performance. Consequently, it seems crucial to sensitize the predecessor on his key role and responsibility regarding this aspect.

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[18] Unfortunately, with the data at hand we have no option to overcome these issues.

[19] We argue that in unplanned successions, which occur due to the death or disease of the predecessor, the predecessor's preferences play a reduced role.

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<div align="center">APPENDIX</div>

<div align="center">*A1. Additional Summary Statistics and Additional Tables*</div>

Table A1 presents additional summary statistics of the classification and distribution of the observed successions.

TABLE A1—CLASSIFICATION AND DISTRIBUTION OF OBSERVED SUCCESSIONS

Industry	Total	Manu-facturing	Construction	Business services	Consumer services	Wholesale & retail	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Male successor	625	260	88	112	47	96	22
	(80.7)	(83.6)	(80.0)	(84.2)	(69.1)	(78.1)	(75.9)
	[100.0]	[41.6]	[14.1]	[17.9]	[7.5]	[15.4]	[3.5]
2. Female successor	149	51	22	21	21	7	15
	(19.3)	(16.4)	(20.0)	(15.8)	(30.9)	(22.0)	(24.1)
	[100.0]	[34.2]	[14.8]	[14.1]	[14.1]	[18.1]	[4.7]
Total	774	311	110	133	68	123	29
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	[100.0]	[40.2]	[14.2]	[17.2]	[8.8]	[15.9]	[3.7]
3. Male family successor	336	155	48	32	23	65	13
	(75.7)	(79.5)	(69.6)	(74.4)	(67.7)	(76.5)	(72.2)
	[100.0]	[46.1]	[14.3]	[9.5]	[6.9]	[19.4]	[3.8]
4. Female family successor	108	40	21	11	11	20	5
	(24.3)	(20.5)	(30.4)	(25.6)	(32.4)	(23.5)	(27.8)
	[100.0]	[37.0]	[19.4]	[10.2]	[10.2]	[18.5]	[4.6]
Total	444	195	69	43	34	85	18
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
	[100.0]	[43.9]	[15.5]	[9.7]	[7.7]	[19.1]	[4.0]

Note: Successions are categorized into: *Male successor*, for male successors, *Female successor*, for female successors; *Male family successor*, for male successors who are related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise, and *Female family successor*, for female successors who are related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise. The industries are clustered using aggregated ISIC classifications, see appendix A2. The fraction of successions as a percentage of the absolute amount of the gross sample (column 1) or of the absolute amount of observed successions per industry cluster (columns 2-7) is displayed in parentheses. The fraction of successions as a percentage of the absolute amount of observed successions per succession type is shown in square brackets.

The industry classification key for the industry aggregation employed (using aggregations of the International Standard Industry Classification of All Economic Activities of the United Nations, ISIC Rev. 3.1) is shown in table A2.

TABLE A2—INDUSTRY CLASSIFICATION KEY

ZEW industry key	ISIC Rev. 3.1 code	ISIC Rev. 3.1 industry description
	(1)	(2)
1. Manufacturing	D	Manufacturing
2. Construction	F	Construction
3. Business services	K	Real estate, renting and business activities (without ISIC 70: real estate activities)
	O	Other community, social and personal service activities (only ISIC 90: sewage and refuse disposal, sanitation and similar activities)
4. Consumer services	H	Hotels and restaurants
	K	Real estate, renting and business activities (only ISIC 70: real estate activities)
	M	Education
	N	Health and social work
	O	Other community, social and personal service activities (only ISIC 92: recreational, cultural and sporting activities and ISIC 93: other service activities)
5. Wholesale & retail	G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
6. Other	I	Transport, storage and communication
	J	Financial intermediation

Note: For each aggregated industry cluster the key in form of the ISIC Rev. 3.1 code (column 1) and its description (column 2) is reported. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are not included. ISIC industry categories with no observations are not displayed.

Chapter 4

Restructuring, Human Capital, and Enterprise Performance in CEO Successions in Family Firms

By Jan-Philipp Ahrens and Michael Woywode [*]

Devising an unique data set we analyze managerial actions and their performance impact during CEO successions in family firms. We find that corporate change unleashes additional performance due to accumulated improvement potentials from the pre-succession period. High human capital successors implement more changes and perform significantly better when compared to low human capital successors. Furthermore, the amount of observed changes is subject to the economic contingency and is highest in CEO successions in turnaround situations. In particular reviews of the supplier relations, the product portfolio, and the compensation scheme were found to significantly enhance performance.

(JEL: G30, G34, L25, M10, M51)

Keywords: CEO succession, family firms, organizational restructuring, turnaround management, human capital, firm performance.

I. Introduction

Changes in organizational leadership are pivotal moments. But in enterprises where concentrated ownership meets ownership control, CEO changes are regularly intertwined with ownership changes and become decisive in a company's fate, as the CEO is often the heart of the organization he is conducting. Provided the leadership of the departing CEO has lasted long enough, both an internal equilibrium of well-established rules or norms, roles, and power distribution, but also of processes and routines, as well as an external equilibrium of economic and sociological embeddedness have developed (Cyert and March, 1963, Nelson and Winter, 1982, and Granovetter, 1985).

By relinquishing the focus on the departing CEO and by the enthronement of a new CEO, a company may become subject to profound reorganization and substantial change (Miller, 1993). Furthermore, in many circumstances this change proves to be vital and advantageous, because experience often makes organizations and leaders cling to old routines of behavior whilst the optimal solutions to organizational challenges might have changed over time (Miller, 1993, Beck et al., 2008). In this context the new leader can act as a reset: He assesses the contemporary fit of the organizational equilibria and general business model and introduces changes.

Consequently, the recent succession literature discusses the ties of successions with change management (Pardo-del-Val, 2009). Managing momentous change is complex: Adapting the stabilizing institutionalized fabric possibly fuels opposition from organizational members (Coch and French Jr., 1948) and inertial forces stemming from structural and environmental embeddedness arise which hinder intended adaptations to a dynamic environment (Hannan and Freeman, 1977). To make things worse, older organizations, for example family firms with a long tradition, might be subject to particularly strong inertial forces and their reorganizations are especially complex and hazardous implying a high default probability (Hannan and Freeman, 1984, Amburgey et al., 1993, and Haveman, 1993). The work of Pérez-González (2006) and Ahrens et al. (2012) hints that CEO successors with high levels of human capital seem to cope better with these challenges. However, despite the growing literature on successions, it is surprising how little is known in detail about the performance impact of such restructuring decisions during successions (Miller, 1993). After all and ceteris paribus, managerial actions should play a key role in explaining firm performance, which is perhaps most true for leader-centered family firms.[1]

This article addresses this gap and visualizes the post-succession managerial actions and evaluates their impact on performance. For this purpose we harness an unique data set which tracks 25 management action types and enterprise performance in 804 leadership changes in enterprises with high ownership concentration and ownership control. As the CEO successors' ability and propensity to implement changes vary significantly across their origins (family, enterprise or external) (Helmich and Brown, 1972,

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[1] Family firms are possibly the most prominent example of constellations of a large shareholder with some satellite minority shareholders, as modeled by Shleifer and Vishny (1986). In addition, ownership concentration and family influence in medium-sized publicly traded companies is a substantial phenomenon across the world. La Porta et al. (1999) report that 45 percent of the observed enterprises are controlled by families.

and Ahrens et al., 2012), we develop a CEO successor typology with respect to origin and ability and combine it with a contingency approach which controls for the economic conditions of the succession enterprise (normal, low relative profit margin, industry downturn, and turnaround situation). By relying on accounting-based performance indicators, we carry out a differential performance analysis. A central advantage of the differential performance approach is that it controls by construction for time-invariant firm characteristics which might drive firm performance. Following the financial economics literature strand on firm performance, our performance measures include industry- and performance-adjustments of comparison groups in order to control for the effects of time and industry trends as well as possible mean reversion effects (Barber and Lyon, 1996). In addition and to account for further heterogeneity of the successions, we incorporate an array of commonly used controls for firm characteristics into our regressions. These include measures for firm size, momentum (starting profitability), ownership, default probability as well as further indicators on the state of the firm in the succession year including possible investment delays and financing requirements, but also sociological controls such as the ability (human capital) and origin of the CEO and the activity of the predecessor to control for influences of knowledge transfers.

The results of our analysis offer empirical evidence that in many family firms which experience a CEO succession, a potential for vital corporate amendments has accumulated, which is unleashed by intensive post-succession corporate change. This change entails a positive and significant impact on enterprise performance even after controlling for industry and performance trends and including an array common company controls. Successors with high human capital are capable of detecting and initiating significantly (at the one percent level) more corporate change and achieve a 1.15 percentage points higher (significant at the one percent level) industry- and performance-adjusted profit margin in the post succession period as compared to successors with low human capital. In addition, the total amount of change is subject to the origin of the successor and the economic contingency in which the succession occurs. The highest total change is observable in the *turnaround* category, followed by the *low relative profit margin* category of the economic contingencies.

With regard to the individual actions' performance impact, we find that a moderate review of the existing product portfolio seems to lead to a 1.23 percentage points higher industry- and performance-adjusted profit margin (significant at the five percent level and robust to the inclusion of various controls). In addition, a review of the existing suppliers (0.92, significant at the five percent level) and a review of the compensation scheme (0.82, significant at the five percent level) seem to drive abnormal post-succession performance. Furthermore, these effects gain magnitude if the successor manages to conquer new customer groups. Interestingly, internationalization strategies during successions are accompanied by significantly reduced (-1.70, at the five percent level) abnormal enterprise performance.

This article is designed in the following way: Section II gives a literature overview and is followed by the theoretical section III. Section IV gives detailed information on the sample. Section V is dedicated to the data analysis. The final section VI discusses

the main results and concludes.

II.   Related Literature

The determining factors of success in successions in family firms are considered in a variety of intertwined literature strands. However, the perspective taken by this article mainly relates to three disciplines: the theory of the firm, the firm performance literature, and the change and business restructuring literature.

As successions in family firms often include the replacement of an old unity of ownership and control by a new unity of ownership and control, the topic is closely related to the theory of the firm literature. Several ownership structure and agency issues (Jensen and Meckling, 1976, Fama, 1980, Demsetz and Lehn, 1985, Demsetz and Villalonga, 2001, and Schulze et al., 2001) are touched upon. As concentrated ownership and ownership control structures in family firms possibly curb the surveillance mechanisms of the old CEO's actions to zero or only internal checks, a possible pursuit of private benefit maximization could potentially endanger firm performance around CEO and ownership changes (Johnson et al., 2000, Dyck and Zingales, 2004, and Villalonga and Amit, 2006). For example, firm performance might be adversely affected because of favoritism, exempli gratia through the appointment of family CEO successors with inadequate abilities (Pérez-González, 2006).

Furthermore, the classical agency costs issue (Arrow, 1963, Holmström, 1979, and Arrow, 1985) becomes relevant: With respect to firm performance, is it better to install an external or a family member as CEO successor? From a theoretical point of view, over the generations the endowment of talents, including leadership and managerial talents, is likely to return to the population's mean (Galton, 1886, Galton, 1890, Heckman, 1995, Mulligan, 1999, and Mehrotra et al., 2011), while inheriting great amounts of wealth might possibly induce lethargic and contemplative behavior (Carnegie, 1889, Carnegie, 1891/1933(reprint), and Holtz-Eakin et al., 1993). Nevertheless, it is argued that the installation of family managers is vital due to the reduced agency costs and improved monitoring (Fama and Jensen, 1983), stronger family peer pressure (Kandel and Lazear, 1992), pro-organizational behavior (Davis et al., 1997) and long-term orientation (Le Breton-Miller and Miller, 2006, and Block and Thams, 2007).

In line with the above divergent considerations, the general empirical evaluation of family influence and firm performance is mixed.[2] However, with respect to firm performance in the succession phase, the literature is fairly unidirectional and observes a negative impact of family CEO successors on firm performance, which has so far been explained by a lower human capital of family heirs (possibly due to nepotism), a lower propensity to implement changes of family heirs and the effects of the "Carnegie Conjecture" (Smith and Amoako-Adu, 1999, Pérez-González, 2006, Bennedsen et al., 2007,

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[2]Positive relationships using various measures are reported by McConaughy et al. (1998), Anderson and Reeb (2003), Maury (2006), Adams et al. (2009), and Mehrotra et al. (2011). Mixed evidence is provided by Morck et al. (1988), Villalonga and Amit (2006), and Miller et al. (2007). Furthermore, negative relationships were observed by Yermack (1996), Morck et al. (2000), Hillier and McColgan (2009). For a detailed literature overview and descriptions of the measures employed we refer to Pérez-González (2006).

and Ahrens et al., 2012). In addition, many succession conditions are complex. They often constitute a phase of organizational change or (r)evolution and sometimes even organizational crisis, thus the decision making in such situations (Smart and Vertinsky, 1977, and Gladstein and Reilly, 1985) is non-trivial and the quality of the new CEOs' decisions may depend on their experience and human capital (Canella Jr. and Rowe, 1995, Adner and Helfat, 2003, Holcomb et al., 2009).

In the spirit of Hannan and Freeman (1984) inertial forces due to established power structures and procedures, or due to a company's history and experiences or even anxious ignorance (Hedberg et al., 1976, Nystrom and Starbuck, 1984, Miller, 1990 and 1991, Schein, 1993, and Miller, 1994), could have potentially desensitized a company to necessary adaptations. Just as tents are sometimes better than palaces, a new CEO who has fewer links to the corporate's past experience evaluates the firm's issues from a different perspective. He or she has fewer commitments to past policies and organizational rules and is thus in a position to act as a catalyst for productive and adaptive change (Grinyer and Spender, 1979, Hofer, 1980, Tushman and Romanelli, 1985, Miller, 1991 and 1993, and Barker III and Duhaime, 1997) and may spark a new phase of organizational evolution, if not revolution (Greiner, 1972, and Miller, 1980). The amount of change in successions is often substantial (Miller, 1993), sometimes even comparable to profound restructuring situations. However, the succession literature has so far (to the best of our knowledge) mainly ignored addressing this post-succession change and its performance impact.

Similar to restructuring and turnaround activities, the change which unfolds in the post-succession renewal processes can be categorized into strategic adaptations (Barker III and Duhaime, 1997) and efficiency-enhancing changes (Hambrick and Schecter, 1983, and Robbins and Pearce II, 1992).[3] As a consequence, Barker III and Duhaime (1997) suggest the enrichment of financial data with detailed field data on managerial actions, as the potential for inference from financial data on managerial decision making is very limited.[4] Furthermore, findings of the responsible restructuring literature (Cascio, 2005) play a key role because the small and medium sized enterprises observed here cannot restructure at any rate without touching critical resources or limits due to their limited size. In line with this argument, the literature hints that strategies including a successful new usage of existing company resources strongly contribute to organizational recovery (Morrow et al., 2007). On such a firm size level a successful re-adaptation may involve, in the spirit of Hammer and Champy (2003), the combination of several jobs into one without damaging the functional core of the organization.

III. Theoretical Section

A. *Categories and Definitions*

The aim of this article is to investigate the managerial actions and their performance impact following CEO successions in enterprises with "concentrated ownership control".

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[3]For a literature overview including early works on turnaround situations we refer to Pearce II and Robbins (1993).

[4]In this article, we track 25 different managerial actions in order to address this issue.

For the purposes of this article we begin by defining the "concentrated ownership control" attribute:

DEFINITION 1: *An enterprise with concentrated ownership control is present if a maximum of three natural persons own more than 50% of the enterprise and at least one of these owners is a leading member of the executive board.*

Furthermore, we classify the successions along the dimensions "origin" of the successor, "human capital" of the successor, and "economic contingency" of the enterprise in the succession year, because we suspect that these dimensions influence the pattern of the post-succession managerial actions and thereby post-succession performance.

The origin dimension distinguishes between the following origins: *family*, for successors related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise, *enterprise*, for unrelated successors who were previously employees of the enterprise, *external*, for successors with no previous ties to the enterprise, and *hybrid*, for multiple successors with differing backgrounds.

We assess the human capital dimension by creating a human capital score as a proxy. This proxy is composed of the sum of five elements which include (1) age above median (proxy for general experience), (2) industry experience above median (proxy for industry related experience), (3) leadership experience (proxy for practical managerial skills), (4) merchant education, if the successor holds an university degree in business studies (or strongly related field) or was educated at an university of cooperative education (proxy for theoretical managerial skills), and (5) use of a business plan during the succession (proxy for professional managerial skills).

In the fashion of Ahrens et al. (2012), the selection of the human capital proxies mirrors an argument brought forward by Murphy and Zábojník (2004). Murphy and Zábojniík (2004) argue that general management skills have gained more importance for CEOs over the last 30 years due to the advances in management science, corporate controlling and finance and other arts, which, if mastered by the CEO, enhance the CEO's ability to lead an enterprise.[5] Thus, we try to capture general managerial skills and argue that leadership experience, a degree in business studies and the ability to apply this knowledge using advanced professional instruments, such as a business plan (which includes a stragic plan, but also a finance- and liquidity-plan and an earnings forecast), are satisfactory proxies. The role of the successor's education is also emphasized in the succession literature (Morris et al., 1997 and Le Breton-Miller et al., 2004). Further, the small business literature emphasizes the beneficial aspects of education in business studies and managerial skills (exemplia gratia cash-flow management) for small business success (Ibrahim and Goodwin, 1986). In addition, education may also be interpreted as a signal of ability, since the investment "degree in business studies" is easier to obtain for more gifted individuals (Spence, 1973, Arrow, 1973, and Spence 1974).[6]

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[5]In addition Murhpy and Zábojník (2004) highlight that the advances in computerization of the digital age over the last 30 years have made company specific knowledge more accessible to managers as compared to earlier times.

[6]In a way, the business plan indicator variable also monitors whether the general managerial skills acquired are in active use as opposed to being only a signal.

However, the human capital theory highlights that productivity-augmenting investments in human capital might also occur in the post-education period (Mincer, 1974 and Strober 1990), which we try to capture by incorporating experience related human capital proxies. First of all, the succession literature casts light on the fact that proven skills, such as previous leadership experience, are vital and generate credibility in successions (Barach et al., 1988, Barach and Ganitsky, 1995, Chrisman et al., 1998, and Le Breton-Miller et al., 2004). For this reason we include leadership experience as an investment with respect to building up CEO relevant human capital. Furthermore, Mincer (1974) shows that the time distribution of the investments in human capital leads to an age variation in earnings resulting in a positive correlation between age and earnings (sometimes called the age profile). As this higher payment might be seen as remuneration for higher ability due to experience, we use age as a proxy for general experience, which might also be relevant for the ability to lead a company as a CEO.[7] Finally, by employing industry experience, we also add one company specific knowledge proxy to the four general proxies, which mirrors potential advantages due to mastering the tricks of the trade of the specific industry of the accordant company.[8] Finally, we decided to work with a sum of these five proxies as many combinations of the above named elements might reflect a augmented ability to succeed as a CEO. The attribute *HHC* for high human capital is assigned to the successors if the overall score of the respective successor is above or equal to the median score of the sample, and *LHC* for low human capital otherwise.

The economic contingency dimension is designed to reflect insights from the restructuring and crisis literature and contains four categories which are *normal* successions, *low relative profit margin* cases, successions during *industry downturns*, and *turnaround* cases. Inspired by Miller (1993) and Barker III and Duhaime (1997), we employ relative performance in the succession year as an indicator of the respective strategic alignment of the company. More precisely, we attach the *low relative profit margin* attribute to a company if it performs -1.0 percentage points in profit margin below its respective industry mean in the succession year and if it does not fall into the *turnaround* category. In such circumstances, the respective company's profit margin situation is likely to stem from firm-based actions or inactions leading to a need for strategic adaptation (Cameron et al., 1988).

Furthermore, companies may be forced to adapt, if their respective industry suffers from a downturn or environmental decline due to shifts in demand size or demand shape (Harrigan, 1980; Zammuto and Cameron, 1985; and Whetten, 1987). Such industry contractions often lead to pressure at the firm level and sometimes also to organizational decline, as the general profitability level declines due to survival contests in industries which support only a reduced number of firms. We attach the *industry downturn* attribute

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[7]We have to add that Mincer (1974) highlights that this relation between age and earnings decreases over time and eventually turns negative at old age. In addition, Miller (1991) argues that seasoned CEOs might become "stale in the saddle" and less effective. We argue that we can ignore these diminishing or even negative effects in our study, as the average age of the CEO successors falls into the increasing part of the relationship.

[8]One could also measure the experience within the respective enterprise. However, this would exclude external CEO successors by definition.

to a company if the following conditions are met: The average profit margin of their respective industry is below 2.0% in the succession year and if it does not earn more than 5.0% profit margin in the succession year and if it does not fall into the *turnaround* category.

As a third category we identify companies which are either suffering from both *low relative profit margin* and *industry downturn* attributes or which earn less than 0.5% profit margin in the succession year. We attach the *turnaround* attribute to these companies as they are likely to need major operative and strategic adaptations. All companies which do not meet these three categories are put into the *normal* succession category for healthy enterprises.[9]

B.   Derived Propositions

Using the categories defined above, we derive propositions which are presented in the following. To start with, many succession conditions are complex and often go along with a phase of organizational change (Miller, 1993), sometimes even a revolution or organizational crisis. It follows that the decision making in such crisis situations (Smart and Vertinsky, 1977, and Gladstein and Reilly, 1985) is demanding.[10] In general, successors with a higher human capital should be better at detecting the need for and implementing change and thereby outperform less experienced or less able successors (Trow, 1961, Canella Jr. and Rowe, 1995, Adner and Helfat, 2003, Pérez-González, 2006, and Holcomb et al., 2009).

PROPOSITION 1: *Successors with high human capital implement more changes as compared to successors with low human capital.*

We also argue that the economic contingency dimension affects the extent and type of change. For example, companies with the *low relative profit margin* attribute are more likely to have failed to adapt strategically as compared to firms in the *normal* succession category. However, the current fit of the firm's strategy is likely to have an impact on the choice of implemented changes. Companies with weak strategic positions have, ceteribus paribus, a higher need for strategic change as compared to companies with a strong strategic position (Barker III and Duhaime, 1997).[11]

Furthermore, if reductions in demand size or demand shape due to an industry downturn occur during a succession, then such industry contractions may pressurize firms

[9]Furthermore, it would be interesting to capture the social contingencies such as the social system in the company which each successor inherited upon succession to office, as this is likely to have an effect on the actions (and performance of the actions) taken by the successor (Guest, 1962). However, this approach is unavailable with the data we have at hand. In addition, please note that some of the definitions and categories applied in this article follow Ahrens et al. (2012), while the human capital score employed in this article is reapplied in Ahrens et al. (2012,b) and Ahrens et al. (2012,c).

[10]This should especially be the case for successions in enterprises which suffer from turnaround conditions prior to a succession. While the literature agrees that a top management change (a succession) in such situations is often desirable, the typical following steps (Bibeault, 1982) for a turnaround such as "evaluation" of the situation and of cash flows, the "emergency" stage (immediate measures) and the restructuring and rebuilding of the organization ("stabilization") require advanced management skills.

[11]Apart from the higher likelihood of strategic adaptations, a low relative profit margin might also stem from operative deficits, thus we also expect operative changes to occur more frequently as compared to the normal successions category.

into striving for efficiency enhancing changes (Harrigan, 1980, Zammuto and Cameron, 1985, and Whetten, 1987), but it also increases incentives to evade the downturn by following a strategic reorientation (Barker III and Duhaime, 1997). However, industry downturns are an external source of pressure, while *low relative profit margin* situations hint at internal issues and are thus more likely to be amendable by actions by the management. We thus expect that the overall change in *low relative profit margin* successions is higher compared to successions in the *industry downturn* category. In turnaround situations we expect an urgent and important need for change and that the overall extent of changes in the *turnaround* category is unsurpassed by the changes in the other categories.

PROPOSITION 2: *The number of changes during successions increases over the economic contingencies in the following order: normal (lowest), industry downturn, low relative profit margin, and turnaround (highest).*

We argue that in many successions a potential for improvements and adaptions has accumulated due to the presence of organizational inertia which may be fueled by established power structures, rules and procedures, a company's history and experiences, and anxious ignorance (Hedberg et al., 1976, Hannan and Freeman ,1984, Nystrom and Starbuck, 1984, Miller, 1990 and 1991, Schein, 1993, and Miller, 1994). By overcoming these barriers, a successor or new CEO may spark productive and adaptive change (Grinyer and Spender, 1979, Hofer, 1980, Tushman and Romanelli, 1985, Miller, 1991 and 1993, and Barker III and Duhaime, 1997), which taps a company's potential for improvements and translates it into boosted enterprise performance. However, we believe that once the major improvement potentials have been salvaged, additional change is unlikely to entail large positive effects. Assuming that the most obvious and vital changes are the first to be introduced, it might be possible to speak of diminishing marginal returns to additional changes.[12]

PROPOSITION 3: *There exists a previously accumulated and limited performance improvement potential in CEO successions which is salvageable by post-succession change.*

IV.   Sample Selection

In this article we revisit the data set of Ahrens et al. (2012). The data set for this article relies on the following sources: (a) the Mannheim Enterprise Panel (MUP), (b) the Bureau van Dyjk Amadeus database (Amadeus), (c) the Hoppenstedt database, (d) the Creditreform solvency index information, (e) German Bundesbank information, (f) standardized computer-aided telephone interviews, (g) non-standardized direct interviews, and (h) web-searches.

We begin by extracting a gross sample of owner-controlled enterprises from the MUP database filtering for the following settings for the years 2002 to 2008:[13]

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[12]Additional change might even be disruptive only. Furthermore, it is possible that the amount of change an organization can bear at a time without causing additional negative effects is limited.

[13]We chose this time horizon as MUP data from earlier than 2002 are less complete and reliable.

1) 30 to 1,000 employees, and

2) going concern, and

3) possesses the concentrated ownership control attribute.

Employing a second filter, we single out 14,250 companies which experienced a succession within this time horizon.[14]

We collect financial data and impute missing values by employing the following hierarchy: 1. MUP information, 2. Amadeus information, 3. Creditreform solvency index information, 4. Hoppenstedt information, and 5. web-searches. Apart from the sample group, a control group of 187,388 company-year observations is drawn from the Amadeus database.[15] Employing Bundesbank price index information, all values are reported in 07/2009 euros.

Devising standardized computer-aided telephone interviews, all gross sample enterprises are contacted. In addition, all interviewees suit the following criteria:

1) interviewee is a successor, and

2) interviewee is a leading member of the executive board, and

3) interviewee holds an ownership fraction of the enterprise, and

4) the succession took place between the years 2002 and 2008.[16]

We arrive at a net sample of 804 CEO successions. The interview spans four key nexi which are succession type, human capital of the successor, post-succession managerial decision pattern of the successor, and enterprise performance. The first interview nexus is designed to allow a fine distinction between succession types and includes information on the successor's origin (e.g. family, enterprise or external). The second information nexus (human capital) delivers observations on variables such as the successor's age, leadership experience, industry experience and his or her highest educational degree or qualification. Nexus three collects data on the post-succession decision pattern by tracking the management actions executed between the succession year and the year 2009. Enterprise performance is measured using accounting variables, for example profit margin, number of employees, and credit rating score measured in the succession year and in 2009. In addition, indicators of the state of the company, such as unexpected post-succession financing requirements and perceived pre-succession investment delays, flank the set of traditional accounting variables. In addition to the 804 standardized interviews, we record 20 successors and two experts in non-standardized in-depth interviews, which serve as an additional, but unrepresentative, source for the interpretation of the empirical results, especially with regard to questions which are difficult to capture in standardized interviews.

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[14]Appendix A1 presents further information on the second filter.

[15]The control group enterprises are required to be of a size between 30 up 1,000 employees and their accounting data to cover the same time horizon as the sample group (2002 to 2009). Furthermore, we exclude unconsolidated sister statements (Amadeus consolidation code U2) as well as duplicates.

[16]We ask for the year when the successor became a leading member of the executive board.

V. Data Analysis

A. Summary Statistics

We begin by presenting the summary statistics of the changes implemented across the dimensions "economic contingency" and "human capital" in table 1.

It is most striking to observe the high general intensity of change during successions.[17] Successions seem to unleash a great wave of corporate change, which underlines ties to reorganization and restructuring research strands. One CEO in-depth interview partner (18) remarked on this: *"...the whole structure was in a sort of daily grind, ...now that we were initiating changes and new approaches, ...it was like a wake-up call which went through the enterprise."* In addition, table 1 offers a very clear and intuitive pattern: high human capital successors implement significantly more changes than low human capital successors (1.70, significant at the one percent level, column 7).[18] It is remarkable that all elements of the organizational structure are changed significantly more often by high human capital successors as compared to low human capital successors. Enterprises in the *turnaround* category experience the highest amount of total change, followed by the categories *low relative profit margin* and *industry downturn*, whereas the lowest change intensity can be found under *normal* conditions (columns 1 to 4). In general, the evidence of table 1 supports the ideas advanced in propositions 1 and 2.

Within the *normal* category we also observe a relatively high percentage of product innovation (39.4%) and improvement in the production methods (54.1%). This may be explained by the circumstance that these enterprises can concentrate resources on innovation and research & development due to their relative strength. In addition, we find that in *normal* succession cases, companies successfully tried to push into national and international markets and reduced the importance of regional markets.

Interestingly, in successions in the *industry downturn* category, we measure the lowest rate of dismissals of execute directors (20.9%). This may be explained by the fact that an industry downturn is not something the management can be blamed for. Furthermore, attempts to strategically evade a shrinking general demand in the downturn become visible: CEO successors try hardest, compared with the other categories, to find new customers (92.5%) and also have the highest rate of product portfolio diversification (additional products: 66.7%). This goes along with an eleven percentage points higher rate of change within marketing and sales as compared with *normal* successions. In addition and compared with *normal* successions, higher rates of operative and efficiency-related changes occur in the *industry downturn* category, possibly in a push to become more efficient in the face of a declining and embattled market. Arguably, this explains and is mirrored in the higher rates of change compared to *normal* successions in the categories working time policy (9.0 percentage points higher), compensation scheme (6.7 percentage points higher), production (5.0 percentage points higher), and new suppliers (9.1 percentage points higher).

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[17] This is inline with observations by Miller (1993).

[18] Product innovation is not included in the total change score due to low observations.

TABLE 1—ECONOMIC CONTINGENCY, HUMAN CAPITAL AND IMPLEMENTED CHANGES

Variable	Economic contingencies				Human capital		Diff. LHC - HHC
	Normal	Low rel. PM	Industry downturn	Turn-around	LHC	HHC	HHC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total change	8.4	9.7	9.2	10.6	7.41	9.11	-1.70***
A. Labor organization (%)							
New executive directors	50.2	69.5	49.2	56.9	44.4	53.2	-8.8**
Dropped executive directors	26.0	40.7	20.9	43.2	20.0	28.0	-8.0***
Flattened hierarchy	27.6	42.4	30.3	27.3	23.9	32.1	-8.2**
Steepened hierarchy	12.5	6.8	13.6	13.6	12.7	14.1	-1.4
Working time policy	29.8	45.8	38.8	45.5	28.1	39.7	-11.7***
Compensation scheme	33.6	35.6	40.3	43.2	26.4	41.3	-14.9***
B. Organizational structure (%)							
Purchasing	50.0	52.5	50.7	70.5	42.0	53.1	-11.1***
Production	51.1	60.3	56.1	67.4	43.8	50.5	-6.6**
Marketing and sales	65.1	78.0	76.1	81.8	57.6	71.2	-13.5***
Personnel	51.5	64.4	55.2	55.3	44.0	55.6	-11.6***
Corporate finance & controlling	57.0	61.0	58.2	63.6	48.9	57.5	-8.7**
C. Products and innovations (%)							
Product innovation	39.4	50.0	20.5	33.3	40.0	41.0	-1.0
Additional products	56.2	64.4	66.7	61.4	57.3	60.5	-3.2
Additional methods of production	54.1	50.8	55.2	61.4	47.7	53.1	-5.4
Sorting out of products (moderate)	30.5	29.3	28.4	43.2	23.6	35.0	-11.4***
Sorting out of products (heavy)	3.0	6.9	1.5	6.8	1.4	4.0	-2.6**
D. Business relations (%)							
New customers	83.8	84.5	92.5	88.4	81.5	87.4	-5.9**
Loss of old customers	24.4	25.4	26.9	20.5	20.2	27.6	-7.4**
New suppliers	53.6	54.2	62.7	65.9	49.9	58.5	-8.7**
Dismissal of old suppliers	36.1	42.4	40.3	52.3	27.4	39.5	-12.1***
New bank relations	16.2	15.2	16.4	22.7	13.8	17.7	-3.9
New financiers	18.3	28.8	25.4	25.0	12.4	20.4	-8.0***
E. Geographical activity (%)							
Δ Regional markets	-3.8	0.0	-3.0	-6.8	-2.0	-3.5	1.5
Δ National markets	3.8	-1.7	7.5	2.3	2.9	2.6	0.2
Δ International markets	6.8	6.8	3.0	13.6	2.9	7.9	-5.1***

Note: The table presents changes implemented between the succession year and the year 2009. Successions are categorized into *Normal*, for successions in healthy enterprises which do not fall into the categories low relative profit margin (PM), industry downturn or turnaround in the succession year; *Low rel. PM*, for successions in companies which earn lower profit margins compared to their industry peers in the succession year; *Industry downturn*, for successions in enterprises which experience an industry downturn (low profit margins across the industry) and which do not earn more than five percent profit margin in the succession year; and *Turnaround*, for successions in companies which face both low relative profit margin and an industry downturn or which earn less than 0.5% profit margin in the succession year. Furthermore, successors are distinguished by high human capital (HHC), or low human capital (LHC) otherwise, depending on the successor's score on a human capital proxy (HCS) including (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism. Interviewees were asked to indicate post-succession changes of their enterprise in each of the subcategories from *A* to *D*. Each of the change indicator variables records 1 if a change is indicated during the interview and 0 otherwise. The geographical activity of the enterprise in the year of the succession and in 2009 is recorded in the interview. Category *E* presents the change in activity per geographical subcategory. The stars display statistical significance of differences at the * ten percent, ** five percent, and *** one percent level.

In contrast to the low dismissal rates in the *industry downturn* category, the *low relative profit margin* category is accompanied by high executive staff dismissal rates (40.7%) and the highest rate of additional appointments of executive staff (69.5%). Arguably, this is because low relative profit margins are highly likely to stem from internal deficits of operative or strategic nature for which the management may be held responsible. Within the *low relative profit margin* category we also argue to observe stronger strategic reconfigurations, which we believe are mirrored in the highest observed rate of product innovation (50.0%), a 12.9 percentage points higher change intensity of in the marketing and sales function and an 8.2 percentage point higher rate of product portfolio diversification as compared with *normal* successions, whilst the complete product portfolio is subject to critical assessment (heavy sorting out of products in 6.9% of the cases). We also find a stronger commitment to close possible gaps in operative efficiency within the *low relative profit margin* category, which is reflected in a higher intensity of changes in the areas of production (8.9 percentage points higher), personnel (12.9 percentage points higher), working time policy (16 percentage points higher) and dismissal of old suppliers (6.3 percentage points higher) as compared to the *normal* category.

It is not really surprising that the *turnaround* category entails the highest rate of dismissal of executives (43.2%). Major attempts to reconfigure the organization and to push for organizational efficiency become visible and are mirrored in the highest rates of change indications, compared to all other categories, in compensation scheme (43.2%), production (67.4%), corporate finance & controlling (63.6%), purchasing (70.5%), new suppliers (65.9%), and a dismissal of old suppliers (52.3%). Furthermore, the product portfolio is often subject to a thorough review (moderate/heavy sorting out of products indicated in 43.2% / 6.8% of the *turnaround* successions), while product innovation is often pursued in a more conservative way as compared to *normal* successions (6.1 percentage points less often). Actions to stabilize revenues are evident: 81.8% of the surviving *turnaround* companies indicate changes within marketing and sales, which is 16.7 percentage points more compared with *normal* successions. At the same time, 88.4% of the surviving *turnaround* companies indicate having gained new customers and in only 20.5% of the cases losses of old customers, which is the lowest rate across the "economic contingency" dimension.[19]

Table 2 offers an overview using two basic differential performance indicators which are profit margin and number of employees. Profit margin (PM) is a straightforward measure of operational efficiency and can serve as an intuitive benchmark for company performance. The differential performance is measured between the succession year and the year 2009. Although the measure is a simple difference, it entails the advantage that it automatically cancels out time-invariant firm characteristics which might drive firm performance. As the PM values might be subject to industry trends, we introduce industry adjustments. We also take into account the influence of potential mean reversion due to transitory accounting components, but also the influence of performance trends due to pre-succession performance by introducing performance adjustments using performance

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[19]We also perform a factor analysis to visualize structures across the managerial changes. We present the results in appendix A2.

TABLE 2—HUMAN CAPITAL, ECONOMIC CONTINGENCY AND DIFFERENTIAL PERFORMANCE

| Variable | All | Economic contingency | | | | Human capital | | Δ |
| | | Normal | Low rel. PM | Industry downturn | Turn-around | LHC successor | HHC successor | LHC-HHC |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PM (succession year)	6.12	9.12	1.84	3.15	0.02	7.55	5.17	2.39***
Δ PM	0.21	-0.69	1.28	0.69	2.90	-0.74	0.84	-1.58***
	(0.25)	(0.37)	(0.48)	(0.30)	(0.76)	(0.44)	(0.29)	(0.53)
Δ Industry-adjusted PM	0.39	-0.28	2.13	0.11	2.36	-0.66	1.09	-1.75***
	(0.25)	(0.38)	(0.51)	(0.33)	(0.55)	(0.42)	(0.30)	(0.52)
Δ Ind.- and performance-adjusted PM	1.54	1.86	1.21	0.98	1.08	0.96	1.92	-0.96**
	(0.23)	(0.35)	(0.52)	(0.31)	(0.53)	(0.36)	(0.29)	(0.47)
Δ Employees (%)	20.7	17.5	16.4	25.9	9.0	15.1	24.9	-9.8*
	(3.27)	(3.77)	(5.42)	(5.63)	(3.58)	(1.75)	(5.62)	(5.88)
Δ Industry-adjusted employees (%)	36.7	33.9	19.0	45.0	21.4	31.1	41.0	-9.9
	(3.42)	(4.05)	(5.27)	(6.26)	(4.34)	(2.09)	(5.85)	(6.21)

Note: The table presents the mean performance development between the succession year and the year 2009. Successions are categorized into: *Normal*, for successions in healthy enterprises which do not fall into the categories low rel. profit margin, industry downturn or turnaround in the succession year; *Low rel. PM*, for successions in companies which have a lower profit margin (PM) compared to their industry peers in the succession year; *Industry downturn*, for successions in enterprises which experience an industry downturn (low profit margin across the industry) and which do not earn more than five percent profit margin in the succession year; and *Turnaround*, for successions in companies which face both low relative profit margin and an industry downturn or which earn less than 0.5% profit margin in the succession year. The human capital of successors is distinguished by *Low human capital* (LHC) and *High human capital* (HHC) depending on the successors' score on a human capital proxy score including (1) age, (2) industry experience, (3) leadership experience, (4) merchant education, and (5) professionalism. The performance indicators presented are calculated via: (a) profit margin (PM): earnings before taxes divided by operating revenue, (b) industry-adjusted variables: the subtraction of the control group median of the respective variable in the according year and industry (two-digit ISIC) from the sample variable, (c) industry- and performance-adjusted variables: industry-adjusted variables less the median industry-adjusted variable of the relevant performance control group, (d) number of employees: the growth of the firm's employees in percent. Control groups for performance are designed by sorting the industry-adjusted values of the variables of control group enterprises (drawn from the Amadeus database) into deciles and matching the industry-adjusted values of the variable in the sample with the accordant Amadeus decile in the year of the succession. The median of the relevant variable in the respective decile and year is then employed as a control. The stars display (Welch-Satterthwaite test) significances at: * ten percent, ** five percent and *** one percent. Standard errors are reported in parentheses.

peer groups (Barber and Lyon, 1996).[20]

[20]PM is calculated by dividing earnings before taxes (Amadeus item 33) by operating revenue (Amadeus item 24) and a multiplication by 100. PM relies on accruals of the same accounting period, which might be seen as an advantage compared to employing return on assets (ROA) instead. Assets might go into the ROA indicator at historic costs, while the earnings before taxes is measured in current dollars. ROA is subject to idle or recently acquired assets, while the downside of profit margin or return on sales is that it does not measure the efficiency of the assets (Barber and Lyon, 1996). Furthermore, PM and number of employees are accounting-based indicators and thus mainly mirror past, but not future, performance. The literature points out that accounting values might be influenced by over- and understatement (Barber and Lyon, 1996). Therefore, a combination of market-based data, for example market-to-book ratios, and accounting-based data might be vital (for examples, see Villalonga and Amit, 2006, and Pérez-González, 2006). Ideally, one would create a difference over a three year average before and after a succession. However, in this study these approaches are unavailable with the data at hand because many small and medium sized enterprises are not publicly traded. The industry-adjusted values are calculated by subtraction of the median PM of the accordant year and industry (at the two-digit ISIC code level) of a control group of 187,388 company-year observations taken from Amadeus. All industry categories in the control group are required to include at least five observations per year and industry (at the two-digit ISIC code level). We use two-digit industry controls because Richard N. Clarke (1989) shows that the difference between two-digit and four-digit SIC controls is marginal. In addition, we try to eliminate the influence of extremes and outliers by winsorizing the unadjusted PM values at the 0.025 level. We design the peer groups for the performance adjustments by dividing the industry-adjusted values of the control group (the Amadeus database enterprises) into deciles for each accounting period. By matching the industry-adjusted variable (e.g. PM) of each sample firm with the accordant Amadeus decile in the year

To begin with, we only have limited performance observations which reduces the possibilities of performance analyses within the economic contingency dimension. We count 235 enterprises in the *normal* category, 59 with *low relative profit margin*, 67 in the *industry downturn category*, and 44 *turnaround* enterprises. We find that the average succession case in our sample achieves a profit margin of 6.12% in the succession year. Performance in the succession year decreases as intended along the categories *normal* (9.12%), *industry downturn* (3.15%), *low relative profit margin* (1.84%), and *turnaround* (0.02%). We draw attention to the fact that these numbers are subject to a survivorship bias, because we do not include companies which went out of business. When comparing low human capital (LHC) and high human capital (HHC) successors, it is not surprising to observe that on average high human capital successors accept slightly less profitable enterprises (mean PM of 5.17% in the succession year). Enterprises with a lower performance tend also to be more difficult and challenging to manage, and might thus be avoided by low human capital successors who on average bought or inherited enterprises with an PM of 7.55% in the succession year. After controlling for performance and industry trends as well as time-invariant firm effects, we find that HHC successors performed significantly better with respect to the profit margin development as compared to LHC successors (difference-in-differences is 0.96 percentage points profit margin). Furthermore, it is interesting to see that the surviving companies in the *turnaround* category (column 5) manage the restructuring without reductions in the overall workforce. We even measure an average increase of 9.0% in workforce. This hints that the small and medium-sized companies observed seem to value responsible restructuring techniques (Cascio, 2005) and try to protect their workforce from layoffs, possibly because their workforce constitutes an investment and vital asset for them which is more difficult to replace as compared to large enterprises. However, from our data we cannot see possible shifts from permanent workforce towards a more flexible and contract based workforce.[21]

B. *Proposition Testing*

We begin by testing propositions 1 and 2 using a simple ordinary least squares regression with Huber-White robust standard errors and with the sum of the reported management actions as the dependent variable. Results are presented in table 3.

High human capital successors carry into effect significantly more changes as compared to successors with low human capital (column 1 of table 3). In addition, the sum of the changes is related to the economic contingency in the manner that was postulated by proposition 2. Turnaround successions spark significantly more change as compared to normal successions. In the reading of table 3 it is interesting to note the external CEO seems to spark significantly more change as compared to non-external CEOs, which

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of the succession, the relevant control group is identified for each enterprise. The median value of the relevant control group and year is then used as a control for the performance observations of the sample group.

[21] In addition we find that the enterprises of HHC successors also experience a 9.8 percentage points higher increase in workforce (significant at the 10% level) as compared to LHC successors (column 8 of table 6). However, the significance of the difference-in-differences in workforce vanishes when introducing industry adjustments. This is not astonishing at a second glance, as one might expect that HHC successors might be expected to be potentially capable of deploying their existing workforce more efficiently, which may lead to a lower demand for workforce in HHC successor-led companies.

TABLE 3—OLS REGRESSIONS - OVERALL CHANGE

					Dependent variable: sum of reported changes		
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Variables of interest							
High human capital (HHC)	1.64***				1.59***	1.56***	1.37***
	(0.43)				(0.44)	(0.44)	(0.43)
External CEO		1.51***			0.94*	0.93**	1.14**
		(0.50)			(0.52)	(0.51)	(0.50)
Industry downturn			0.45		-	-	-
			(0.59)		-	-	-
Low rel. PM			1.09*		-	-	-
			(0.64)		-	-	-
Turnaround			2.05***		-	1.29**	1.39***
			(0.55)		-	(0.52)	(0.52)
Male successor				1.71**	1.71**	1.73**	-
				(0.67)	(0.67)	(0.67)	-
B. Control variables							
Industry- and performance-adjusted PM	0.38***	0.38***	-	0.37***	0.35***	-	-
	(0.11)	(0.11)	-	(0.11)	(0.11)	-	-
Industry-adjusted PM	-0.12***	-0.13***	-	-0.13***	-0.10**	-	-
	(0.04)	(0.04)	-	(0.04)	(0.04)	-	-
Default probability	-0.30	-0.27	-0.28	-0.30	-0.33*	-0.34*	-0.31*
	(0.19)	(0.18)	(0.17)	(0.19)	(0.18)	(0.17)	(0.17)
Further controls	√	√	√	√	√	√	√
Construction (industry)	-0.87	-1.06*	-1.04*	-0.89	-0.79	-0.87	-0.97*
	(0.57)	(0.58)	(0.59)	(0.60)	(0.57)	(0.58)	(0.57)
Further industry controls	√	√	√	√	√	√	√
Years since succession	0.29***	0.29***	0.25**	0.32***	0.30***	0.27***	0.25**
	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Observations	350	350	353	339	339	341	353
R-squared	0.12	0.11	0.08	0.10	0.15	0.14	0.12

Note: The dependent variable is the sum of the reported management actions in the post-successions period. Independent variables are: *High human capital (HHC)* indicates if the successor's human capital score (derived from the proxies age, industry experience, leadership experience, merchant education, and professionalism) is greater or equal than the median score; *External CEO* is an indicator for successors without previous ties to the enterprise; *Low relative PM*, for successions in companies which earn lower profit margins compared to their industry peers in the succession year; *Industry downturn*, for successions in enterprises which experience an industry downturn (low profit margins across the industry) in the succession year; *Turnaround*, for successions in companies which face both low relative profit margin and an industry downturn or which earn less than 0.5% profit margin in the succession year; and *Male successor* indicates one if the successor is male. Controls include: *Industry- and performance-adjusted PM* (momentum) is the industry-adjusted profit margin (PM) in the succession year less the median industry-adjusted PM of the relevant control group; *Industry-adjusted PM* (momentum) is PM in the succession year less the median PM of the according year and industry of a control group. Industry-adjusted PM values are calculated by the subtraction of a control group median (drawn from the Amadeus database) of the accordant year and industry (two-digit ISIC) from the sample variable. Control groups for performance are designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted PM values of the sample group with the according control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control; *Default probability* is based on the Creditreform solvency index score of the enterprise in the year of the succession; *Ln sales* (size) is the natural logarithm of operating revenue in the year of the succession; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Predecessor active (shareholder & executive)* is an indicator variable equal to one if the predecessor still holds shares of the enterprise and remains operatively active in a leading position; *Unplanned successions* is an indicator for unplanned successions due to heavy disease or death of the predecessor; *Construction (industry)* and the further industry indicator variables are equal to one if the respective category according to the ZEW industry classification (see appendix) is met; and *Years since succession* reports time elapsed in years since the succession. All values are displayed in 07/2009 euros. The stars within the table display significances at the * ten percent, ** five percent, and *** one percent level. The values in parentheses display Huber-White robust standard errors.

supports a finding discussed by Ahrens et al. (2012), while there also seems to be a gender component: Male successors introduce significantly more changes as compared to female successors. These results are robust to the inclusion of an array of company, industry and time controls. Moreover, as columns 5 to 7 show, these effects are to a great degree independent from each other. Propositions 1 and 2 are supported in a remarkable way by the evidence visualized in table 3 and we conclude that we cannot reject them on the basis of our results.

As a next step, we investigate the performance impact of this change (proposition 3) employing a Huber-White robust ordinary least squares regression. In detail our model reads as follows:

$$(1) \qquad Y = \alpha_i + \delta c_i + X_i \beta + \varepsilon_i \qquad \textit{Ordinary least squares model (table 4)}$$

Here, Y denotes differential industry-adjusted PM (for columns 1 to 3) or differential industry- and performance-adjusted PM (for columns 4 to 6), α_i is the intercept, δ is the coefficient of interest (in this case of the variable sum of the changes), X_i is an array of controls with a vector of coefficients β, and ε_i denotes the error term. In line with the recent literature on firm performance and successions we include controls for typical firm characteristics (Villalonga and Amit, 2006, Pérez-González, 2006, and Ahrens et al., 2012, who use a similar model). In detail, our controls include size (operative revenue) in the succession year, momentum (e.g. industry-adjusted and industry- and performance-adjusted profit margin in the succession year), ownership structure in the succession year, default probability in the succession year, and year controls. In addition, we include further controls to address the effect of family successors, investment delays and unexpected financing requirements, and the activity of the predecessor for possible effects of the predecessor's tacit knowledge (Berman et al., 2002) to increase the robustness of our results. Furthermore, we exclude four observations ($\sim$1.25%) due to extreme values when inspecting studentized residuals, Cook's D, DFITS and leverage to residuals squared plots. The results are visualized in table 4.

Robust to the inclusion of various controls, the natural logarithm of the cumulative change has a positive and significant impact on post-succession enterprise performance (coefficient 0.93, significant at the five percent level; 1.16 for industry-adjusted), which is observable in columns 1 and 4 of table 4. This result is indicative that in many succession cases a potential for improvement has accumulated and that, once it is salvaged by post-succession management changes, it unleashes additional enterprise performance. Furthermore, the logarithmic form of the relationship already hints at decreasing marginal returns from additional changes, as the additional performance potential becomes increasingly salvaged. What this translates into on the operative level, becomes clear when we cite some of the in-depth CEO successor interviewees, for example (1): *"... since last year, we have not even had a sales and operation plan"*; (4): *"If you ask me, what was missing in the company was controlling."*; (10): *"... a lot had settled around it, we had 75 employees, but we figured out that we could do the same job with 50"*; *"We used to have three tax and accounting consultancies, one for our assets and the wage payments,*

TABLE 4—OLS REGRESSIONS - HUMAN CAPITAL, CHANGES AND ENTERPRISE PERFORMANCE

	Dependent variable: differential adjusted profit margin (PM)					
	Ind.-adj. ΔPM			Ind.& perf.-adj. ΔPM		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Ln changes	1.16***	-	1.44**	0.93**	-	1.14*
	(0.42)	-	(0.61)	(0.42)	-	(0.61)
High human	-	1.17***	3.10*	-	1.15***	2.78
capital (HHC)	-	(0.43)	(1.69)	-	(0.44)	(1.73)
Ln changes *	-	-	-0.97	-	-	-0.82
HHC	-	-	(0.77)	-	-	(0.78)
Industry- and performance-	-	-	-	-0.31**	-0.27*	-0.32**
adjusted PM	-	-	-	(0.15)	(0.14)	(0.15)
Industry-adjusted PM	-0.30***	-0.27***	-0.28***	0.05	0.06	0.06
	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
Family-, company-,						
industry- and time-controls	√	√	√	√	√	√
Observations	290	309	290	290	309	290
R-squared	0.2285	0.2224	0.2452	0.0448	0.0508	0.0642

Note: The dependent variables are the difference in industry-adjusted profit margin (PM) in columns 1 to 3 and difference in industry- and performance-adjusted PM in columns 4 to 6. The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM values are calculated by the subtraction of a control group median (drawn from the Amadeus database) of the accordant year and industry (two-digit ISIC) from the sample variable. Control groups for performance are designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted PM values of the sample group with the according control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control. The variables of interest include: *Ln changes*, is the natural logarithm of the sum of observed changes during the succession; and *High human capital (HHC)* indicates if the successor's human capital score (derived from the proxies age, industry experience, leadership experience, merchant education, and professionalism) is greater or equal than the median score. Controls are: *Ln sales* (size) is the natural logarithm of operating revenue in the year of the succession; *Industry- and performance-adjusted PM* (momentum) is the industry-adjusted PM in the succession year less the median industry-adjusted PM of the relevant control group; *Industry-adjusted PM* (momentum) is PM in the succession year less the median PM of the according year and industry of a control group; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* is based on the Creditreform solvency index score of the enterprise in the year of the succession; *Family CEO* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; *Investment delay* is an indicator variable equal to one if an investment delay is observed; *Predecessor active (shareholder & executive)* is an indicator variable equal to one if the predecessor still holds shares of the enterprise and remains operatively active in a leading position; and *Years* is the number of years since the succession until 2009. Interaction terms between variables are displayed as variable I * variable II. The stars within the table display significances at the * ten percent, ** five percent, and *** one percent level. The values in parentheses display Huber-White robust standard errors.

the next for the taxes and the third for public accounting. And still we factorized our bills while the payroll accounting was calculated by hand.”; *“...the internal organization was really 30 to 40 years old, and it was about time to overhaul it.”*; (13): *“...the goods received were booked by the incoming goods department by hand, every day hundreds of book entries... . We have completely new logistic systems. That had an immense impact.”*; and (16): *“...we experienced some skidding,... because we were clinging to long to formerly successful structures, but whose success was individual-related.”* Overall, this is strong evidence in favor of proposition 3 and we conclude that proposition 3 should not be rejected on the basis of these results.

Furthermore, table 4 shows that HHC successors generate a 1.15 percentage points higher industry- and performance-adjusted post-succession profit margin (significant at the one percent level, column 5 of table 4) as compared to LHC successors, which underlines results observed by Ahrens et al. (2012). This indicates that HHC successors are potentially better at seeing and executing the potential for improvements and highlights the crucial role of CEO human capital for enterprise performance in successions. Arguably, management actions can be interpreted as human capital “put into practice”. In this respect it seems that there is a performance impact of managerial actions during successions. The idea that the management's actions might be a ritual of symbolic meaning which entails no effect on firm performance (Gamson and Scotch, 1964, Pfeffer, 1981, and Meindl and Ehrlich, 1987) seems not to fit in this setting. However, there seem to be more benefits from CEO human capital to enterprise performance than just the management actions we track, as can be seen in column 3 of table 4 where both the coefficient of the changes (1.44) and the coefficient of the high human capital indicator (3.10) are positive and significant.

In the reading of table 4 it is interesting to observe that the coefficient of the interaction term between the natural logarithm of the sum of the changes implemented and high human capital is insignificantly negative. The finding is difficult to interpret, as the coefficient of high human capital jumps from 1.17 (column 2) to 3.10 (column 3) when including the interaction term. However, from this finding we suspect that HHC successors also tackle changes which are more difficult to implement, and furthermore, as HHC successors also implement more changes (which might suffer from decreasing marginal returns), that there seems to be a “speed-limit” for the amount of organizational change an organization can absorb without jeopardizing enterprise performance. One of the CEO successors (18) of the in-depth interviews noted on this: *I said to myself: “Man, a change here should really go faster!” But there are certain operations whose size you have to obey or which simply take their time.”*

With the results of the tables 3 and 4 in mind, one question, which is perhaps most relevant for practitioners, is which management changes are winners with respect to enterprise performance. Or put differently, in terms of a search for best practice, is there something we can learn from the performance impact of the individual management actions? In order to investigate this question, we track abnormal differential performance due to execution of a specific managerial action using the same regression model as in table 4, besides the variable of interest now being the respective managerial action. Due

to the great amount of changes, we restrict the presentation to significant results, which are shown in table 5.

TABLE 5—OLS REGRESSIONS - PERFORMANCE IMPACT OF CHANGES

| | Dependent variable: Δ Ind.& perf.-adj. PM | | | | | | |
| | Full sample | | Long-run | Family=1 | Interactions | | |
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Compensation scheme	0.82*	0.81*	0.97	1.26*	0.15	-	-
	(0.46)	(0.47)	(0.63)	(0.68)	(0.50)	-	-
Moderate sorting	1.23**	-	-	-	0.44	-1.60	-
	(0.50)	-	-	-	(0.60)	(1.03)	-
Sorting out of products	-	2.59**	3.48**	3.60**	-	-	-
	-	(1.01)	(1.46)	(1.53)	-	-	-
Sorting out of products^2	-	-1.38**	-1.77*	-1.82**	-	-	-
	-	(0.57)	(0.89)	(0.87)	-	-	-
Dismissal of	0.92**	0.93**	1.54**	0.39	-	-	-1.33
old suppliers	(0.45)	(0.46)	(0.69)	(0.73)	-	-	(1.15)
Internationalization	-1.70**	-1.72**	-2.02*	-2.73***	-	-	-
	(0.73)	(0.74)	(1.03)	(0.83)	-	-	-
New customers					-	-0.01	-0.11
					-	(0.65)	(0.69)
Moderate storing*					2.03**	-	-
comp. scheme					(1.00)	-	-
New customers*					-	3.40***	-
moderate sorting					-	(1.16)	-
New customers*					-	-	2.92**
dism. of old suppliers					-	-	(1.26)
Controls	√	√	√	√	√	√	√
Years since succession	√	√	√	√	√	√	√
Observations	305	305	146	164	307	305	305
R-squared	0.10	0.10	0.18	0.12	0.09	0.09	0.08

Note: The dependent variable is the difference in industry- and performance-adjusted profit margin (PM). The differences are calculated via: industry- (and performance-) adjusted PM of the year 2009 less industry- (and performance-) adjusted PM of the succession year. Industry-adjusted PM values are calculated by the subtraction of a control group median (drawn from the Amadeus database) of the accordant year and industry (two-digit ISIC) from the sample variable. Control groups for performance are designed by sorting the industry-adjusted values of the Amadeus database enterprises (control group) into deciles and matching the industry-adjusted PM values of the sample group with the according control group decile in the year of the succession. The median industry-adjusted PM of the relevant control group decile and year then serves as a control. The variables of interest are *[Management action indicators]* (for example *Compensation scheme*) which are equal to one if a change was indicated in the accordant action category. Control variables include: *Ln sales* (size) is the natural logarithm of operating revenue in the year of the succession; *Industry- and performance-adjusted PM* (momentum) is the industry-adjusted PM in the succession year less the median industry-adjusted PM of the relevant control group; *Industry-adjusted PM* (momentum) is PM in the succession year less the median PM of the according year and industry of a control group; *Ownership* is an indicator equal to one if the successor owned a share of the enterprise in the succession year; *Default probability* is based on the Creditreform solvency index score of the enterprise in the year of the succession; *Family* indicates if a successor is related by marriage or blood to at least one of the three persons owning more than 50% of the enterprise; *Financing requirements* is an indicator variable equal to one if severe unexpected financing requirements were encountered during the succession; *Investment delay* is an indicator variable equal to one if an investment delay is observed; *Predecessor active (shareholder & executive)* is an indicator variable equal to one if the predecessor still holds shares of the enterprise and remains operatively active in a leading position; and *Years since succession* reports the time in years since the succession. *Long-run* refers to successions which took place between 2002 and 2005. Interaction terms between variables are displayed as variable I * variable II. The stars within the table display significances at the * ten percent, ** five percent, and *** one percent level. The values in parentheses display Huber-White robust standard errors.

To start with, what seems to be most fruitful with respect to inducing abnormal performance is a moderate review of the product portfolio. Enterprises in which a moderate sorting out of products is indicated benefit from a 1.23 percentage point higher industry- and performance-adjusted profit margin as compared to enterprises which do not perform this action (column 1 of table 5). Possibly an honest due diligence of a company's product portfolio during successions reveals pet products or products which are mainly offered due to a company's history rather than for performance reasons. In addition, a positive impact on performance for enterprises which follow a selective product or market pruning strategy and refocus on their strengths is in line with the restructuring literature (Hambrick and Schecter, 1983). However, a heavy sorting out of products is rather indicative of severe difficulties and likely to break through the speed limit of organizational change, sparking organizational resistance and being very difficult to implement. Therefore, we would expect a heavy sorting out of products to have a negative impact on performance and the relationship of the intensity of product sorting out and enterprise performance to be described by an inverted u-shape. Interestingly, this is exactly what we observe in column 2 of table 5 as can be seen in the positive coefficient of sorting out of products (2.59, significant at the five percent level) and the negative and significant coefficient of sorting out of products squared (-1.38, significant at the five percent level).

In addition, reviewing relations with old suppliers seems to be a worthwhile idea with respect to inducing abnormal performance in successions. A dismissal of old suppliers seems to be related to a significant (at the five percent level) increase of 0.92 percentage points in industry- and performance-adjusted profit margin (column 1 of table 5). Moreover, we find that a review of the existing compensation scheme is significantly positively (0.82, significant at the ten percent level) related to abnormal enterprise performance in successions. It is worth noting that for companies which have to manage a succession process it seems definitely not the time to start to pursue internationalization projects (coefficient -1.70, significant at the five percent level). As internationalization strategies are risky and require profound market and industry knowledge, a relatively new successor may not yet be equipped for such ventures and is perhaps best advised to focus on national and regional markets. The above effects are robust to the inclusion of various controls and seem to be robust in nearly all cases when subjecting them to sub-samples such as a long-run view or restricting the sample to family successions (column 3 and 4).[22]

We draw attention to the fact that the positive impact of the review of the product portfolio and of previous supplier relations is amplified when the the new CEO successfully gains access to new customer groups, as is indicated by the positive and highly significant interaction terms new customers*moderate sorting (3.40, significant at the one percent level) and new customers*dismissal old suppliers (2.92, significant at the five percent level) in column 6 and 7 of table 5. Besides the large amount of change, this highlights the vital and important aspect of keeping and acquiring new customers in the aftermath of CEO successions in family firms.

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[22]Furthermore, it would be interesting to have the possibility to verify our findings using a separate data set on CEO successions.

In general, our findings give an indication of the average performance impact of managerial actions in successions, such as a beneficial role for a review of the product portfolio, the compensation scheme and old supplier relations. At the same time, we would like to emphasize that these findings should not be confused with rules. There are no "cooking recipes" or "blueprint solutions" available with regard to the managerial actions: a thorough understanding of the company's specific situation is vital for identifying the appropriate changes.

VI.   Conclusion

Our results provide evidence that in many family firms (companies with concentrated ownership control), which experience a CEO succession, a potential for vital corporate amendments has accumulated which is unleashed by intensive post-succession corporate change. The overall impact of this change on enterprise performance was found to be positive and significant, even after controlling for industry and performance trends and including an array of common company controls.

In line with this evidence, the crucial role of the CEO successor's human capital for post-succession enterprise performance becomes visible. We find that successors with high human capital are capable of detecting and initiating significantly more corporate change and achieve a 1.15 percentage points higher industry- and performance-adjusted profit margin in the post succession period when compared with successors with low human capital. These findings are robust to the inclusion of an array of controls. Furthermore, we observe that the total amount of change is subject to the origin of the successor and is influenced by the economic contingency in which the succession occurs. The lowest total change is found in *normal* successions followed by successions during an *industry downturn* and successions in the *low relative profit margin* category. The highest amount of change is observable in the *turnaround* category.

We also present a performance analysis regarding the impact of individual management actions. We find that a moderate review of the existing product portfolio seems to lead to a significant increase in differential industry- and performance-adjusted profit margin (plus 1.23 percentage points, significant at the five percent level and robust to the inclusion of various controls). In addition, a review of the compensation scheme (0.82, significant at the ten percent level) and a review of the existing suppliers (0.92, significant at the five percent level) seem to drive abnormal post-succession performance. In addition, we observe that some of these effects amplify if the successors successfully acquires new customer groups. Interestingly, internationalization strategies during successions are observed to occur along with significantly reduced (-1.70, at the five percent level) abnormal enterprise performance.

We emphasize that these general findings should not be confused with "blueprint rules" and highlight the role of understanding the individual company's situation before initiating change. When following a predecessor's footsteps, the new CEO not only inherits a formal position, but also finds a current internal and external equilibrium of organizational rules, norms, power structures and procedures, which are, in the abstract, nothing other than the result of the organization's past experiences and behavior. The question

is this: are the reasons for these organizational forms still extant, and if not, are there better forms achievable within the limits of reasonable effort? The new CEO often has to combine the organization's past experience with new, possibly external, insights to unleash the additional performance potential of his company. This approach is perhaps best explained with an example: In 1911 Roald Amundsen and Robert Scott started rival expeditions in a race to be the first explorer and pioneer to reach the Antarctic South Pole. As a seasoned polar veteran, Amundsen made a huge effort in his native Norway to plan his journey and continued to subject his equipment to rigorous scrutiny and refinement during the time in his winter base camp in Antarctica's Bay of Whales. Amundsen employed old knowledge and experiences, exemplia gratia employing traditional Nordic skiing and Eskimo Husky dog-sledge techniques, harnessing the sledges to Huskies used to the vicious conditions, crafting and adapting Eskimo clothing made of thick leather and fur capable of withstanding the lowest temperatures, and combining this knowledge with modern, contemporary equipment, such as the 1892 invention of the Primus stove, which was the first pressurized-burner kerosene (paraffin) stove and which had a reputation of being reliable under adverse conditions.

The British Antarctic expedition under the command of Captain Scott was equipped with very modern motor sledges and ponies, and relied techniques which were formerly employed by the British navy. This gallant British company of scientists, explorers and adventurers had high morale, grit, valor and courage. When their motor sledges and ponies failed, Scott and his men pulled the sledge themselves on their frostbitten journey of more than 800 miles. Fighting for every mile, Scott and his company reached the pole, but perished tragically in the unforgiving winter only a few miles away from the safety of their base camp. In contrast, Amundsen's team reached the pole, had no casualties and after being en route for 99 days en route returned safely to their base camp.[23]

In this vein, our advice to CEO successors when searching for the "right" changes is: adopt the techniques of the Amundsen approach, but in the spirit and the manner of the Scott approach.

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[23] Today, the southernmost place on earth is named the Amundsen-Scott South Pole Scientific Station to honor both expeditions.

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Appendix

A1.   *Further Sample Selection Information*

The second filter is designed to find enterprises where a succession event was likely to have occurred. The filter required the following arguments to be true between the years 2002 and 2008:

1) a leading member of the executive board resigned, or

2) a new leading member of the executive board was appointed, or

3) a previous owner reduced his share, or

4) a new or previous owner (a natural person) increased his share, and

5) one of the previous owners and leading members of the executive board was at least 55 or older.

The age requirement increases the likelihood to observe normal successions caused by old age. The natural person requirement ensures that the observed companies keep the "concentrated ownership control" (family firm) attribute, which excludes takeovers by other enterprises (legal entities) from the sample. We draw attention to the fact that we do not observe enterprises which went out of business during a succession. This creates a survivorship bias and thus we emphasize that any results reached are of reduced holistic representativeness and limited to the selected sample. However, we believe that this bias is only a minor caveat with respect to this article's research aims. In addition to the second filter, the ISIC industry sections (International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations) (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are excluded. Also, companies for which no telephone number is available in the MUP database are dropped (less than one percent). The gross sample of 14,250 enterprises is contacted by the Center for Evaluation and Methods (CEM) employing a standardized computer aided interview (ZEW-Unternehmensbefragung "Generationenwechsel Mittelstand", 2010).

A2.   Additional Tables

The industry classification key for the industry aggregation employed is shown in table A1. We categorize the successions using aggregations of the International Standard Industry Classification of All Economic Activities (ISIC Rev. 3.1) of the United Nations.

Table A2 shows the results of a factor analysis of the management actions. Employing an unrotated plain-vanilla version (estimates of the communality are computed using squared multiple correlates), we find one factor with an Eigenvalue greater or equal to 1.0, which we name ORGRES as it seems to represent mostly internal organizational restructuring. This factor seems to be more prominent with high human capital successors and in turnaround situations, mirroring our previous findings. Using the principal component factor method and employing varimax or minimum entropy rotation (Jennrich, 2004), we find a very stable pattern which includes 9 factors with an Eigenvalue greater or equal to 1.0. These factors seem to represent: internal organization restructuring, supply-restructuring, portfolio review, heavy portfolio review, management change, hierarchy flattening, financial restructuring, national focus, and international focus.

As can be observed in table A3, the prominence of the factors across the various dimensions is highly heterogeneous, which is analyzed using ordinary least squared regressions with Huber-White robust standard errors. In detail our model reads as follows:

$$Y = \alpha_i + \text{origin } c_i + \text{economic contingency } d_i + \text{human capital } f_i + \varepsilon_i$$

(A1)

Ordinary least squares model (table A3)

Here, Y denotes the respective factor, α_i is the intercept, and the independent variables include the dimensions "origin", "economic contingency" and "human capital". ε_i denotes the error term.

TABLE A1—INDUSTRY CLASSIFICATION KEY

ZEW industry key	ISIC Rev. 3.1 code	ISIC Rev. 3.1 industry description
	(1)	(2)
1. Manufacturing	D	Manufacturing
2. Construction	F	Construction
3. Business services	K	Real estate, renting and business activities (without ISIC 70: real estate activities)
	O	Other community, social and personal service activities (only ISIC 90: sewage and refuse disposal, sanitation and similar activities)
4. Consumer services	H	Hotels and restaurants
	K	Real estate, renting and business activities (only ISIC 70: real estate activities)
	M	Education
	N	Health and social work
	O	Other community, social and personal service activities (only ISIC 92: recreational, cultural and sporting activities and ISIC 93: other service activities)
5. Wholesale & retail	G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
6. Other	I	Transport, storage and communication
	J	Financial intermediation

Note: For each aggregated industry cluster the key in form of the ISIC Rev. 3.1 code (column 1) and its description (column 2) is reported. The ISIC industry sections (A) agriculture, hunting and forestry, (B) fishing, (C) mining, quarrying and (E) electricity gas and water supply, (L) public administration and defense & compulsory social security, (P) activities of households, (Q) extra-territorial organizations and bodies as well as division (91) activities of membership organizations are not included. ISIC industry categories with no observations are not displayed.

TABLE A2—FACTOR ANALYSIS: FACTOR LOADINGS - POST-SUCCESSION MANAGEMENT ACTIONS

Method	Plain vanilla & unrotated	Principal-component factors - orthogonal minimum entropy rotation								
Factorname	ORGRES	IntOrg-Res	Supply-Res	Portf-Rev	HPortf-Rev	Mgmt-Cha	Hier-Flat	Fin-Res	Nat-Focus	Int-Focus
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
A. Labor organization										
New executive directors	0.36					0.74				
Dropped executive directors	0.36					0.74				
Flattened hierarchy	0.32						0.73			
Steepened hierarchy	0.09						-0.79			
Working time policy	0.39	0.43								
Compensation scheme	0.36	0.40								
B. Organizational structure										
Purchasing	0.50	0.50								
Production	0.39									
Marketing and sales	0.50	0.54								
Personnel	0.46	0.64								
Corporate finance & controlling	0.35	0.63								
C. Products and innovations										
Additional methods of production	0.46	0.40								
Sorting out of products (moderate)	0.29			0.42	-0.49					
Sorting out of products (heavy)	0.08				0.80					
D. Business relations										
New customers	0.39			0.49						
Loss of old customers	0.25			0.78						
New suppliers	0.49		0.80							
Dismissal of old suppliers	0.52		0.78							
New bank relations	0.22							0.73		
New financiers	0.25							0.71		
E. Geographical activity										
Δ Regional markets	-0.20								-0.88	
Δ National markets	0.15								0.87	
Δ International markets	0.18									0.85
Observations	747									
Sampling adequacy (KMO)	0.72									

Note: Factor loadings below 0.4 are not shown in columns 2-10.

TABLE A3—OLS ANALYSIS OF MANAGEMENT ACTION FACTORS

Variable	ORGRES	IntOrgRes	SupplyRes	PortfRev	Dependent variable HPortfRev	MgmtCha	HierFlat	FinRes	NatFocus	IntFocus
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Family	0.05	0.10	-0.08	0.16	-0.07	-0.06	0.30**	-0.28**	0.01	0.13
	(0.11)	(0.12)	(0.13)	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.11)	(0.12)
External	0.33***	0.24*	0.15	-0.04	0.01	-0.01	0.51***	0.01	0.54***	-0.01
	(0.12)	(0.13)	(0.15)	(0.14)	(0.15)	(0.16)	(0.15)	(0.17)	(0.18)	(0.19)
High human capital	0.25***	0.19*	0.14	0.03	0.10	0.19*	-0.03	0.08	-0.17	0.22*
	(0.09)	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
Industry downturn	0.07	0.07	0.10	0.13	-0.02	-0.16	-0.10	0.08	-0.04	-0.11
	(0.12)	(0.15)	(0.15)	(0.15)	(0.12)	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)
Low rel. PM	0.22	0.21	0.01	-0.08	0.24	0.32*	0.22	0.22	-0.23**	-0.01
	(0.14)	(0.14)	(0.16)	(0.15)	(0.20)	(0.17)	(0.15)	(0.17)	(0.09)	(0.15)
Turnaround	0.38***	0.18	0.33*	0.06	0.09	0.13	0.01	0.19	-0.01	0.29
	(0.13)	(0.12)	(0.18)	(0.17)	(0.21)	(0.19)	(0.19)	(0.19)	(0.21)	(0.26)
Ln sales	0.03	0.02	0.01	0.00	-0.03	0.07	0.08	-0.02	-0.07	-0.02
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)
Construction	-0.16	0.21	-0.20	-0.37***	-0.24*	-0.12	-0.01	-0.41***	0.12	-0.12
	(0.12)	(0.14)	(0.14)	(0.14)	(0.13)	(0.16)	(0.14)	(0.15)	(0.17)	(0.16)
Business services	-0.02	0.22	-0.37**	0.30*	-0.47***	-0.02	-0.03	-0.43***	0.06	0.04
	(0.13)	(0.14)	(0.15)	(0.15)	(0.16)	(0.16)	(0.16)	(0.16)	(0.14)	(0.17)
Consumer services	0.41*	0.30	0.44**	-0.13	-0.44**	0.11	0.40	0.12	0.24	-0.23
	(0.23)	(0.22)	(0.22)	(0.23)	(0.19)	(0.22)	(0.24)	(0.28)	(0.29)	(0.15)
Wholesale & retail	0.06	0.11	0.06	-0.01	-0.43**	-0.21	0.15	-0.06	0.18	0.00
	(0.13)	(0.15)	(0.17)	(0.18)	(0.18)	(0.18)	(0.16)	(0.16)	(0.14)	(0.17)
Other	0.17	0.25	0.04	-0.02	0.11	-0.38	0.23	0.28	0.33	-0.27
	(0.22)	(0.22)	(0.24)	(0.24)	(0.42)	(0.26)	(0.24)	(0.29)	(0.29)	(0.20)
Years	0.04*	0.04	-0.02	0.05*	-0.01	0.01	0.02	0.01	0.01	0.04
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	373	373	373	373	373	373	373	373	373	373
R-squared	0.11	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.07	0.04

Note: The table presents the prominence of the action factors across various subgroups. The values in parentheses display Huber-White robust standard errors.

Chapter 5
Entrepreneurship under Imperfect Institutions

By JAN-PHILIPP AHRENS AND MICHAEL WOYWODE *

We consider the effects of imperfect institutions on entrepreneurial activity. Employing a microeconomic model, we argue abnormal uncertainty and transactions costs reduce profitability and volume of entrepreneurial activity while companies complying with good practices enjoy rewards in the optimal contracts. However, applied to an international context, counterintuitive niche cases where imperfect institutions enhance the wealth of nations occur, mirroring seemingly contrary findings in the development literature. Policies and business strategies to escape imperfect institutions are discussed, casting light on medieval merchant guilds or township and village enterprises and arguing for a holistic approach when introducing policies for institutional change.
(JEL: D02, D21, D82, D86, F23, L26, O34, O43, R00)
Keywords: Entrepreneurship, Principal-Agent Model, Institutions, Institutional Change, Development Economics

Commerce and manufactures gradually introduced order and good government, and with them, the liberty and security of individuals, [...]. This, though it has been the least observed, is by far the most important of all their effects. (Adam Smith (1776), Book III, Chapter IV, 3.4.4)

I. Introduction

This article explores the effects of imperfect institutions on entrepreneurial activity by considering its microfoundations using a principal-agent framework. By "microfoundations" we mean the underlying economic mechanics hidden below the surface of the observed contracting behavior and profits of a market participant. "Imperfect institutions" are characterised by inefficiency and an incomplete supply of Dixit's (2009) "good governance": (1) *security of property rights*, (2) *enforcement of contracts* and (3) *collective action* to remedy the effects of externalities.

Studying entrepreneurial activity under imperfect institutions is important because markets tend to develop failures in the absence of sound institutional economic governance. Good governance and thus sound institutions are essential to Smithian capitalism (Dixit, 2009).[1] Moreover and adding to the confusion, the development literature offers contrary findings on the role of imperfect institutions. There is some literature where imperfect institutions "sand" and others where they "grease" the wheels of growth.[2] To practitioners, these opposing observations give economists the flavour of ancient astronomers, who had observed and predicted the night sky, but could not provide reasonable explanations for their observations. However, billions of people and millions of companies trade under imperfect institutions every day, a state which calls for advances and further understanding in the field.

Applying results and a model of the principal-agent theory, this article offers an applied perspective arguing that possibly both views are right under certain contingencies and discusses practical policy and management implications. Its results suggest that, contingent on the assumptions introduced below, overall entrepreneurial activity is reduced by the various effects of an imperfect institutional design. It argues that com-

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[1]Smith (1776) writes of the effect of secured property rights: *"But men in [...] defenceless state naturally content themselves with their necessary subsistence, because to acquire more might only tempt the injustice of their oppressors. On the contrary, when they are secure of enjoying the fruits of their industry, they naturally exert it to better their condition, and to acquire not only the necessaries, but the conveniences and elegancies of life." (Adam Smith (1776), Wealth of Nations, Book III, Chapter III, 3.3.12).* Whilst he writes on contracts and conflicting objective functions of two parties: *"What are the common wages of labour, depends, everywhere upon the contract [...] made between [...] two parties, whose interest are not the same." (Adam Smith (1776), Book I, Chapter VIII, 1.8.11).* However, both property and contracts are subject to institutions, as Hobbes (1651) notes: *"If a Covenant be made, wherein neither of the parties performe presently, but trust one another; in the condition of meer Nature, (which is a condition of Warre of every man against every man,) upon any reasonable susption, it is Voyd: But if there be a common Power set over them both, with right and force sufficient to compell performance; it is not Voyd. For he that performeth first, has no assurance the other will performe after; because the bonds of words are too weak to bridle mens ambition, avarice, anger, and other Passions, without the feare of some coerceive Power; [...]" (Thomas Hobbes (1651), Leviathan, Chapter XIV).*

[2]For some different positions, see Leff (1964), Lui (1985), and Méon and Sekkat (2005). An overview is given by Aidt (2009).

panies complying with fair practices will gain partnership rents for not exploiting the sub-optimal institutional set-up. Contingent on the specific parameterization, the results of the employed principal-agent model also allow for counter-intuitive niche cases where the wealth of a nation is enhanced by an imperfect institutional design.

For entrepreneurs, inefficient institutions are often associated with a costly hurdle, thereby tempering entrepreneurial activity as a direct effect. But aside from this obvious effect, for companies well acquainted with their underdeveloped local institutional set-up, a leeway of opportunities to gain advantages through exploitative behavior unfolds. This is particularly the case, when these companies are dealing with uninformed third (foreign) companies. Examples of such exploitations include favouritism, bribery, minor breaching of contractual agreements and moderate violations of property rights such as patent right infringements, which are not punished by a domestic court of law. Accordingly, this article explores the impact of scarcity of "sound economic governance" with respect to the entrepreneurial activity and profits of the parties involved.

In this article entrepreneurial activity is modeled by a principal-agent model in order to investigate a simple trade or venture between two entrepreneurs. In order to model the government and market failures, this article applies a private values framework.[3] The model developed is best suited to situations, where a non-informed entrepreneur or company wishes to venture in a foreign or alien market and is obliged to establish a venture (or to trade) with a specific local partner due to his lack of choice, lack of information or even by force of authorities. With respect to these spatial contingencies, the real world examples of such a setting include cases of western enterprises wishing to venture in emerging economies, interregional trade in less developed (or developing) economies and medieval economies operating under imperfect institutions.[4] Clearly, such a contracting situation occurs countless times in many economies each day and is therefore also relevant from a macroeconomic perspective.

The perspective of this article is of applied and policy oriented nature and constitutes an interdisciplinary synthesis. As far as the model is concerned, it builds on the work of numerous researchers of the principal-agent and contract theory realm, especially the fundamental and technical work of Akerlof (1970) and Laffont and Martimort (2002). However, its applied perspective builds a bridge to findings and observations made by scholars of the realms of institutional economics, entrepreneurship and development economics literature, especially the work of Rodrik (2008) and Dixit (2009).

In section I the specific terminology and the model assumptions are introduced. Section II discusses the model and derives its respective optima, while section III discusses its implications for policy advisers and for strategic management in the light of development, entrepreneurship and business policy literature. The conclusions of this article are briefly summarized in section IV.

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[3] A survey and treatment of similar classes of such theoretical problems is given by Guesnerie and Laffont (1984). For a technical exposition of the general principal-agent realm we refer to Laffont and Martimort (2002).

[4] The context of Greif's (1993) Maghribi Traders' Coalition is a good example.

II.   A Model of Entrepreneurial Activity under Imperfect Institutions

A.   *Terminology*

The following classifications of institutions are derived for the purpose of this article and to serve within the limits of this article. We believe that the distinctions allow us to carve out the different economic effects more clearly.

To start with, this article's notion of a sound institution is a "second-best institution". Note, that a second-best institution may still not be perfect, but as perfect as a policy maker is currently able to design it. This embraces the idea that appropriate and sound institutions may still diverge greatly from the ultimate best-practice economic governance. Indeed the economist's first best state may be unattainable, since context-specific market and government failures, especially in less developed and developing economies, will always constrain the set of feasible institutional designs. Realizing this general principle, Rodrik (2008) coined the term "second-best" institution.

Installing optimal second-best institutions is complex and various authors have contributed research to this field. Dixit (2004) argues that self-enforcing governance arrangements are often more efficient than formal institutions in less developed countries. Laffont and Martimort (1999) highlight the benefits of institutional separation. Furthermore, the role of informal institutions replacing formal ones for entrepreneurship is emphasized by Tonoyan et al. (2010). Acemoglu et al. (2001) point out that institutions for the security of property rights could, from a historical perspective, be the single most important factor for the wealth of nations. Summarizing, Rodrik (2006) drives home the point that there are no blueprints for optimal institutions, but that country specific economic constraints should be taken into account.

Taking these ongoing discussions into account, we refrain from specifying the constructs (and variables) which constitute an optimal institutional set-up contingent on its environment. We assume instead that a governance optimization has already been performed by a sophisticated policy maker and refer to the result as a "second-best institution". Furthermore, if an institution is not classifiable as "second-best institution", it is referred to as an "imperfect institution" within this article. In order to distinguish within the principal-agent model between different economic effects of institutional imperfections, the class of imperfect institutions is further divided into two sub-categories: "inefficient" and "inferior" institutions.

"Inefficient institutions" include institutions which are superfluously costly. For example, an inefficient institution may be a bureaucratic process which imposes unnecessary transaction costs on its customers (e.g. an entrepreneur wishing to acquire a license). The term "superfluous" indicates that a sophisticated policy maker could suppress the inefficiencies in the given context. The costs may also be induced by externalities which the inefficient institutions fail to internalize. Examples include insufficient organization of "collective action" to incorporate external social costs induced by individuals and the under-supply of public goods or social-security-nets. Broadly understood, inefficient institutions coincide with the scarcity of the third element of Dixit's (2009) definition of functions of good economic governance: (3) *collective action*.

The second subcategory of imperfect institutions is that of "inferior institutions", which refers to institutions which superfluously forbear exploitative behavior. An example of an inferior institution is a court of law which does not punish a minor breach of contractual agreements or violations of property rights. Further examples of inferior institutions are institutions which allow favoritism or bribery. To a certain extent, this represents a scarcity of the first two elements of Dixit's (2009) definition of functions of good economic governance: (1) *security of property rights* and (2) *enforcement of contracts*. Note that according to these definitions an institution may be inefficient as well as inferior.

B.   Model Specification

The model applies the Gauß-notation for sums and the Leibniz-notation for calculus. In detail, the model incorporates the following assumptions:

A1. *Players, Behavior and Risk.* There exists an entrepreneur (principal), referred to in a Schumpeterian sense as the "initiator" (or sometimes initiator-company), and a partner-trader (agent), referred to as the "partner" (or partner-company), both of them being risk-neutral and profit maximizers.

A2. *Initiator's objective.* The initiator wishes to venture in a market currently being regulated by an imperfect institution. For this purpose, he considers a venture with a partner who is active in the market being considered.[5] Let Π denote the initiator's profit of the venture. Furthermore, assume that ρ denotes the revenue of the venture, depending on the volume of professional entrepreneurial activity e that is created by it.[6]

(1) $$\rho(e).$$

Assume the revenue function of the venture to be defined as

(2)
$$\frac{\delta\rho(e)}{\delta e} > 0,$$
$$\frac{\delta\frac{\delta\rho(e)}{\delta e}}{\delta e} < 0,$$
$$\rho(0) = 0,$$
$$\frac{\delta\rho(0)}{\delta e} \to +\infty \quad \text{as } e \to 0.$$

In addition, the initiator is obliged to contribute a certain amount of resources to the venture, in order to assure the partner of the attractiveness of a co-operation agreement. Such an input can take various forms: direct payments or investments,

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[5]Alternatively, it is also possible to think of a trade between a local and a stranger.

[6]We shall add that we employ e as a construct for simplicity reasons. The construct e may be composed of numerous variables, possibly in a macroeconomic context of the number of small and medium sized enterprises and their respective turnover.

delegation of human resources or sharing of sensible knowledge. Hence, for simplicity's sake, we model all benefits of the partner abstractly as a transfer t in monetary units from the initiator to the partner. Hence, the objective function of the initiator reads

$$(3) \qquad\qquad \Pi = \rho(e) - t.$$

A3. *Information structure.* The partner has private information ψ on the inferior institutions in his market. This private information allows the partner to exploit the venture to an extent depending on its knowledge of the inferiority. For example, the partner has private information with regard to which person can be bribed in order to commit a non-punishable larceny of knowledge within a venture. It is public knowledge, that ψ is randomly drawn from the interval

$$(4) \qquad\qquad \Psi = \{\underline{\psi}, ..., \overline{\psi}\}.$$

with probability density function $h(\psi)$, which is identically for each partner. $H(\psi)$ denotes the respective cumulative distribution function. $H(\psi)$ is absolutely continuous and differentiable.

A4. *Exploitative behavior and preferences.* To the extent of the partner's possibilities due to his information draw ψ, the partner executes a bribe (for instance to be privileged in a contract distribution by the institution or to commit a larceny of the initiator's knowledge without punishment) which will result in costs for the initiator. A well informed partner $\overline{\psi}$ can carry out a substantial bribe, while an uninformed partner $\underline{\psi}$ cannot bribe. The costs of bribing or exploiting directly correspond to the amount of the entrepreneurial activity which the bribe needs to cover.[7] However, for simplicity it is assumed in this model that the partner always bribes the institution and furthermore that the partner's benefits from bribing equal its bribing costs.[8] Covered by the bribe any exploitation of the contract is observable by the initiator ex post, but cannot be punished judicially due to the inferior institutions.

A5. *Partner's objective.* Taking into account the venture transfers t from the initiator, the partner has the following objective function

$$(5) \qquad\qquad \pi = t - C(e, \theta).$$

The partner incurs costs of the function

$$(6) \qquad\qquad C(e, \theta) = e\theta.$$

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[7]This corresponds to a variable bribe. A simple, fixed bribe would also be thinkable, but is not introduced here. Simple fixed bribes can be considered as a costly hurdle for investment.

[8]This assumption implies that this model does not cover moral hazard profit maximizations, which is not the focus of this article and would be a distraction from the main arguments. We suggest it as a topic for future research.

The marginal costs θ of the partner include his variable production costs $u = \underline{\theta}$, which are normalized to be equal for all partners, and also his bribing costs. Directly corresponding to the draw of the partner's private information Ψ on the institutional inferiority, the realization of the marginal costs of the partner belongs to the set

(7) $$\Theta = \{\underline{\theta}(\underline{\psi}), ..., \overline{\theta}(\overline{\psi})\}.$$

As an example, $\overline{\theta}$ describes an informed partner type with high exploitation ability and mathematically with high marginal costs, while $\underline{\theta}$ describes an uninformed reliable partner with low marginal costs. It is public knowledge, that the corresponding continuous probability density function $g(\theta)$ is distributed identically for each partner. Let $G(\theta)$ denote the corresponding cumulative distribution function. $G(\theta)$ is commonly known, absolutely continuous and differentiable. For simplicity's sake, we furthermore assume a monotone hazard rate of θ

(8) $$\frac{\delta}{\delta\theta}\left(\frac{G(\theta)}{g(\theta)}\right) \geq 0 \quad \forall\, (e, t, \theta)\, \in\, \mathbb{A} \times \Theta.$$

A6. *Contracting variables.* $\mathbb{A}$ denotes the set of all feasible contracts. Both parties can contract on the level of entrepreneurial activity e and on the transfer t, which are both observable and verifiable. $\mathbb{A}$ is defined as

(9) $$\mathbb{A} = \{(e, t), \;\; where \;\; e, t \in \mathbb{R}_+\}.$$

A7. *Imperfect institution.* The institution may be imperfect in two ways. Firstly, due to institutional inefficiencies, employing the rule of the institution inflicts costs of Φ on the initiator (This may be due to an inefficient routine or due to a bribe). Secondly, the institutional inferiority is modeled as follows: The institution detects any exploitation by the partner greater than his exploitation ability according to his information draw ψ. Thus, the institution imperfectly supervises the contracts and property rights of the initiator which inflict variable costs on the initiator.

A8. *Timing.* Contracting takes place at an interim stage. At time $T = 0$ the partner draws on his level of private information of the inferior institutions in his market and bribes. At the successive stage $T = 1$, the initiator offers a menu of venture contracts. Accordingly, the contracts are accepted or refused by the partner in $T = 2$. At stage $T = 3$ the chosen contract is executed.[9]

A9. *Outside options.* There are no outside options available to both initiator and partner.

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[9]Clearly, it is perfectly feasible for contracting to take place at an ex-ante stage $T = 0$. However, then we also would need to control for risk-attributes of the parties, which would be distracting from the main argument.

A10. *Initial endowment.* Any fixed costs of the partner are considered as sunk costs. The initial endowment of wealth of the partner π is zero. In the end the partner will accept the venture only if at least his status-quo level of wealth is covered.

III.   The Model - Discussion and Optimal Contracts

Employing the principal-agent model described above, how much entrepreneurial activity will unfold? Who benefits from such an environment and what are the wealth levels of the parties? What is the optimal menu of contracts for the initiator? In what ways will contracts and entrepreneurial activity diverge compared to a second-best institutional surrounding? The core idea is that imperfect institutions can both directly increase the costs of entrepreneurial activity and create abnormal uncertainty on the quality and trustworthiness of trading partners. The resulting reallocations of wealth leave the relationship between imperfect institutions and wealth in most cases negative, but are subject to contextual parameters which also allow niche cases with positive results.

These questions will be the driving forces of the following discussion, which is of technical nature and follows findings of the principal-agent theory, which is a well researched theoretical framework. In detail, the model described above belongs to the class of adverse selection with incentive and participation constraints under a continuum of types.[10] Thus, with great respect for its historical development, we refer to the synthesis of Laffont and Martimort (2002), for theoretical and earlier versions of the mathematics, proofs and concepts applied within this section. We must not be credited for the model's mathematical derivation, as we rely on their towering achievement and adopt their notation in the following mathematical section.[11] We highlight that our contribution in the following mathematical section is strictly limited to the application and transfer of the Laffont and Martimort (2002) theory to an entrepreneurship under imperfect institutions setting in order to offer a model based on logic to the "sand" or "grease" debate around imperfect institutions, which is capable to unify seeming contrary positions and from which we then derive management and policy implications.

A.   Second-Best Institutions - A Benchmark

Following Laffont and Martimont (2002), pp. 28-81, we comment briefly on the optimal contract under second-best institutions to establish a benchmark as a starting point of the discussion. We assume an utopian world where properly and efficiently functioning institutions prohibit any exploitations (or bribes) and that the initiator is correctly informed about the level of costs of his venture partners $u = \theta$. Accordingly, the initiator's maximization problem reads as follows:

(10)
$$\underset{(e,t)}{\text{maximize}} \quad \Pi = \rho(e(\theta)) - t(\theta)$$
$$\text{subject to} \quad t(\theta) - C(e,\theta) \geq 0.$$

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[10] See Laffont and Martimort (2002), appendix of chapter 3, pp. 134-140.
[11] See Laffont and Martimont (2002), chapters 2 and 3, pp. 28-140.

Clearly, the participation constraint must bind, since the proper institutional surrounding does not allow exploitations

$$(11) \qquad\qquad\qquad t(\theta) = e\theta.$$

A substitution and maximization leads to the rearranged first-order condition

SOLUTION (PROPOSITION) 1:

$$(12) \qquad\qquad\qquad \frac{\delta\rho(e^*(\theta))}{\delta e} = \theta.$$

The initiator contributes $t^* = e^*(\theta)\theta$ to the venture and accesses the market and the partner's resources at a fair price (i.e. he has to pay for no additional costs). If we assume that there were two types of partners: an inefficient partner with marginal costs $\overline{u} = \overline{\theta}$ and an efficient partner $\underline{u} = \underline{\theta}$, the optimal contracts read

$$(13) \qquad\qquad \begin{aligned} (\underline{e}^*, \underline{t}^*) \ \textit{iff} \ \theta = \underline{\theta}, \\ (\overline{e}^*, \overline{t}^*) \ \textit{iff} \ \theta = \overline{\theta}. \end{aligned}$$

It is possible to depict these contracts on the (e, t) space by representing the initiator's profit Π and the partner's wealth level π in the form of isoprofit functions. The isoprofit functions of the partners will follow the indifference path $t - e\theta = \pi$ from the origin, according to their respective definition in assumption (A5.).[12] In addition, the isoprofit function of the initiator is by definition in assumption (A2.) a strictly concave function in e. Considering both isoprofit functions, the optimal contract is described by the tangential point between them, when the marginal costs equal the marginal benefits. Two main observations can be drawn from this figure. Firstly, the initiator maximizes his profits by expanding entrepreneurial activity e until his marginal benefit equals his marginal costs. Since in the optimal contracts the marginal benefit from the venture for the initiator is higher when venturing with type $\overline{\theta}$, this in turn implies the volume of the entrepreneurial activity e with this type is lower $\overline{e}^* < \underline{e}^*$.[13] Secondly, the objective of the initiator is to accrue e and to avoid t, his profit Π increases when moving to the south-east direction on the (e, t) space. For the partner the opposite is true. Therefore, since $\overline{\theta} > \underline{\theta}$, the tangential point when dealing with the partner of type $\underline{\theta}$ will allow the initiator to reach a higher profit level, than when venturing with the partner type $\overline{\theta}$ (Laffont and Martimont, 2002). In a nutshell, these results are well in line with economic intuition. Companies

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[12] Since the gradient of these functions is determined by θ, two different isoprofit functions will only cross once in the (e, t) space. Hence, the partners' isoprofit functions in this model fulfill the Spence-Mirrlees property, which assures that a monotone ranking between the types θ on the marginal rate of substitution between entrepreneurial volume e and transfer t is possible. Or mathematically stated

$$\frac{\delta}{\delta\theta}\left(\frac{\frac{\delta\pi}{\delta e}}{\frac{\delta\pi}{\delta t}}\right) \lesseqgtr 0 \quad \forall (e, t, \theta) \in \mathbb{A} \times \Theta.$$

See Mirrlees (1971) and Spence (1974).

[13] Since $\overline{\theta} > \underline{\theta}$, it follows that the marginal benefits are ordered $(\delta\rho(e^*(\overline{\theta})))/(\delta e) > (\delta\rho(e^*(\underline{\theta})))/(\delta e)$. Note that this fact holds due to the spatial boundaries of ρ defined in assumption (A2.) which postulate positive and diminishing marginal revenues in e.
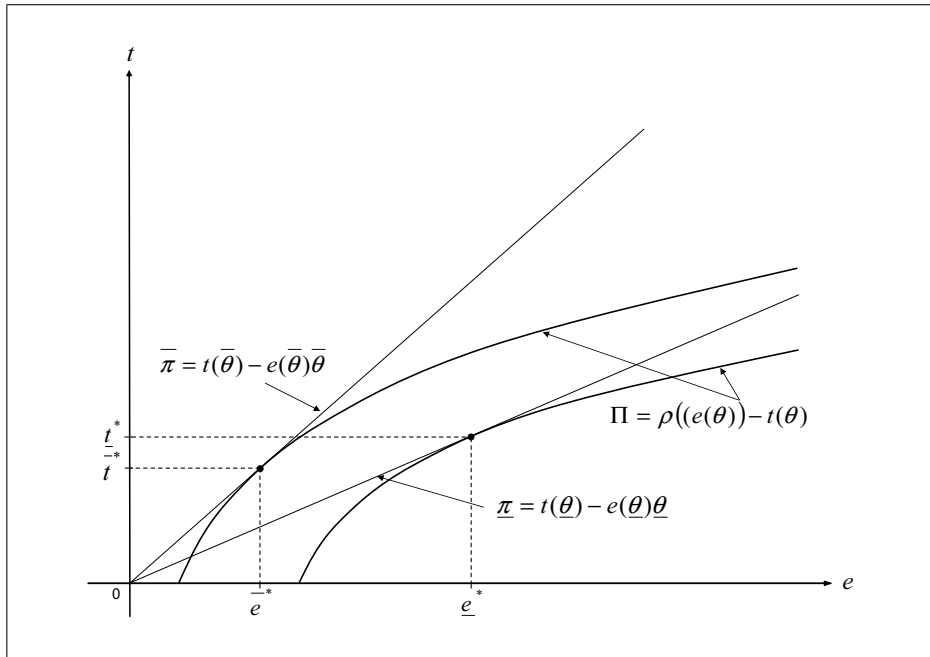
FIGURE 1. THE BENCHMARK CONTRACT $(\underline{e}^*, \underline{t}^*)$ ON THE (E,T)-SPACE

venture more profitably and intensely with more efficient partners.

B.   Inefficient Institutions

We start with the easiest case of an imperfect institution: assume an institution is inefficient, but not inferior. Its inefficiency inflicts costs Φ on the entrepreneurial activity (for example the initiator has to purchase an expensive license). Exploitation is not tolerated by the institution. The initiator is correctly informed about the type of partner he is venturing with $u = \theta$. Furthermore assume again, that there are only two types of partners: an inefficient partner $\overline{u} = \overline{\theta}$ and an efficient partner $\underline{u} = \underline{\theta}$. With the assumptions of the model above, the following three cases are possible.

As a first case, if $\Phi \leq \overline{\Pi}^*$ there will be no effect on the volume of entrepreneurial activity. Secondly, once the threshold value $\overline{\Pi}^*$ is reached, projects with sub-optimal partners will begin to be located outside the profitability horizon. Projects, which otherwise would have been viable, are now subject to shut-down due to the inefficient institutional environment. Thus, the reduced range of projects executed will only include $(\tilde{e}; \underline{e}^*)$. Thirdly, if $\Phi > \underline{\Pi}^*$, entrepreneurial activity breaks down completely since no project is located inside the profitability horizon. These direct effects of institutional inefficiency can be visualized in the (e, t) space, as displayed in the figure below.

Although this effect may seem very intuitive, it entails a big effect for economies, because, similar to a black hole, all entrepreneurial projects beyond the profitability horizon
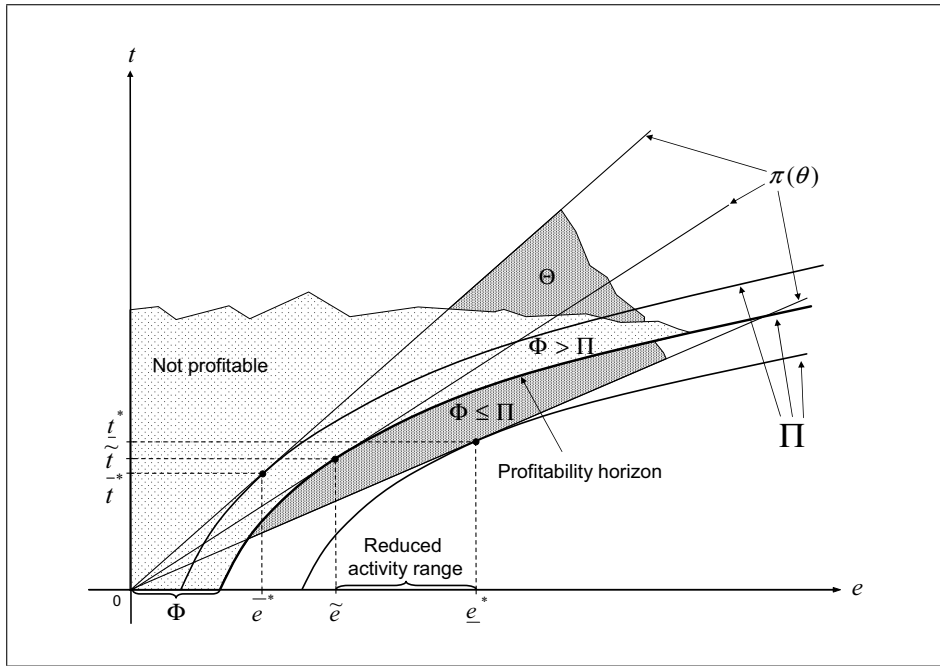
will not be realized.

C.   *Discussion of Inferior Institutions - Trading with Thieves*

Assume now that the institution is inferior and thus tolerates exploitations or bribes, but is not inefficient. In accordance with the assumptions, the marginal costs θ of possible partners include their variable production costs u, which are now normalized to be equal for all partners $u = \underline{\theta}$, but also the costs of their bribery. The partner's bribing ability directly corresponds with the draw of the partner's private information Ψ on the institutional inferiority, the realisation of the marginal costs of the partner thus belongs to the set $\Theta = \{\underline{\theta}(\underline{\psi}), \overline{\theta}(\overline{\psi})\}$. Furthermore, in order to clarify the mechanics, assume for the moment that there are still only two levels of information about the inferiority.

The initiator must now budget for being exploited, since he knows that he is now trading with thieves whose abilities he does not know. In addition, for the non-informed partner of type $\underline{\theta}$ it is more profitable to select the contract designed for the exploiting partner $\overline{\theta}$ when offered a menu of proposals during a contract negotiation.[14] To see this numerically, we compute the profits of a partner of type $\underline{\theta}$ when mimicking a partner of

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[14]The contract $(\overline{t}^*, \overline{e}^*)$ is located westwards of $(\underline{t}^*, \underline{e}^*)$ on the (e, t) space, choosing the $(\overline{t}^*, \overline{e}^*)$ contract will enable the non-exploiting partner of type $\underline{\theta}$ to reach a higher iso-profit function π.

type $\overline{\theta}$

$$\overline{t}^* - \overline{e}^* \underline{\theta},$$

(14) $$\Leftrightarrow \quad \overline{t}^* - \overline{e}^* \underline{\theta} + \overline{e}^* \overline{\theta} - \overline{e}^* \overline{\theta},$$

$$\Leftrightarrow \quad \pi(\overline{\theta}) + \overline{e}^*(\overline{\theta} - \underline{\theta}).$$

Thus, the partner $\underline{\theta}$ is in a position to barter for $\overline{e}^*(\overline{\theta} - \underline{\theta})$.[15] Either he pretends to have knowledge about the inferior institutions or he barters for an additional rent as a compensation. Hence, the contracts tailored for a normal second-best institutional set-up normal are no longer optimal as the partners no longer self-select the contract designed for them. In order to avoid such pretensions in negotiations, the initiator can only identify the true level of information θ, if it is in the best interest of the partner to reveal his level. Therefore, an optimal contract must take into account, that being offered a choice of contracts in $\mathbb{A}$, truth-telling is weakly preferred by the partner for any possible pair of $\theta \in \Theta \times \Theta$. Following Laffont and Martimont (2002), this puts additional truth-telling constraints on the problem, which read

(15) $$t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\underline{\theta},$$
$$t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} \geq t(\underline{\theta}) - e(\underline{\theta})\overline{\theta}.$$

Moreover, a simple addition yields an additional insight:

$$t(\underline{\theta}) - t(\underline{\theta}) + t(\overline{\theta}) - t(\overline{\theta}) + e(\overline{\theta})\underline{\theta} - e(\underline{\theta})\underline{\theta} - e(\overline{\theta})\overline{\theta} + e(\underline{\theta})\overline{\theta} \geq 0,$$

(16) $$\Leftrightarrow \qquad\qquad e(\underline{\theta})(\overline{\theta} - \underline{\theta}) - e(\overline{\theta})(\overline{\theta} - \underline{\theta}) \geq 0,$$

$$\Leftrightarrow \qquad\qquad\qquad\qquad e(\underline{\theta}) \geq e(\overline{\theta}).$$

Therefore, the truth-telling constraints force the initiator to limit the volume of his entrepreneurial activity with the exploiting partner of type $\overline{\theta}$ at least to that of the non-exploiting type $\underline{\theta}$. In other words, the level of entrepreneurial activity must be ranked monotonically according to the level of exploitation of the inferior institution by the partner types. It is worth noting, that this peculiar structure arises regardless of the objective function of the initiator. The initiator's objective function is now weighted by the likelihood ϑ to meet the $\underline{\theta}$ partner type, since the trustworthiness of the venture partner is blurred by a veil of uncertainty. Following Laffont and Martimont (2002), pp. 28-81,

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[15] The partner of type $\overline{\theta}$ already manifests the most informed type and hence it cannot avoid the initiator's discrimination, thus $\pi(\overline{\theta}) = 0$.

the objective function and the initiator's problem read

$$\underset{\left(e(\underline{\theta}),t(\underline{\theta}));(e(\overline{\theta}),t(\overline{\theta}))\right)}{\text{maximize } \Pi} = \vartheta(\rho(e(\underline{\theta})) - t(\underline{\theta})) + (1 - \vartheta)(\rho(e(\overline{\theta})) - t(\overline{\theta}))$$

(17)

subject to

$$t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq 0, \tag{I}$$

$$t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} \geq 0, \tag{II}$$

$$t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\underline{\theta}, \tag{III}$$

$$t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} \geq t(\underline{\theta}) - e(\underline{\theta})\overline{\theta}. \tag{IV}$$

The solution to this problem yields the optimal contracts with all possible venture partners. After some calculations one arrives at the following first order conditions:[16]

SOLUTION (PROPOSITION) 2:

(18)

$$\frac{\delta\rho(e^{\diamond}(\underline{\theta}))}{\delta e(\underline{\theta})} = \underline{\theta},$$

$$\frac{\delta\rho(e^{\diamond}(\overline{\theta}))}{\delta e(\overline{\theta})} = \overline{\theta} + \frac{\vartheta}{(1 - \vartheta)}(\overline{\theta} - \underline{\theta}).$$

By observing the resulting contracts, we note that overall entrepreneurial activity is greatly reduced, as compared to the contract $(\underline{e}^*, \underline{t}^*)$ that would have been implied under second-best institutions. The first order conditions yield the same result for the partner of type $\underline{\theta}$. However, the first order conditions indicate that the marginal benefits with partner type $\overline{\theta}$ have increased, reflecting a reduced entrepreneurial activity with this type.[17]

The transfers of the optimal contracts $\underline{t}^{\diamond} = \underline{e}^{\diamond}\underline{\theta} + \overline{e}^{\diamond}(\overline{\theta} - \underline{\theta})$ and $\overline{t}^{\diamond} = \overline{e}^{\diamond}\overline{\theta}$, as well as the partners' resulting wealth levels $\underline{\pi}^{\diamond} = \overline{e}^{\diamond}(\overline{\theta} - \underline{\theta})$ and $\overline{\pi}^{\diamond} = 0$, indicate another economic link: the partner type $\underline{\theta}$ accrues a positive partnership rent for not exploiting. Due to this rent, the wealth level of the initiator will also be lower, $\Pi^* > \Pi^{\diamond}$.[18]

D. Optimal Contracts under Inferior Institutions

Let us now allow for the more realistic case of a continuum of information levels $\theta \in \Theta = \{\underline{\theta}, ..., \overline{\theta}\}$, with a density function $g(\theta)$ and a cumulative distribution function $G(\theta)$ behaving in accordance to assumption (A5.). This problem discussed in Laffont and Martimont (2002) pp. 134-140 and we follow their solution. In line with the approach in the discussion above, we now search for the optimal contract $(e^{\circ}(\theta), t^{\circ}(\theta))$ in order to compare it with the benchmark case. As a starting point, the objective function of the

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[16] For the reader's convenience, we omitted the calculations and refer to the appendix.

[17] This is due to the assumed shape of the ρ-function, $(\delta\rho(e))/(\delta e) > 0$ and $((\delta\rho(e))/(\delta e))/(\delta e) < 0$, which leads to $\overline{e}^{\diamond} < \overline{e}^*$ and $\underline{e}^{\diamond} = \underline{e}^*$. Also, the results follow the monotone ranking demanded by equation (16): $\underline{e}^{\diamond} = \underline{e}^* > \overline{e}^* > \overline{e}^{\diamond}$ (Laffont and Martimont, 2002).

[18] See Laffont and Martimont (2002).

initiator under these conditions reads[19]

$$(19) \qquad \underset{\{(e(\theta),t(\theta))\}}{\text{maximize}} \Pi = \int_{\underline{\theta}}^{\overline{\theta}} [\rho(e(\theta)) - t(\theta)]\, g(\theta)\, \delta\theta.$$

The objective function is now subject to an infinite amount of constraints due to the infinity of possible types of θ. As the problem is designed to be well behaved in order to carve out the possible economic effects of the inferiority of an institution, it turns out that the infinite amount of constraints in our case collapses to an individual rationality constraint $\pi(\theta) \geq 0$, a second constraint which imposes a monotone ranking on the entrepreneurial activity depending on the information level $(\delta e(\theta))/(\delta\theta) \leq 0$ and a truth-telling constraint $(\delta\pi(\theta))/(\delta\theta) = -e(\theta)$.[20] This makes the program of the initiator much handier and allows us to calculate the optimal contracts. The program of the initiator, in terms of profit levels, now reads

$$\underset{(e(\cdot),\pi(\cdot))}{\text{maximize}} \Pi = \int_{\underline{\theta}}^{\overline{\theta}} (\rho(e(\theta)) - e(\theta)\theta - \pi(\theta))\, g(\theta)\delta\theta,$$

$$(20) \qquad \text{subject to} \qquad \pi(\theta) \geq 0, \qquad\qquad\qquad \text{(I)}$$

$$\frac{\delta e(\theta)}{\delta\theta} \leq 0, \qquad\qquad\qquad \text{(II)}$$

$$\frac{\delta\pi(\theta)}{\delta\theta} = -e(\theta). \qquad\qquad \text{(III)}$$

In line with Laffont and Martimont (2002), we try to reduce the variables in the objective function. For this purpose, we employ the truth-telling constraint $(\delta\pi(\check{\theta}))/(\delta\check{\theta}) = -e(\check{\theta})$ to enlarge $\pi(\theta) = \pi(\theta)$.

$$\pi(\theta) = \pi(\theta) + \pi(\overline{\theta}) - \pi(\overline{\theta}),$$

$$(21) \qquad\qquad \Leftrightarrow \pi(\overline{\theta}) - \int_{\theta}^{\overline{\theta}} \frac{\delta\pi(\theta)}{\delta\theta}\delta\theta,$$

$$\Leftrightarrow \int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma + \pi(\overline{\theta}).$$

However, the most informed type $\overline{\theta}$ of the partners is not capable to pretend to be even more informed, since the cumulative distribution function $G(\theta)$ is common knowledge. It follows immediately that he will be discriminated perfectly. As a consequence, the individual rationality constraint of the most informed type $\overline{\theta}$ will be binding: $\pi(\overline{\theta}) = 0$.

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[19]The integral is used, since the initiator can only form an expected value. This will be the sum of all possible (thus type dependent) profit situations times their respective likelihood in the form of the density function.

[20]The derivation and the calculations belong to the standard repertoire of the principal-agent realm and would be distracting from the main results. They are provided in the appendix for the reader's convenience.

Thus, we can write

$$(22) \qquad \pi(\theta) = \int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma.$$

This is a remarkable feature of the optimal contract. It dictates that partners will receive a partnership rent $\int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma$ for compliance with good practices.[21] Observe that we can plug this result into the objective function of the initiator, which also implies that the constraint $\pi(\theta) \geq 0$ is fulfilled due to the partnership rent. As Laffont and Martimont (2002) point out the objective function of the initiator now reads

$$(23) \qquad \underset{e(\cdot)}{\text{maximize}} \ \Pi = \int_{\underline{\theta}}^{\overline{\theta}} \left(\rho(e(\theta)) - e(\theta)\theta - \int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma \right) g(\theta)\delta\theta,$$

$$\text{subject to} \qquad \frac{\delta e(\theta)}{\delta\theta} \leq 0. \qquad (\text{II})$$

For the moment, we will neglect the remaining monotonicity constraint and follow a more practical approach by checking whether the omitted constraint is fulfilled afterwards. We directly proceed by maximizing the objective function of the initiator. The double integral exudes an air of difficulty, but it turns out that it can be tackled by integration by parts and a substitution of $\int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma$.[22]

$$\int_{\underline{\theta}}^{\overline{\theta}} \left(\rho(e(\theta)) - e(\theta)\theta - \underbrace{\int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma}_{f(x)} \right) \underbrace{g(\theta)}_{g(x)} \delta\theta,$$

$$\Leftrightarrow \qquad \int_{\underline{\theta}}^{\overline{\theta}} \Big(\rho(e(\theta)) - e(\theta)\theta$$

$$(24) \qquad - \Big(\underbrace{\left[\int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma \, G(\theta) \right]_{\underline{\theta}}^{\overline{\theta}}}_{=0} - \int_{\underline{\theta}}^{\overline{\theta}} \Big(\frac{\delta \int_{\theta}^{\overline{\theta}} e(\sigma)\delta\sigma}{\delta\theta} G(\theta) \Big)\delta\theta \Big) \Big) g(\theta)\delta\theta,$$

$$\Leftrightarrow \qquad \int_{\underline{\theta}}^{\overline{\theta}} \Big(\rho(e(\theta)) - e(\theta)\theta + \int_{\theta}^{\overline{\theta}} \Big(-e(\theta) \frac{G(\theta)}{g(\theta)} g(\theta) \Big)\delta\theta \Big) g(\theta)\delta\theta,$$

$$\Leftrightarrow \qquad \int_{\underline{\theta}}^{\overline{\theta}} \Big(\rho(e(\theta)) - e(\theta)\theta - e(\theta) \frac{G(\theta)}{g(\theta)} \Big) g(\theta)\delta\theta.$$

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[21] Note that this rent must be paid independently of the initiator's objective function. See also Laffont and Martimont (2002).

[22] We employ the extension of Leibniz's law for integration by parts:
$\int_a^b f(x)g(x)\delta x = \left[f(x) \int g(x)\delta x \right]_a^b - \int_a^b \left(\int g(x)\delta x \right) \frac{\delta f(x)}{\delta x} \delta x.$

Now we are in a position to optimize this expression point-wise which yields the following results:

SOLUTION (PROPOSITION) 3:

(25)
$$\frac{\delta\rho(e^\circ(\theta))}{\delta e(\theta)} - \theta - \frac{G(\theta)}{g(\theta)} = 0,$$
$$\Leftrightarrow \quad \frac{\delta\rho(e^\circ(\theta))}{\delta e(\theta)} = \theta + \frac{G(\theta)}{g(\theta)}.$$

It is remarkable, that for the partner of type $\underline{\theta}$, this result shows the following attributes

(26)
$$\frac{\delta\rho(e^\circ(\underline{\theta}))}{\delta e(\underline{\theta})} = \underline{\theta} + \underbrace{\frac{G(\underline{\theta})}{g(\underline{\theta})}}_{=0} = \underline{\theta}.$$

This indicates that non-exploiting partners will enjoy the same extent of co-operation as under second-best institutions, as shown by Laffont and Martimont (2002). Let us summarize the situation derived for the optimal contracts under inferior institutions. For this purpose, we expose the results in the (e, t) space. We note that overall entrepreneurial
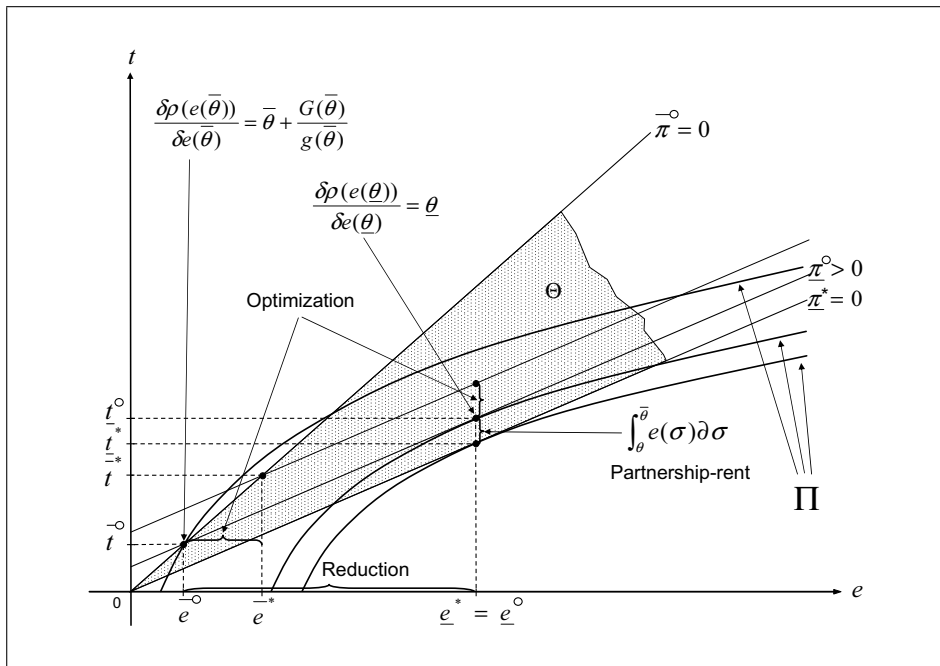
FIGURE 3. VISUALISATION OF THE CONTRACTS UNDER INFERIOR INSTITUTIONS

activity is harshly reduced, since the level of entrepreneurial activity with bribing part-

ners (or companies) is reduced according to the extent of their exploitations and their position in the population's general compliance with good practices. Vice versa, partner-companies with a reputation for good practices enjoy partnership rents $\int_{\theta}^{\bar{\theta}} e(\sigma)\delta\sigma$, depending on their degree of compliance. Remarkably, non-exploiting partners of type $\underline{\theta}$ will enjoy the same volume of trade as under second-best institutions, plus being rewarded for their good practices due to the partnership rent. Overall, it is more profitable for the initiator to venture with non-exploiting partners than with exploiters. However, the general level of profitability will be lower as compared to second-best institutions $\Pi^* > \Pi^\circ$. This is due to the fact that the initiator has to reward good compliance with partnership rents to remedy the inferior institutional environment. Thinking beyond the assumptions of the model, we note that these effects are sensitive to improvements in competition. If a competitive situation develops, for example two partners starting a bidding race for the contract with the initiator, the veil of uncertainty on the partners' costs is lifted considerably, since the bargaining position of the initiator improves dramatically.

IV. Derived Propositions and Policy and Management Implications

A. Propositions and Boundaries

The insights gained from applying the Laffont and Martimont (2002) model above will be cumulatively exposed in the form of propositions of a theorem.

THEOREM 1:

I. *Inefficient institutions:*

PROPOSITION 1: *An inefficient institution has no impact on the volume of entrepreneurial activity if the cost inflicted by its inefficiency is outside the profitability horizon.*

PROPOSITION 2: *An inefficient institution diminishes the volume of entrepreneurial activity if the cost inflicted by its inefficiency exceeds the profits generated by some projects. All projects outside the shifted profitability horizon will be shut down.*

PROPOSITION 3: *An inefficient institution prevents all entrepreneurial activity if the cost inflicted by its inefficiency exceeds the profits generated by all projects.*

II. *Inferior institutions:*

PROPOSITION 4: *An inferior institution has no impact on the volume of entrepreneurial activity for partners complying with good practices.*

PROPOSITION 5: *An inferior institution diminishes the volume of entrepreneurial activity by an extent according to the general compliance of partners with good practices $(G(\theta))/(g(\theta))$ and the extent of their individual exploitational abilities $\theta(\psi)$.*

PROPOSITION 6: *An inferior institution diminishes the profitability of all entrepreneurial activity for the initiator.*

PROPOSITION 7:   The presence of an inferior institution forces the initiator to award partnership rents $\int_\theta^{\bar\theta} e(\sigma)\delta\sigma$ to its partners.

PROPOSITION 8:   Competition dampens the effects of inferior institutions on entrepreneurial activity.

We stress that these propositions should be read from an agnostic perspective, as they are subject to the spatial boundaries defined in the assumptions of the model, as well as the implicit assumptions of the model. One such implicit assumptions is that the construct "entrepreneurial activity" is modeled sufficiently in the form of a simple trade or venture and a production function. We are aware that it is influenced by many more variables in practice.[23] We purposely neglect and fade out other variables in order to carve out the economic effects of imperfect institutions on entrepreneurial activity.

Our approach is driven by the profit maximization objective and views the entrepreneur as an autonomous decision making entity. Other authors, for example Cyert and March (1963) emphasize that companies are a collection of individuals. In addition, in the literature strand on organizational theory, personality traits of persons in charge, political processes within a company and generally broader goal systems of the company are considered as determinants of the actual behavior of firms. These sociological and psychological dimensions are neglected in our approach, since the perspective taken is related more to industrial organization, microeconomics and contract theory.

Furthermore, we would like to stress that the approach taken implicitly assumes a deterministic framework. We argue that exogenous changes in the structural elements of the economy, e.g. in our article the institutional design, induce changes in the entrepreneurial activity. We are aware of the fact that other authors, for example Brandenburger and Nalebuff (1996), highlight that companies can gain advantages by changing the structural elements in the market themselves. According to our approach, this corresponds to an institutional amendment, be it informal or formal. Such considerations are however beyond the scope of this article.

B.   Policy Implications

Reflecting the recognition that markets are unlikely to operate well in the absence of proper institutions which provide them with security through predicable rules, much of the reform focus in the developing world has shifted towards improving and reforming institutions and governance. But at what institutions should governance reformers aim? Some insights for practical policy making can be drawn from the propositions of the theorem. Due to the generality of the model, they are applicable to a wide range of settings, ranging from a regional, microcosmic trade situation to an international venture. However, and in line with contemporary development economics research, see Rodrik

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[23] For example one could postulate that variables like "literacy rate" influence the "entrepreneurial activity" construct. But the decision to form a venture itself is also influenced by numerous variables. A large body of literature has attempted to explain the portfolio of venture decisions by firms and has identified numerous reasons for inter-firm collaboration, thus influencing venture activity. See Hitt et al. (2011), or for an agency theoretical point of view, see Reuer and Ragozzino (2006).

(2007), the contextuality of these policy implications cannot be overstated. Proper institutions may be necessary for economic growth, but they are not a blueprint for achieving economic growth. Thus, the policy implications given here are formulated with the emphasis on humility, they should not be confused with rules.

I. *The Partnership Rent: A Diagnostic Signal.* - The propositions predict that once a country allows for inferior institutions, the entrepreneurs and companies will isomorphically introduce partnership rents for good compliance as a rational response.[24] In turn, high partnership rents relative to second-best levels indicate the need for lifelines outside the formal institutional environment. Thus, they might be taken as a diagnostic signal of high institutional inferiority for policy makers (in parts, as there may also be other, e.g. cultural, reasons). In practice, such partnership rents may take various forms such as special conditions and discounts in relational contracting situations with the goal of building up a long-term relationship of mutual trust between trading partners to allow successive projects (i.e. repeated partnerships).[25]

II. *Reforming Institutions: i. Inferior Institutions.* - Following the principal-agent framework applied here, there are two main approaches open to the government reformer. The first approach is to enhance the institutional surrounding in which the exploitation occurred (e.g. improve law enforcement and rule of law). However, in practice this relationship is non-trivial since the model predicts that as a consequence the enhancement will undermine the lifelines of partnership rents which formerly saved companies from exploits. Therefore, one has to consider whether the informal partnership rents c_{pr} or the formal law enforcement routines c_{inst} due to exploitations impose more transaction costs on firms. In line with Dixit (2003) as well as Li (2003), we argue that trading based on partnership rents requires no fixed costs but high marginal costs. In contrast, law enforcement is associated with high fixed costs for its provision but lower marginal costs. Maintaining and enforcing an institution may be only become optimal for entrepreneurs when a certain amount of trading contacts is exceeded, which may not be the case for early development stages. Thus, the answer obviously depends on the country specific development situation: how interwoven is the economy and how many ties or business contacts have to be maintained by the individual entrepreneurs? Is there (or will there be) a demand for an institution such that $c_{pr} > c_{inst}$?

The second approach is to tackle the exploitation at its roots. One reason for the exploit's magnitude is asymmetric information. Entrepreneurs foreign to a specific market possessed inefficient screening opportunities and the quality of its trading partners remained opaque. Thus, increasing competition, helping companies to gather information about market participants and disseminating or even ostracizing transgressors will remedy the institutional situation. Supply of information may be provided from official institutions or on a private profit-maximizing basis, as Dixit (2003) shows in a theoretical

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[24]In this context, we draw the attention of the interested reader to a neo-institutional perspective outlined from DiMaggio and Powell (1983) which consider isomorphic institutional change in organizational fields as a response to uncertainty (amongst other reasons).

[25]Work from Abreu et al. (1991) on repeated partnerships shows that under imperfect conditions long-term agreements may foster compliance.

context. However, supplying market information is costly and may be difficult to achieve in practice.

Besides the above economic suggestions, sociological and psychological aspects shall not be forgotten. Even if the exploitation or bribe was possible, it would be the individual behavior and action which made it real. In the manner in which Bénabou and Tirole (2003) argued, intrinsic incentives will shape and interact with the outcomes of extrinsic incentives. If the internal value system of the individual had attributed utility or happiness to behavior in accordance with social norms of honesty, righteousness and fairness, and if the internal values system reacted to a violation of these norms by increased disutility in the form of a feeling of guilt, then less exploitations might be carried out. The prevalence of egoistic and transgressive behavior is thus broken and the need for governance or partnership rents is reduced. However the installation of such so called "pro-social preferences" is a long-winded process, which will take hold only gradually as individuals become educated in and familiar with social norms, as the work of Camerer (2003) on behavioral economics indicates. Thus, fostering "pro-social preferences" by direct or indirect education is considerable as a worthwhile, but long-run policy.

The above political advice is not new. An early form of these insights appears in Hobbes's Leviathan (1651): *"The force of Words, being [...] too weak to hold men to the performance of their Covenants; there are in mans nature, but two imaginable helps to strengthen it. And those are either a Feare of the consequence of breaking their word; or a Glory, or Pride in appearing not to need to breake it. This later is a Generosity too rarely found to be presumed on, especially in the pursuers of Wealth, Command, or sensuall Pleasure; which are the greatest part of Mankind." (Thomas Hobbes (1651), Leviathan, Chapter XIV)*

Reforming Institutions: ii. Inefficient Institutions. - If an institution is found to be inefficient, it is crucial to determine what caused the inefficiencies and to determine the related costs Φ. For example, if the costs Φ are caused by externalities, a reform of an institutions must take into account the incentives of the individuals causing them or force them to compensate their victims, which will induce resistance by those who must pay for it. Regarding processual inefficiencies it is perhaps best to consider benchmark institutions, which offer more effective routines. As Rodrik (2008) points out, this may be a second-best institution with respect to the country specific appropriateness.

III. *Economic Desirability of Reforms: i. Inefficient Institutions.* - Regardless of the context, institutional inefficiencies should be avoided since their effects are purely of negative nature. To make things even worse, highly inefficient institutions may even induce institutional inferiority. High costs related to institutional inefficiency, for example extensive licensing or entry costs (de Soto, 1989, and Djankov et al., 2002), can create incentives for market participants to bypass them at lower costs $\tilde{\Phi}$ by bribing.

Niche Case: Interestingly, in the niche case of a given strong institutional inefficiency, an induced institutional inferiority may even entail positive effects here. In this niche case, as the costs for the bribing bypass (exploit) are lower than the original costs induced
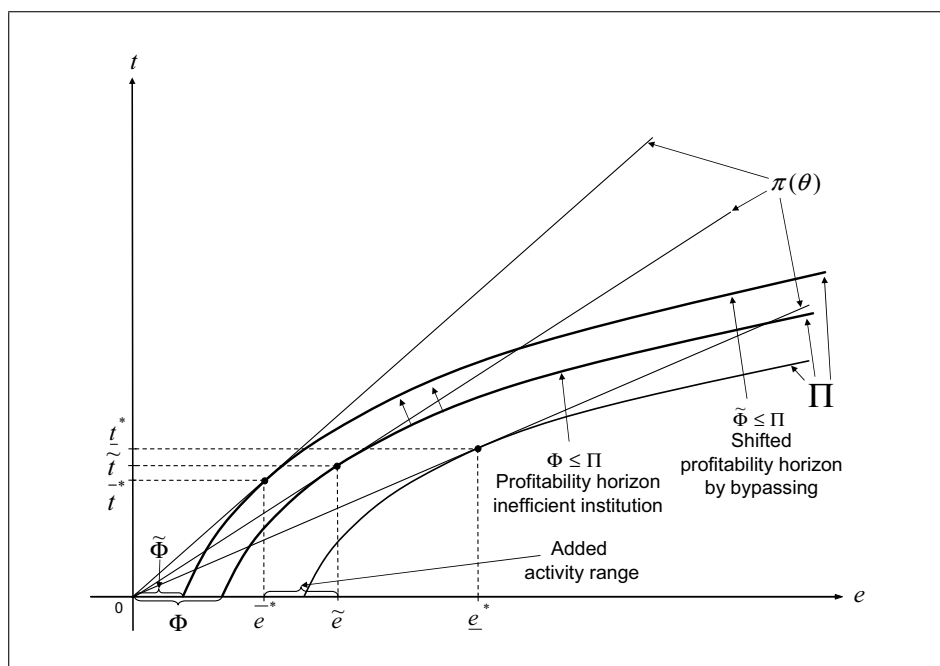
FIGURE 4. INSTITUTIONAL INEFFICIENCY INDUCING INSTITUTIONAL INFERIORITY

by the high inefficiency, $\tilde{\Phi} < \Phi$, this expands the profitability horizon and more projects are being realized because entrepreneurial activity is more profitable. Furthermore, the increased entrepreneurial activity e may also have positive effects on a country's wealth $\Pi_c(e)$, which arguably may surpass the potential negative effects of the institutional inferiority Φ_{inf} on the country's wealth $\Pi_c(\Phi_{inf})$, leading to positive net wealth effect $\Pi_c \Uparrow$. The above case also suggests that there may, under certain parameter values, exist an optimal level of inferiority, if the inefficiency cannot be avoided. Such a correlation was empirically observed by Méndez and Sépulveda (2006) and Méon and Weill (2010), while Levy (2007) offers historical evidence. These efficiency gains relative to an inefficient institution are better understood if one compares bribing to competitive bidding procedures (Beck and Maher, 1986) which reveals similarities between both mechanisms.

However, let us be very clear: the model strongly suggests that institutional inefficiencies should be avoided if possible.

Economic Desirability of Reforms: ii. Inferior Institutions. In general, it cannot be overstated that the mathematical results of this article strongly indicate that institutional inferiority is likely to be undesirable due to the partnership rents and the reduced entrepreneurial activity, which arguably reduces a countries wealth $\Pi_c(e) \Downarrow$.

Niche Case: However, the model also allows for parameters values for which this is not the case: the relationship is non-monotonic from a national perspective. This id-

iosyncratic effect is best visualized with an example: A country hosts institutions of inferior quality, which favor domestic entrepreneurs and allocate foreign entrepreneurs to specific domestic venture partners. Subsequently, the model suggests that the foreign entrepreneurs will adjust their contract offerings and reduce their entrepreneurial activity. After the contract negotiations the contracts are executed and the domestic players (partner companies and institutions) reap bribing profits π_b or enjoy partnership rents π_{pr}.

Given that the reduction of overall entrepreneurial activity $e \Downarrow$ generates less welfare loss than the extra profits enjoyed by the domestic players, thus $\Pi_c(e) \Downarrow < \Pi_c(\pi_b + \pi_{pr}) \Uparrow$, inferior institutions are desirable for a domestic policy maker. Overall the welfare of the country rises $\Pi_c \Uparrow$, while foreign entrepreneurs suffer a decreased level of profits $\Pi \Downarrow$, which may be regarded as irrelevant from a national perspective. In addition, privileging incumbent firms over entrants may in certain contexts be desirable. In addition the capital accumulation generated domestically may be necessary to open a leeway for the next development stage and induce growth. For instance Acemoglu et al. (2006) argue that rents generated by incumbents stimulate necessary investment for countries lagging behind the global technology frontier. In line with this argument, Qian (2003) argues that China's rise is due to the proper application of imperfect institutions as stepping stones.

Here, the question remains whether the government would not better of extracting a surplus from a foreign entrepreneur by imposing a simple lump-sum tax, rather than using the indirect approach of creating additional uncertainty for the foreign entrepreneur through an institutional inferiority. However, some capital might be inaccessible by taxes and but accessible by inferior institutions, for example through a tolerance of patent right infringements and accesses to firm specific knowledge or technologies. Furthermore, in practice a tax may be a less feasible instrument, because it potentially may create high transaction costs and because multi-national organizations are often very professional in reducing their tax burdens. Such (peculiarly) beneficiary effects of inferior institutions were highlighted by scholars quite early, for instance by Leff (1964). However, we emphasize that this is a niche case, which may only be relevant as a stepping stone, and that we refrain from putting to much emphasis on it.

On the contrary, if the institutional inferiority is located on a domestic or regional basis (i.e. a domestic entrepreneur trading with an domestic entrepreneur), then the impact of an institutional inferiority is very likely to have only strongly negative, reallocative and wasteful welfare effects. Entrepreneurial activity and, assuming beneficiary effects from entrepreneurial activity, welfare will be reduced. Furthermore, if the costs of partnership rents can be passed to the consumers of the entrepreneurial activity, consumers will suffer a loss in consumer surplus. Given such a context, inferior institutions should obviously be avoided and amended. For such negative effects, there is large body of supportive, empirical, and argumentative evidence in the corruption and growth literature (Shleifer and Vishny, 1993, Mauro, 1995, Rose-Ackerman, 1999, Méon and Sekkat, 2005, and Aidt, 2009). Dixit (2009) points out that a failure to protect (and a violation of) property rights by the government and its agents is a major cause of poor economic performance

in many countries. Furthermore, there is the danger that the institutional inferiority induces damaging lock-in effects: considering the benefits some players enjoy, it will be hard to introduce incentives in favor of a policy reform towards a second-best institution (Coate and Morris, 1999, and Blackburn et al., 2006). This may lead to complication in economic transitions and be a source of unsustainable development (Paldam, 2002, and Aidt, 2009).

IV. Imperfections as Barriers. - Furthermore, imperfect institutions create barriers to entering the domestic market and reduce entrepreneurial activity. This result is in line with current findings in the literature. For instance Klapper et al. (2006) consider entry barriers reducing entrepreneurial activity. Campos et al. (2010) show that corruption is an important barrier to entry and thereby inflicts social costs. In addition, according to Ricardo (1817) a liberal perspective would suggest that such barriers are undesirable with regard to the benefits of free trade.[26] Barriers to entry also curb entrepreneurial selection and thus fuel inefficiencies.

But on the other side of the coin, entry barriers may be vindicated from a protectionist-national perspective, since protected higher profits of incumbents create higher incentives for domestic entrepreneurial activity and thereby fuel growth. Hausmann and Rodrik (2003) argue that modest entry barriers shield incumbents from imitators, thus providing them with rents in equilibrium. These rents subsidize the risk-taking which goes along with entrepreneurial activity, and thus promote domestic entrepreneurial activity. Also, according to Bliss and Di Tella (1997), a profit-maximizing bureaucrat could wish to reduce the number of firms, since bribe-profits of the remaining firms are potentially higher. Thus, regarding the desirability of these entry barriers, the objective function of the governance reformer plays an important role.

V. *Addressing the Right Constraints.* - We shall draw attention to the fact that many developing countries face constraints of various natures in their ability to tackle and implement reforms. Reforms and amendments are thus scare resources. Consequently the above has to be judged in a holistic framework. The reforms which create higher marginal benefits should be realized first. If for instance the main constraint for entrepreneurial activity is the literacy rate or an inefficient financial sector, then a reform of the rule of law will clearly not be advisable and will only waste scarce resources. Inspired by a framework proposed by Rodrik (2006), the figure below attempts to provide a holistic framework for constraints of entrepreneurial activity and highlights the area in which our model grips. Obviously, the figure below is necessarily imperfect and we apologize for any omissions.

C.   Strategic Management Implications

To formulate a necessarily inchoate collection of strategies based on the insights of the principal-agent model of this article, it is worthwhile to expand the scope of this industrial-organizational related framework and, loosely restating Brandenburger and

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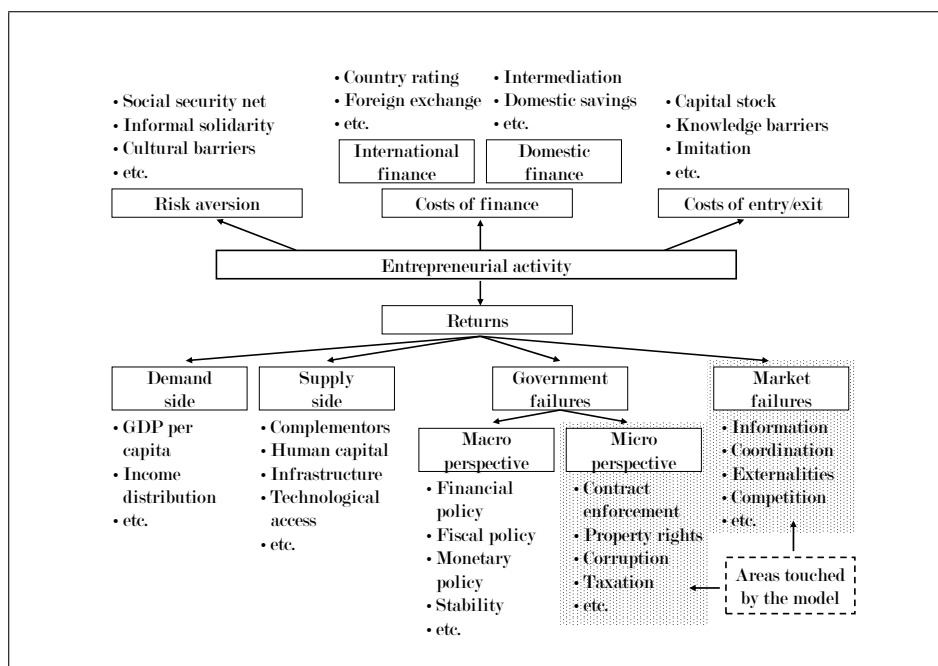
[26]See Ricardo (1817), pp. 146-185.

FIGURE 5. HOLISTIC FRAMEWORK FOR CONSTRAINTS ON ENTREPRENEURIAL ACTIVITY

Nalebuff (1996), to allow the companies to change the structure of the game itself. The basic question is: What determines the magnitude of the exploitation (of the foreigner) and how can companies reduce it?

I. *Corporate Citizenship.* - In the strategic management literature Hymer (1976), Zaheer and Mosakowski (1995), and Mezias (2002) argue that there exists a set of liabilities due to foreignness which inflict additional costs on foreign players in local or domestic markets. According to Zaheer and Mosakowski (1995), Vernon (2001), and Gardberg and Fombrun (2006) these liabilities are composed of transaction costs, information costs, lack of familiarity with and awareness of the domestic institutional environment, lack of legitimacy, and local biases. If one assumes, that the magnitude of the exploitation or bribe is influenced by these liabilities of foreignness, then entrepreneurs or companies should invest in measures to increase their local embeddedness.

Gardberg and Fombrun (2006) argue that corporate citizenship, understood as the socioeconomic and philanthropic activities which companies undertake to fulfill perceived duties as members of society, creates intangible assets such as reputational and social capital as well as legitimacy. These intangible assets help companies to integrate into the sociocognitive fabric of domestic and local communities, thus buffering the negative impacts of the foreignness attribute. Indeed, research suggests that companies can leapfrog such a nationalistic or regionalistic barrier by enhancing the perceived legitimacy to oper-

ate in the considered domestic market (Oliver, 1991, and Gardberg and Fombrun, 2006). Hence, if foreignness is identified as the reason for the exploitative behavior of partner-companies, then investing in corporate citizenship might be one strategy for the initiator to dampen the magnitude of exploits.

II. *Internalization.* - Another strategy might be to incorporate the institutions which forbear the exploitation into the venture. Following this approach, the initiator partially sells or shares the assets of the venture with the institution. The rationale behind this approach is that once the institution becomes a claimant of residual cash flows generated by the venture, it is incited not to tolerate any exploits. Thereby the initiator actively changes the "rules of the game": The institution and the initiator streamline their objective functions towards parallelism and the internalization transforms the exploitation into an agency problem of the institution. Such an approach can be observed in China, where community enterprises, so called "township and village enterprises", are a common business model. Such an approach may furthermore save the company transaction costs and enhance a company's position in an environment of imperfect institutions. However, a joint venture with authorities can also backfire, because the company may actually lose more bargaining power to the authority than they have sold in terms of shares. Thus to a certain extent, according to von Hayek (1944), the positive effects of such a strategy are accompanied by a loss of freedom, the company has made a few steps on "the road to serfdom".

The analogous approach of integration of the partner-company into the initiator's company, in accordance with Williamson's (1985) transaction cost theory, is also possible. In a similar way, this transforms the economic governance problem into a corporate governance problem. The vitality of this approach depends on whether internal or external governance is more costly to the initiator. Dixit (2009) points out that examples of such behavior can be found in family-owned conglomerates in less-developed countries, which are integrated mainly to escape weak external governance and tolerate the inefficiencies caused, since exposure to external governance would be even costlier.

III. *Competition.* - As a next strategy, since the effects of the model are limited to the case of non-competitive interaction between two parties, the initiator's strategy might include fuelling competition between several partners or institutions across regions. Both partnership rents and institutional inferiorities are sensitive to competition if the partners or the institution are interested in trading with the initiator. The initiator might, for instance, consider another foreign or domestic market for his activities and thereby enhance his bargaining position.

However, such a strategy may have limited effects, since increasing competition alone may not suffice to fully extinguish exploitations. For example Ades and Di Tella (1999) point out corruption may be fuelled not only by rents from imperfect competition, but also natural rents (e.g. revenue from rich natural resources). Furthermore, Bliss and Di Tella (1997) argue that competition may not be an exogenous parameter, but could also be endogenously determined by the objective function of a profit-maximizing bureau-

crat.[27]

IV. *Strategic Governance Alliances.* - Another approach for companies wishing to escape the "world of thieves" setting is to form "strategic governance alliances" which shield individual companies from exploitations by threatening transgressors with sanctions by all alliance members. When calculating the pay-off from exploiting, any transgressor would then have to incorporate the profits forgone with other alliance members into his objective function. If the profits lost are higher than the immediate gains from the exploitation, then compliance with fair practices is ensured. However, the punishment of the transgressor equals a private provision of a public good for all alliance members except for the one who has been cheated. Thus, in order to overcome free-riding behavior a second layer of punishment directed at free-riders within the alliance must be introduced. Such strategies and codices were successfully employed by medieval merchant guilds in Europe, as Greif et al. (1994) show. Another work by Greif (1993) on the 11th century Maghribi traders' coalition in the Mediterranean area shows that such coalitions worked extraordinarily well in very hostile institutional surroundings. A review of ancient reports of the time reveals that only a handful of reports contain allegations of misconduct. We wonder whether there are insights to be gained from the knowledge of these guilds for modern alliances too. Such strategies may have become viable again, especially since information on transgressors is distributable via modern communication technologies very easily and transparently.

V. Private Enforcement. - Private enforcement of contracts and property rights under the shadow law can be observed in practice. For example, before the modern Italian state was installed, formal institutions in Italy could not perfectly fulfill parts of their functions, especially in the poorer south of Italy. The civil society and merchants thus reacted by hiring guards who would enforce their masters' claims. For potential transgressors this guardianship acted as a strong deterrence and credible threat (Gambetta, 1993). Another example of private enforcement is private collecting agencies which can also be understood as private strategies to escape institutional imperfections.

VI. *Embracing Imperfections.* - From a corporate perspective institutional imperfections might also be a chance to fortify a corporate strategic alignment. The astute initiator could thus bear the institutional imperfections, since they constitute an entry barrier which defends his strategic position once he has entered the market. Companies adopting this strategy will invest in human resources capable of navigating in imperfect institutional surroundings, such as experts in relational contracting.

The model we applied is actually good news for all companies complying with good practices. It predicts that honest behavior pays, especially if competitors are known for not tolerating the laws of good business conduct. Adopting an honest strategy is remunerated with the first-best volume of entrepreneurial activity, an interesting point

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[27]But this is only the case if the bureaucrat is a monopolist. Fuelling competition between corrupt bureaucrats might actually reduce bribes, for example by installing competing official institutions offering identical services.

with regard to scale effects, and on top of this is rewarded with partnership rents. This is clearly one of the most encouraging results of the model.

V. Conclusion

The propositions we derived from applying a standard principal-agent model to the context of international or interregional entrepreneurial activity suggest that imperfect institutions reduce the volume and the profits of entrepreneurial activity for the initiating entrepreneur. Analyzing the incentives structures in partnerships reveals that it is optimal for entrepreneurs venturing under imperfect trading conditions to distribute and pay partnership rents, as the imperfect institutions may induce abnormal uncertainty due to the hidden information on the trustworthiness of the trading partner. Applied on a national or regional basis the model mainly suggests redistributive and negative effects of imperfect institutions on the wealth of a nation. However, applying the model to a holistic international macroeconomic context or to countries with feeble institutions unveils niche-cases, where the wealth of a nation may (given specific parameter values) be increased through an imperfect institution, which is mirrored in contemporary findings and debates in the development literature.

TABLE 1—EFFECTS OF IMPERFECT INSTITUTIONS

Case	Level of entrepreneurial activity	Level of initiator's wealth	Level of host-country's wealth
	(1)	(2)	(3)
General case:			
1. Imperfect institution	$\Downarrow$	$\Downarrow$	$\Downarrow$
Niche cases:			
1. Inferior institution & foreign initiator	$\Downarrow$	$\Downarrow$	$\Downarrow, \Uparrow, \Rightarrow$
2. Inefficient institution & exploit bypass	$\Uparrow$	$\Uparrow$	$\Downarrow, \Uparrow, \Rightarrow$

Note: The level of entrepreneurial activity is measured in e and the profit of the initiator in Π. The level of the host country's wealth incorporates the profit of domestic initiators Π, the profit of partners π, the payments to the institution $(\theta - u)e$ and possible macroeconomic wealth effects of the level of e. In the general case the effects of imperfect institutions (both inefficient and inferior) are described in a standard domestic setting. Niche case one assumes that the initiator and his profit levels are accounted within the realm of a foreign economy. Niche case two describes a standard domestic setting with strong institutional inefficiencies, where inferior institutions allow an exploit bypass. The arrows describe the direction of possible level changes compared to the levels under second-best institutions. For niche case two, the arrows describe possible level changes compared to the levels of inefficient institutions without the exploit bypass.

We highlighted several strategies (e.g. corporate citizenship, internalization, strategic governance alliances, and private enforcement) which allow entrepreneurs to navigate in and to escape from an imperfect institutional setting. Furthermore, a discussion of the driving forces and the effects of the imperfections as well as the policies to remedy them highlight the need for a holistic approach. Due to the existence of several trade-offs, no

deterministic policy advice can be given on the basis of the derived propositions without knowing the country-specific parameters necessary to judge the policy's appropriateness. The importance of the context rather reminds economists and policy advisers of the "art of humility" in policy making. Since although institutions may be imperfect, they may be so for a very good reason. A current institutional "species" of a country may be the outcome of an experimental evolutionary process which has settled in a current equilibrium. The famous author Herbert G. Wells noted on this: *"Biologically the species is the accumulation of the experiments of all its successful individuals since the beginning, and the World State of the Modern Utopist will, in its economic aspect, be a compendium of established economic experience [...]" (Herbert G. Wells (1905), A modern Utopia, Chapter III, 4).* But at the same time they may be an accident or relict of history which has erroneously been defended and survived previous suggestions of change: a winner of the Nobel Prize in Literature once wrote: *"[...] that all evolution in thought and conduct must at first appear as heresy and misconduct." (George B. Shaw (1923), Saint Joan, Preface, The Law of Change is the Law of God.).* So the questions are: Is the reason for the current equilibrium still intact? And, since resources for reform are scarce, is there a better equilibrium available at a reasonable price?

All this indicates that before advising institutional change, economists should inquire very carefully into the context of the institutional setting: How do the domestic companies of the considered country trade? Have they many partners or just a few? Do they trade a lot with foreign countries? Is the binding constraint on growth of this specific country really the institutional sub-optimality, or is it from a holistic point of view another issue? A good economic "country due diligence" is needed, otherwise any advice, with our model in mind, is of uncertain outcome. For what Leonardo da Vinci once noted on the art of painters, may also be true for the art of economists:

"Those who are in love with practice without knowledge are like the sailor who gets into a ship without rudder or compass and who never can be certain whether he is going." (Leonardo da Vinci, Book I, 19.)

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MATHEMATICAL APPENDIX - OMITTED CALCULATIONS

A1. Preface to the Mathematical Appendix

The version of the principal-agent model, which we apply for the imperfect institution setting in this article, is a well researched theoretical model. The derivations and calculations presented below are given for the reader's convenience and belong to the standard repertoire of the principal-agent realm. They build on the work of numerous researchers of the principal-agent realm and the discovery of the revelation principle. With great respect for the field's historical development, we predominantly rely on the approaches and terminology used in the book of Laffont and Martimont: *The Theory of Incentives - The Principal-Agent Model*, 2002, which is one of the towering standard technical references of this field of research.

A2. Equations (17)

In order to solve the problem of the equations numbered with (17), it is necessary to determine which constraints are the relevant ones.

LEMMA 1: (A.) *Constraint (II) is active and equal to zero.* (B.) *Therefore, constraint (III) is also active and binding.*

LEMMA 1 (A.) We begin by establishing that constraint (II) is binding. Recall that $\overline{\theta} > \underline{\theta}$. Observe that constraint (III) unveils us that

(A1) $$ t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\overline{\theta}. $$

This implies constraint (II) must be active and equal to zero. Imagine constraint (II) is not equal to zero, which would imply accordingly constraint (I) also not equal to zero, since $t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\overline{\theta}$. This cannot be optimal, since the initiator could profitably lower both $t(\overline{\theta})$ and $t(\underline{\theta})$ by an amount Δt without any changes in the incentive structure and generate profits Δt. Hence, the second constraint must bind in the optimum (Laffont and Martimont, 2002).

LEMMA 1 (B.) From Lemma 1 (A.) we know that $t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} = 0$. Combining this insight again with constraint (III) yields

(A2) $$ t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} = 0. $$

Now assume for a moment that constraint (III) would not be binding. Then, by inspection of the equation above, the initiator could decrease his payments $t(\underline{\theta})$ by an amount $\Delta t(\underline{\theta})$ and thereby improve his profits by $\vartheta \Delta t(\underline{\theta})$. Clearly, this cannot be true in the optimum, therefore the opposite must be true and constraint (III) must bind (Laffont and Martimont, 2002).

LEMMA 2: (A.) *Constraint (I) and* (B.) *constraint (IV) are not relevant to the optimization problem.*

LEMMA 2 (A.) Note that $t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\underline{\theta}$ can be expanded by $+e(\overline{\theta})\overline{\theta} - e(\overline{\theta})\overline{\theta}$ without defects. A simple rearrangement yields

(A3) $$ t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} \geq t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} + e(\overline{\theta})(\overline{\theta} - \underline{\theta}). $$

We see that constraint (II) and (III) directly imply constraint (I).[28] What remains is to validate its slackness property. Again, from Lemma 1 (A.) we are assured that $t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} = 0$. Furthermore, since $\overline{\theta} - \underline{\theta} > 0$ and if we assume $e(\overline{\theta})$ to be positive, the slackness property is fulfilled.[29] Constraint (I) can therefore be omitted (Laffont and Martimont (2002).

LEMMA 2 (B.) Applying Lemma 1 (B.) yields

(A4) $$ \begin{aligned} t(\underline{\theta}) - e(\underline{\theta})\underline{\theta} &= t(\overline{\theta}) - e(\overline{\theta})\underline{\theta}, \\ \Leftrightarrow \quad t(\underline{\theta}) - t(\overline{\theta}) &= (e(\underline{\theta}) - e(\overline{\theta}))\underline{\theta}. \end{aligned} $$

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[28] Intuitively, this is in line with our argumentation above, we argued that partner $\underline{\theta}$ must be given $\overline{e}^*(\overline{\theta} - \underline{\theta})$ to induce truthful behavior, hence he will enjoy a positive wealth level.

[29] We assume here for convenience, that entrepreneurial activity is desirable and $\overline{e} > 0$. We shall prove this later.

However, from equation (16) we already know that $e(\underline{\theta}) \geq e(\overline{\theta})$. Combining this knowledge with $\overline{\theta} > \underline{\theta}$ and rearranging again shows

(A5)
$$t(\underline{\theta}) - t(\overline{\theta}) = (e(\underline{\theta}) - e(\overline{\theta}))\underline{\theta} \leq (e(\underline{\theta}) - e(\overline{\theta}))\overline{\theta},$$
$$\Leftrightarrow \qquad t(\overline{\theta}) - e(\overline{\theta})\overline{\theta} \geq t(\underline{\theta}) - e(\underline{\theta})\overline{\theta}.$$

Thereby we have shown that if constraints (II) and (III) are active and fulfilled, constraint (IV) will hold implicitly also. Hence, we can neglect constraint (IV) (Laffont and Martimont, 2002). Applying Lemma 1 and Lemma 2 this program is solvable. However, before determining the optimum, we will rewrite the problem in terms of wealth levels π and of entrepreneurial activity e. The rearranged problem of the principal reads (Laffont and Martimont, 2002):

$$\underset{(e(\underline{\theta}),\pi(\underline{\theta}));(e(\overline{\theta}),\pi(\overline{\theta}))}{\text{maximize}} \Pi = \vartheta(\rho(e(\underline{\theta})) - e(\underline{\theta})\underline{\theta}) + (1-\vartheta)(\rho(e(\overline{\theta})) - e(\overline{\theta})\overline{\theta})$$
$$- (\vartheta\pi(\underline{\theta}) + (1-\vartheta)\pi(\overline{\theta}))$$

(A6)   subject to
$$\pi(\underline{\theta}) \geq 0,$$
$$\pi(\overline{\theta}) \geq 0,$$
$$\pi(\underline{\theta}) \geq \pi(\overline{\theta}) + e(\overline{\theta})(\overline{\theta} - \underline{\theta}),$$
$$\pi(\overline{\theta}) \geq \pi(\underline{\theta}) - e(\underline{\theta})(\overline{\theta} - \underline{\theta}).$$

Applying Lemma 1 and Lemma 2 this problem will shrink to

$$\underset{(e(\underline{\theta}),\pi(\underline{\theta}));(e(\overline{\theta}),\pi(\overline{\theta}))}{\text{maximize}} \Pi = \vartheta(\rho(e(\underline{\theta})) - e(\underline{\theta})\underline{\theta}) + (1-\vartheta)(\rho(e(\overline{\theta})) - e(\overline{\theta})\overline{\theta})$$
$$- (\vartheta\pi(\underline{\theta}) + (1-\vartheta)\pi(\overline{\theta}))$$

(A7)

subject to
$$\pi(\overline{\theta}) = 0,$$
$$\pi(\underline{\theta}) = \pi(\overline{\theta}) + e(\overline{\theta})(\overline{\theta} - \underline{\theta}).$$

A substitution yields
(A8)
$$\underset{(e(\underline{\theta}),e(\overline{\theta}))}{\text{maximize}} \Pi = \vartheta(\rho(e(\underline{\theta})) - e(\underline{\theta})\underline{\theta}) + (1-\vartheta)(\rho(e(\overline{\theta})) - e(\overline{\theta})\overline{\theta}) - \vartheta e(\overline{\theta})(\overline{\theta} - \underline{\theta}).$$

However, we assumed implicitly that it is profitable for the initiator not to exclude exploiting types from the venture.

LEMMA 3: *The initiator maximizes his profits when venturing with all possible companies.*

LEMMA 3. Following Laffon and Martimont (2002), for Lemma 3 to hold, the profit of venturing with both possible partner-types must exceed the profits of venturing with the more profitable partner alone. Or expressed in other words, the difference in both profit levels yields a positive value. This we will now demonstrate. To start with, recall that $\underline{e}^\diamond = \underline{e}^*$. Observe that venturing with both partners is optimal, as compared to with only one partner, when

(A9)
$$\vartheta \left(\rho(\underline{e}^\diamond) - \underline{e}^\diamond \underline{\theta} - \overline{e}^\diamond (\overline{\theta} - \underline{\theta}) \right) + (1 - \vartheta) \left(\rho(\overline{e}^\diamond) - \overline{e}^\diamond \overline{\theta} \right) > \vartheta \left(\rho(\underline{e}^*) - \underline{e}^* \underline{\theta} \right),$$

$$\Leftrightarrow \qquad -\vartheta \overline{e}^\diamond (\overline{\theta} - \underline{\theta}) + (1 - \vartheta)(\rho(\overline{e}^\diamond) - \overline{e}^\diamond \overline{\theta}) > 0,$$

$$\Leftrightarrow \qquad \rho(\overline{e}^\diamond) - \overline{e}^\diamond \overline{\theta} - \left(\frac{\vartheta}{(1 - \vartheta)} \overline{e}^\diamond (\overline{\theta} - \underline{\theta}) \right) > 0,$$

$$\Leftrightarrow \qquad \rho(\overline{e}^\diamond) - \overline{e}^\diamond \left(\overline{\theta} + \frac{\vartheta}{(1 - \vartheta)} (\overline{\theta} - \underline{\theta}) \right) > 0.$$

Applying equation (18) to this system yields

(A10)
$$\rho(\overline{e}^\diamond) - \overline{e}^\diamond \left(\frac{\delta \rho(e^\diamond(\overline{\theta}))}{\delta e(\overline{\theta})} \right) > 0,$$

From this rearranged equation it is possible to show that the above is true. Since

(A11)
$$\frac{\delta \rho(e)}{\delta e} > 0$$
$$\wedge \quad \frac{\frac{\delta \rho(e)}{\delta e}}{\delta e} < 0,$$

it follows that $\rho(e) - e \left((\delta \rho(e(\theta)))/(\delta e(\theta)) \right)$ is strictly increasing in e. Since e cannot be negative, and $\overline{e}^\diamond$ must have a positive value due to equation (18), it follows that $\rho(\overline{e}^\diamond) - \overline{e}^\diamond \left((\delta \rho(e^*(\overline{\theta})))/(\delta e(\overline{\theta})) \right)$ must be positive and it is optimal to venture with both partners (Laffont and Martimont, 2002).[30]

A3.   Equations (19)

In the following we will descriptively categorize the infinity of constraints of equations (19) in order to reach a calculable version of the problem. The following considerations build on earlier discoveries such as the revelation principle, see Myerson (1979) and (1981), and follow an approach used in Laffont and Martimont (2002).

Participation. To start with, it is individually rational for a partner to participate in a

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[30]This result is not generalizable, since a shut-down may occur if the model is changed marginally, for instance if one allows for positive levels of initial endowments of wealth π (or positive fixed costs).

contractual agreement only if he reaches at least his status-quo level of wealth

(A12)
$$t(\theta) - e(\theta)\theta \geq 0,$$
$$\Leftrightarrow \quad \pi(\theta) \geq 0.$$

Monotonicity. Secondly, in order to avoid that the partner pretends to be another type, the initiator has to take into account the truth-telling constraints, such that it is optimal for each possible partner-type to self-select the venture contract designed for its type θ (Laffont and Martimont, 2002). Let $\hat{\theta} \in \Theta$ be a pretended value, then the following must hold

(A13)
$$t(\theta) - e(\theta)\theta \geq t(\hat{\theta}) - e(\hat{\theta})\theta \quad \forall\, (\theta, \hat{\theta}) \in \Theta \times \Theta.$$

However, if the above holds globally for all types of partners θ, then it must also hold locally for particular pretended values $\check{\theta} \in \Theta$ such that

(A14)
$$t(\theta) - e(\theta)\theta \geq t(\check{\theta}) - e(\check{\theta})\theta$$
$$t(\check{\theta}) - e(\check{\theta})\check{\theta} \geq t(\theta) - e(\theta)\check{\theta} \qquad \forall \text{ pairs } (\theta, \check{\theta}) \in \Theta \times \Theta.$$

In a rearranged and added form, this system yields an additional insight

(A15)
$$t(\theta) - e(\theta)\theta + t(\check{\theta}) - e(\check{\theta})\check{\theta} \geq t(\check{\theta}) - e(\check{\theta})\theta + t(\theta) - e(\theta)\check{\theta}$$
$$\Leftrightarrow \qquad (\theta - \check{\theta})\left(e(\check{\theta}) - e(\theta)\right) \geq 0.$$

Assuming $\check{\theta} > \theta$, we can see

(A16)
$$\underbrace{\left(\theta - \check{\theta}\right)}_{-} \underbrace{\left(e(\check{\theta}) - e(\theta)\right)}_{\text{must be } -} \geq 0.$$

Therefore, the truth-telling constraints dictate that the entrepreneurial volume e is decreasing in θ (Laffont and Martimont, 2002).[31] This is in line with our discussion results in equation (16), however this condition requires all levels of entrepreneurial activity to be ranked in a monotonic way (Laffont and Martimont, 2002)

(A17)
$$\frac{\delta e(\theta)}{\delta \theta} \leq 0.$$

Small pretensions. Following Laffont and Martimont (2002), a third point to note is that the local truth-telling constraint $t(\theta) - e(\theta)\theta \geq t(\check{\theta}) - e(\check{\theta})\theta$ is expandable by

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[31]While, of course, the reverse case $\check{\theta} < \theta$ yields a parallel result. Furthermore, we assume that e is differentiable almost everywhere.

$+e(\check{\theta})\check{\theta} - e(\check{\theta})\check{\theta}$. Rewriting this extended constraint in terms of wealth levels reveals

(A18) $$\pi(\theta) \geq \pi(\check{\theta}) + e(\check{\theta})(\check{\theta} - \theta).$$

From the point of view of the partner, this is an optimization problem with two steps, due to the two variables. If the partner wants to maximize his profit from pretending, he will calculate the following

(A19) $$\text{argument of the maximum } \pi = \pi(\check{\theta}) + e(\check{\theta})(\check{\theta} - \theta).$$
$$\check{\theta} \in \Theta$$

This will be maximized if $\theta = \check{\theta}$. Therefore, the partner proceeds and derives the first order condition to determine his optimal behaviour[32]

(A20) $$\frac{\delta\pi(\check{\theta})}{\delta\check{\theta}} + e(\check{\theta}) + \frac{\delta e(\check{\theta})}{\delta\check{\theta}}(\check{\theta} - \theta) = 0.$$

If we insert $\theta = \check{\theta}$ into the above first order condition we arrive at

(A21) $$\frac{\delta\pi(\theta)}{\delta\theta} = -e(\theta),$$

which shows us what the constraints impose on small changes (Laffont and Martimont, 2002).

Large pretensions. To be complete, we need to check whether the optimum is indeed also a global optimum. In others words, now we have set a condition for the partner not to pretend slightly, but we also need to exclude his ability to pretend greatly. Returning to the global truth-telling constraint

(A22) $$t(\theta) - e(\theta)\theta \geq t(\hat{\theta}) - e(\hat{\theta})\theta \quad \forall (\theta, \hat{\theta}) \in \Theta \times \Theta,$$

we simulate a large pretension $\hat{\theta}$. In order to prove that such a large pretension is economically uninteresting for the partner, it must be that there is a positive amount of profits not realized by the partner, an opportunity loss ϖ due to the pretension. Therefore we need to prove the following (Laffont and Martimont, 2002):

(A23) $$t(\theta) - e(\theta)\theta = t(\hat{\theta}) - e(\hat{\theta})\theta + \varpi \quad \forall (\theta, \hat{\theta}) \in \Theta \times \Theta; \quad \varpi \in \mathbb{R}_+.$$

LEMMA 4: *There exists a $\varpi \in \mathbb{R}_+$, when a partner is not telling the truth. Hence, the global truth-telling constraint is fulfilled.*

LEMMA 4. The initiator will offer different transfers for different types, as we know

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[32] Here we employ Leibniz's law: $\frac{\delta ab}{\delta x} = \frac{a\delta b}{\delta x} + \frac{b\delta a}{\delta x}$.

from the local truth-telling constraints. Therefore a difference in transfers to the partner can be expressed in the following way[33]

$$(A24) \qquad t(\theta) - t(\hat{\theta}) = \int_{\hat{\theta}}^{\theta} \sigma \frac{\delta e(\sigma)}{\delta \sigma} \delta \sigma.$$

An integration by parts and a rearrangement of this term yields[34]

$$
\begin{aligned}
t(\theta) - t(\hat{\theta}) = & \quad e(\theta)\theta - e(\hat{\theta})\hat{\theta} - \int_{\hat{\theta}}^{\theta} e(\sigma)\delta\sigma, \\
\Leftrightarrow \quad t(\theta) - e(\theta)\theta = & \quad t(\hat{\theta}) - e(\hat{\theta})\hat{\theta} - \int_{\hat{\theta}}^{\theta} e(\sigma)\delta\sigma, \\
\Leftrightarrow \quad \underbrace{t(\theta) - e(\theta)\theta}_{\text{Truth}} = & \quad \underbrace{t(\hat{\theta}) - e(\hat{\theta})\theta}_{\text{Pretension}} + \underbrace{e(\hat{\theta})(\theta - \hat{\theta}) - \int_{\hat{\theta}}^{\theta} e(\sigma)\delta\sigma}_{\text{Loss due to pretension}}.
\end{aligned}
$$

(A25)

It remains to establish that $\varpi = e(\hat{\theta})(\theta - \hat{\theta}) - \int_{\hat{\theta}}^{\theta} e(\sigma)\delta\sigma$ belongs to the realm of $\mathbb{R}_+$, so we can indeed speak of losses instead of profits. However, since e is not increasing in either θ nor σ, it follows that $\varpi = e(\hat{\theta})(\theta - \hat{\theta}) - \int_{\hat{\theta}}^{\theta} e(\sigma)\delta\sigma \geq 0$. Therefore, the global truth-telling constraint for the partner is fulfilled by our approach and we can neglect it in the following (Laffont and Martimont, 2002).

We are now in a position to collect the above results on the structure of the infinite amount of constraints and summarize them. However, any results are only valid, if the neglected monotonicity constraint $(\delta e(\theta))/(\delta\theta) \leq 0$ holds.

LEMMA 5: *The monotonicity constraint $(\delta e(\theta))/(\delta\theta) \leq 0$ holds, the contract is thus optimal.*

LEMMA 5. We start by checking if $e^{\circ}(\theta)$ is decreasing in θ. The derivative at e° reads:[35]

$$(A26) \qquad \left(\frac{\delta^2 \rho(e^{\circ}(\theta))}{\delta e^2(\theta)} \right) \frac{\delta e^{\circ}(\theta)}{\delta\theta} = 1 + \frac{\delta}{\delta\theta} \frac{G(\theta)}{g(\theta)}.$$

In assumption (A2.) we assumed diminishing marginal returns from entrepreneurial activity, and in assumption (A5.) we postulated a monotone hazard rate. Therefore we can

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[33]σ replaces θ here.

[34]The version of the rule employed here:
$\int_a^b f(x) \frac{\delta g(x)}{\delta x} \delta x = [f(x)g(x)]_a^b - \int_a^b \frac{\delta f(x)}{\delta x} g(x)\delta x = f(b)g(b) - f(a)g(a) - \int_a^b \frac{\delta f(x)}{\delta x} g(x)\delta x.$

[35]We apply the chain rule here.

write

$$(A27) \qquad \left(\underbrace{\frac{\delta^2 \rho(e^\circ(\theta))}{\delta e^2(\theta)}}_{-} \right) \frac{\delta e^\circ(\theta)}{\delta \theta} = \underbrace{1 + \frac{\delta}{\delta \theta} \frac{G(\theta)}{g(\theta)}}_{+},$$

$$\Leftrightarrow \qquad \frac{\delta e^\circ(\theta)}{\delta \theta} \leq 0,$$

which is the desired inequality for our approach to be valid (Laffont and Martimont, 2002). It is worth mentioning that our results are thus limited to these assumptions, especially the monotone hazard rate.[36]

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[36]It turns out that, if one does not assume this, this article would plunge into fancy mathematics, which clearly would not be suited to carve out and model the economic effects.

Erklärung gemäß §8 der Promotionsordnung der Universität Mannheim vom 27.März 2006

Ich, Jan-Philipp Ahrens, geboren am 17.12. 1982, habe bislang keinen Promotionsantrag anderweitig gestellt, bzw. habe meine Dissertation nicht als Ganzes oder zu wesentlichen Teilen einer anderen Prüfungsbehörde vorgelegt.

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Eidesstattliche Erklärung gemäß §8 der Promotionsordnung der Universität Mannheim vom 27.März 2006

Ich, Jan-Philipp Ahrens, geboren am 17.12.1982, habe die vorgelegte Dissertation selbständig angefertigt und mich nicht anderer als der in ihr angegebenen Hilfsmittel bedient. Entlehnungen aus anderen Schriften, soweit sie in der Dissertation nicht ausdrücklich als solche gekennzeichnet und mit Quellenangaben versehen sind, haben nicht stattgefunden. Ich versichere, dass ich nicht die Hilfe einer kommerziellen Promotionsvermittlung/-beratung in Anspruch genommen habe.

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Nachweis über die Teilnahme am Graduiertenstudium gemäß §8 der Promotionsordnung der Universität Mannheim vom 27.März 2006

Der Nachweis über die Teilnahme am Graduiertenstudium wird auf der folgenden Seite über das Transcript of Grades der graduate school of economic & social sciences der Universität Mannheim, Center for Doctoral Studies in Business vom 04. April 2012 geführt.

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Mannheim, April 4, 2012

Transcript of Grades

This is to certify that **Jan-Philipp Ahrens** took part in the following courses:

Course	Lecturer	Term	Grade
Introduction to the Economics of Contests (acknowledged from Humboldt-University Berlin)	Giebe	Winter 2009/2010	1,3
Theory of Incentives (acknowledged from Humboldt-University Berlin)	Strausz	Summer 2010	1,7
MAN801 Advances in Strategic Management	Woywode	HWS 2010	1,3
MAN803 Applied Econometrics in Management and Entrepreneurship Research	Woywode	FSS 2011	1,3

Agathe Klosterhalfen
(Center Manager CDSB)

Guide to grading system

Until FSS 2009: A (excellent), B (good), C (satisfactory), F (fail). The following differentiation is possible: A-, B+, B-, C+. Courses without any grades are assessed by: P (pass) or F (fail)
From HWS 2009: 1,0 (excellent) to 4,0 (fair/pass). 5,0 (fail). A differentiation in 0,3 steps is possible.

CURRICULUM VITAE

Jan-Philipp Ahrens

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Geburtstag:	17.12.1982
Geburtsort:	Stuttgart
Familienstand:	Verheiratet
Staatsangehörigkeit:	Deutsch

Akademischer Lebenslauf

· · · · · · · · · ·

2010 – 2013 Mannheim	Universität Mannheim Studiengang: Promotion Betriebswirtschaftslehre Lehrstuhl für Mittelstandsforschung und Entrepreneurship (Prof. Dr. Michael Woywode)
2011 - 2013 München	Ludwig-Maximilians-Universität München Visiting Student Courses in Econometrics (Prof. Dr. Winter)
2010 - 2011 Berlin	Humboldt-Universität zu Berlin Visiting Student: Berlin Doctoral Program in Economics & Management Science Courses in Economics (Prof. Dr. Strausz & Prof. Dr. Wolfstetter)
2002 – 2008 Mannheim	Universität Mannheim Studiengang: Diplomstudium Betriebswirtschaftslehre mit interkultureller Qualifikation Englisch Schwerpunkte Organisation (Prof. Dr. Dr. h.c. Kieser) Internationales Management (Prof. Dr. Perlitz) Anglistik & Anglo-Amerikanischer Kulturraum (Prof. Dr. Reichardt)
2000 - 2002 England	Haileybury Imperial College International Baccalaureate & A-Level