The Effect of Succession Taxes on Family Firm Investment: Evidence from a Natural Experiment

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ABSTRACT

This paper provides causal evidence on the impact of succession taxes on firm investment decisions and transfer of control. Using a 2002 policy change in Greece that substantially reduced the tax on intrafamily transfers of businesses, I show that succession taxes lead to a more than 40% decline in investment around family successions, slow sales growth, and a depletion of cash reserves. Furthermore, succession taxes strongly affect the decision to sell or retain the firm within the family. I conclude by discussing implications of my findings for firms in the United States and Europe.

DEMOGRAPHIC TRENDS IN both the United States and Europe make firm succession planning increasingly important for privately held family businesses.[1] Each year, an estimated 690,000 firms providing 2.8 million jobs change hands in the (European union/EU; European Commission (2006)).

Succession taxes, which are incurred during such transfers and are sometimes referred to as transfer taxes, have been at the center of debate. On the one hand, there are concerns that taxing successions can discourage firm investment and growth, and may even force entrepreneurs to sell their firms in order to meet their tax liability. On the other hand, abundant empirical evidence suggests that inherited firms underperform (Perez-Gonzalez (2006), Villalonga and Amit (2006), Bennedsen et al. (2007)), which implies that succession taxes might be too low, that is, provide incentives to keep poorly managed firms within the family (Bloom (2006)). Underlying both these arguments is a belief that succession taxes may affect firm boundaries and investment.

However, systematic empirical evidence that establishes this link is missing. In this paper, I aim to fill this gap by establishing and quantifying the effect of succession taxes on entrepreneurs' succession decisions, investment decisions, and financial policies.

The challenge in empirically identifying a causal effect of succession taxes on firm policies is threefold. First, one needs to isolate the effect of succession taxes from other possible factors that might affect firm policies around successions (e.g., the ability of the new owner or aggregate trends). Second, endogeneity of the decision to transfer the company to family members must be addressed. Finally, an exogenous source of variation in the tax environment is required.

To overcome these challenges, I exploit a 2002 tax reform in Greece that reduced succession tax rates for transfers of limited liability companies to family members from 20% to less than 2.4%.[2] I begin by constructing a unique database that contains information on all transfers of limited liability firms in Greece for the years 1999 to 2005. Although limited liability firms are private, they are required to publish their ownership changes as well as their financial statements. I then supplement these data by matching them to hand-collected data on the gender of each entrepreneur's first-born child and on each entrepreneur's personal income from other sources.

In the quasi-experimental setting provided by the tax policy change, I employ two methodologies to measure the effect of the policy change on investment. First I apply difference-in-difference-in-differences (DDD) to analyze the change in investment around successions in response to the tax policy change. I compare firms that undergo a family succession (the treated group) to firms transferred to unrelated entrepreneurs (the control group) both before and after the policy change. This method controls for aggregate trends and other succession-induced changes in investment. Furthermore, by comparing the two groups before and after the tax reform, the analysis disentangles the effect of the identity of the new owner (family or unrelated) from the effect of the succession tax.

A major concern with the DDD approach is that the family versus unrelated succession decision is unlikely to be independent of firm characteristics related to investment opportunities. To address this concern, I use the gender of the departing entrepreneur's first-born child as an instrument for family succession, as in Bennedsen et al. ([2007])). The gender of the departing entrepreneur's first-born child is a plausible instrument for family successions because it affects the probability of a family succession and is unlikely to be correlated with a firm's investment opportunities. As before, I compare firms that undergo a family succession to firms transferred to unrelated entrepreneurs both before and after the policy change, but I use the instrument to randomly assign firms into the two groups. Thus, the identification exploits two sources of variation: the tax reform provides time-series variation with respect to the transfer tax, whereas the instrument provides exogenous cross-sectional variation with respect to the succession decision. This method allows for causal inference because, as

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[2] The tax rate remained unchanged at 20% for unrelated transfers.

before, it disentangles the effect of the new owner's identity from the effect of the succession tax, while also addressing concerns regarding endogeneity of the succession decision.

Both the DDD and the instrumental variable (IV) estimates reveal a negative effect of transfer taxes on postsuccession investment for firms transferred within the family. In the presence of higher succession taxes, investment drops from 17.6% of property, plant, and equipment (PPE) three years before succession to 9.7% of PPE two years after. This impact of succession taxes on investment is economically large: the implied decline in investment ratio (0.079) is approximately 40% of the pretransition level of investment. For these firms, successions are also associated with a decrease in cash reserves, a decline in profitability, and slower sales growth. Note that, to the extent that entrepreneurs can plan ahead for the succession and the related tax liability, the estimates I report in the paper likely underestimate the true effect of succession taxes. Nevertheless, I obtain similar results when limiting attention to death-related successions—instances in which succession planning is less likely.

I also find a strong relation between succession taxes and the decision to sell or keep the firm within the family. After the reduction in inheritance taxes, family successions increase from 45.2% of all transfers before the reform to 73.9%, a more than 63% increase. This evidence shows that succession taxes significantly influence the allocation of firm ownership and thus firm boundaries. This finding has potentially important implications, given existing evidence in the literature that inherited family firms underperform. In particular, to the extent that lower succession taxes provide incentives to allocate assets to low-ability heirs, tax policy that changes such taxes could impact aggregate productivity and economic growth (Morck, Stangeland, and Yeung (2000), Bloom (2006), Bennedsen et al. (2007), Bloom and Van Reenen (2007)).

The final part of the analysis investigates whether the effect of succession taxes on investment varies with observed firm characteristics. I find that the results continue to hold for both large and small firms in my sample. However, when I run the analysis separately for low versus high asset tangibility, I find that the observed effects are stronger for family firms with low asset tangibility. The effects are also stronger for firms owned by entrepreneurs with relatively low income from other sources, and as a result may have no alternative sources of financing apart from costly external finance. This evidence is consistent with financial constraints exacerbating the effects of succession taxes on firm investment. However, care should be taken in interpreting the results, as these patterns may also be consistent with other plausible channels.

This paper connects to several strands of the literature. First, it contributes to the literature on family firms. Understanding what factors affect firm policies around successions is important because the way in which firm control is passed from one generation to the next can critically affect the development and growth of the firm. The literature so far highlights three factors that can affect intergenerational transfers of family firms: nepotism (Burkart, Panunzi, and Shleifer (2003), Caselli and Gennaioli (2005), Perez-Gonzalez (2006),

Bennedsen et al. (2007)), infighting among family members (Muller and Warneryd (2001), Bertrand et al. (2008)), and legal constraints to bequeathing minimal stakes to noncontrolling heirs (Ellul, Pagano, and Panunzi (2010)). I show that succession taxes can also influence the succession decisions of family firms, and in turn growth and investment around transitions. To the best of my knowledge, this paper is the first empirical study to establish a causal relationship between succession taxes and family firm investment.

Second, the paper connects to work on firm boundaries that investigates how changing insider incentives affects ownership as well as investment decisions (Coase (1937), Jensen and Meckling (1976), Holmstrom and Roberts (1998), Seru (2014)) by showing that succession taxes affect firms' transfer of control. The results on ownership changes have implications not only for firm growth but also for the equilibrium distribution of privately owned firms in the economy, especially where family firms dominate. Although some arguments suggest that one of the undesirable effects of estate taxes is that they may force entrepreneurs to sell the firm, supportive evidence has been scant and mainly suggestive (Brunnetti (2006)). This paper uses a causal experiment design to provide robust evidence that estate taxes affect firm boundaries by impacting the entrepreneur's decision to sell versus keep the firm within the family.

The paper also adds to the literature on entrepreneurs' responses to estate taxation. Evidence on the effects of estate taxes on entrepreneurial firms is scarce, and the evidence that does exist is based largely on limited surveys.[3] This paper offers the first causal empirical evidence linking succession taxes and firm investment policies.

Finally, this study relates to the literature that analyzes the investment behavior of private firms (Campello, Graham, and Harvey (2010), Campello et al. (2011)). In particular, the study adds to the literature on how high external finance costs affect investment, because, relative to public firms, private firms' costs of external finance are likely to be high (Campello et al. (2011)).[4] The paper provides further evidence on the effect of external finance costs on private firms' investment.

The rest of the paper is organized as follows. Section I discusses the tax reform. Section II describes the data. Section III analyzes the succession decision and provides summary statistics. Section IV develops the empirical methodology, and Section V presents the results. Section VI concludes.

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[3] Holtz-Eakin (1999) uses a survey of 444 small business owners from upstate New York to study how estate taxes affect employment growth. Gale and Slemrod (2001) and Kopczuk (2013) offer an overview of the literature and discuss the need for systematic empirical evidence on the effect of estate taxes on entrepreneurial firms.

[4] A large literature links external finance costs to underinvestment, and shows how the accumulation of liquidity can mitigate these costs (Fazzari, Hubbard, and Petersen (1988), Calomiris, Himmelberg, and Wachtel (1995), Gilchrist and Himmelberg (1995)). More recent studies use external shocks to firms' internal cash to address the endogeneity of cash flows and investment to firms' investment opportunities (Blanchard, Lopez-de-Silanes, and Shleifer (1994), Rauh (2006)).
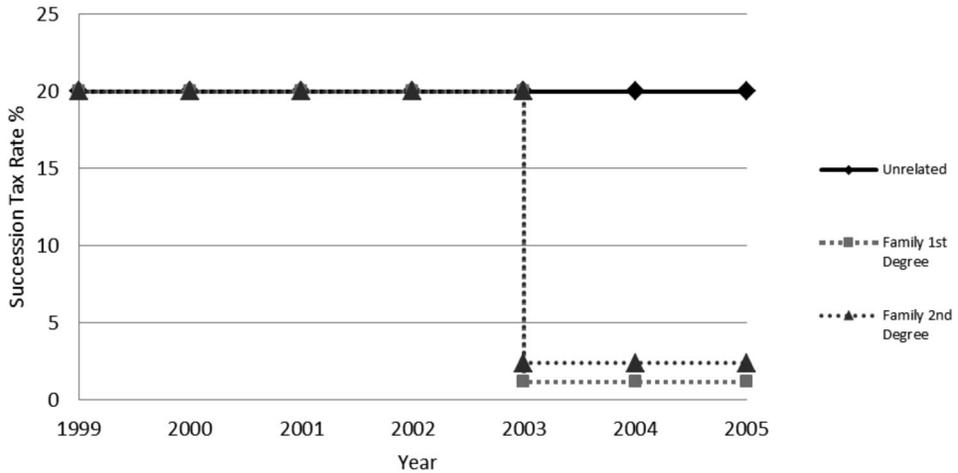
Figure 1. Tax reform: tax rate by succession type. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, unrelated otherwise.

I. Event: Legal Reform

Taxation reform for business transfers is an issue subject to debate both in the United States and Europe. In many countries, tax law treats within-family transferred firms preferentially. In 1994, the European Commission issued a recommendation to its country members supporting the transfer of small and medium-sized companies from one generation to the next (Grossmann and Strulik (2010)).[5]

In 2002, policy makers in Greece enacted Law N.3091 to facilitate intergenerational transfers of family firms. The reform substantially decreased succession taxes for transfers of limited liability firms within the family, whether those transfers were inter vivos business transfers, gifts, or inheritances after death. In particular, effective January 1, 2003, the tax rate dropped to a flat rate of 1.2% for transfers of limited liability companies to first-degree relatives (sibling, spouse, parent, or offspring) and 2.4% for transfers to second-degree relatives (grandchild, nephew, or niece). The tax rate for business transfers to unrelated third parties did not change and remained at 20% (Figure 1).

Before Law N.3091 took effect, tax rates were substantially higher. The tax rate for inter vivos business transfers of limited liability companies was a flat rate of 20%, regardless of whether the firm was transferred to family members (sibling, spouse, parent, offspring, grandchild, nephews) or third parties. If the transfer of the limited liability firm was a gift or inheritance, for first-degree

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[5] According to the EU recommendation (European Commission (1994)), "The Commission requests the Member States to ensure that family law, inheritance law . . . cannot jeopardize the survival of business and to reduce taxation on assets in the event of transfer by succession or by gift."

Table I
Industry Distribution of Successions

This table presents the industry distribution of successions by family ties. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree (column (3)), unrelated otherwise (column (4)). Firms are sorted by industry using the NACE 1.1 primary classification (European industry classification system). Firms in utilities and finance industries are excluded. Column (1) reports the number of limited liability firms (E.P.E.) in each industry in the database for the years 1999 to 2005, where parentheses report the share of firms in the industry as a percentage of all firms in the database. Column (2) reports the number of firms in each industry that undergo a succession, where parentheses report the share of successions as a percentage of the total number of successions in the sample. Columns (3) and (4) report in square brackets the share of successions as a percentage of the total number of successions per industry.

Industry	All Companies (1)	All Successions (2)	Family Successions (3)	Unrelated Successions (4)
1 Agriculture	95	5	3	2
	(0.8)	(0.7)	[60.0]	[40.0]
2 Construction	374	20	10	10
	(3.2)	(2.8)	[50.0]	[50.0]
3 Education	120	8	4	4
	(1.0)	(1.1)	[50.0]	[50.0]
4 Health and social work	240	13	5	8
	(2.1)	(1.9)	[38.5]	[61.5]
5 Hotels and restaurants	423	23	17	6
	(3.6)	(3.3)	[73.9]	[26.1]
6 Manufacturing	2,331	144	93	51
	(20.2)	(20.7)	[64.6]	[35.4]
7 Mining	48	3	1	2
	(0.4)	(0.4)	[33.3]	[66.7]
8 Other community, social, and personal services	170	7	1	6
	(1.5)	(1.0)	[14.3]	[85.7]
9 Real estate, renting, and business activities	1,324	70	30	40
	(11.5)	(10.1)	[42.9]	[57.1]
10 Transport, storage, and communication	1,114	62	36	26
	(9.6)	(8.9)	[58.1]	[41.9]
11 Wholesale and retail trade	3,945	244	146	98
	(34.1)	(35.2)	[59.8]	[40.2]
12 Other	1,372	95	56	39
	(11.8)	(13.7)	[59.0]	[41.0]
Total	**11,556**	**694**	**402**	**292**
		(100.0)	[57.9]	[42.1]

family members the tax was 15% for amounts between 28,000 and 131,000 euros and 25% for amounts above 131,000 euros. For second-degree family members, the rates were 20% and 35%, respectively.[6]

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[6] Thus, the tax code gave a clear advantage to inter vivos business transfers, which were subject to a flat 20% tax. This is even more evident if one takes into account the fact that the accumulated lifetime exemption amounts for gifts and inheritances are low, at 15,000 euros. The results are robust to controlling for transfer type. Furthermore, Table X shows the results are robust to transfers upon the death of the entrepreneur.

All limited liability companies operating in Greece are subject to these taxes. For inter vivos transfers, the departing entrepreneur pays the succession tax upon transferring the company.[7] The fact that the transfer tax has to be paid upon the transfer allows for clear identification of the effect of the tax by looking at the years around transfer events.[8] Furthermore, the tax is levied on the fair market value of the enterprise or the part transferred. The valuation principle used by the tax authorities is common for both family and nonfamily transfers, and takes into account the firm's financial statements over the last five years, as well as any appreciation in the market value of assets (including buildings, land, etc.).[9]

The proposed law was introduced in the Greek parliament on November 4, 2002, and was approved on December 16, 2002; the law went into effect January 1, 2003. The first mention in the financial newspapers of a potential transfer tax reform was in early summer of 2002, when the ministry formed a committee to examine this issue.

Based on my discussions with tax officials, parliament passed the law suddenly, and companies did not anticipate it. The law was not part of an EU reform. Although in 1994 the European Commission recommended that its country members support intergenerational transfers of small and medium-sized companies, such recommendation was not binding.[10] Furthermore, a general movement of other EU countries toward new tax measures in 2002 did not occur.

That the regulatory change was a surprise is also corroborated by the data in Table II below, which repeats the distribution of firm transfers in our sample period. If companies had anticipated the tax, within-family transfers presumably would have been delayed to take advantage of the lower tax rate. But the percentage of family transfers in 2001 is similar to that in other pre-2002 years. As an additional check, I examine the monthly distribution of transfers. Only in the last three months (October, November, and December) of 2002 did family transfers decline somewhat relative to unrelated transfers. To address potential biases related to 2002, the year of the regulatory change, I exclude transfers that occurred in 2002 from all analyses reported below. Furthermore, in robustness checks I also exclude transfers that occurred in 2003.

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[7] For transfers upon death (Table X), the tax can be paid in 12 bimonthly installments.

[8] In some countries (including the United States), transfer taxes can in some cases be paid in installments that can span 10 years. In such cases, the effect of the tax would be spread out and would need to be calculated across all the installment years.

[9] The main inputs in the valuation principle are operating results, the number of years the firm operates, the firm's equity and net assets, and any appreciation in the market value of the assets. I do not observe appreciation of the firm's assets, which requires detailed information on the size and location of any land or buildings to calculate the exact tax liability.

[10] Country members often do not introduce reforms until the recommendations become binding in the form of regulations or directives. Furthermore, while the EU recommendation regarding the intergenerational transfers of family businesses suggested legal as well as tax measures, most countries opted for legal measures (European Commission (2003)).

Table II

Distribution of Successions by Family Ties

The table illustrates the distribution of successions during the sample period. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. Family successions are further categorized as family-children successions, when the firm is transferred to the child of the departing entrepreneur. *** indicates significance at the 1% level.

Year of Succession	Number of Successions (1)	Unrelated Successions		Family Successions		Family: Children Successions	
		Number (2)	Percent (3)	Number (4)	Percent (5)	Number (6)	Percent (7)
	694	292	0.421	402	0.579	293	0.729
1999	101	56	0.554	45	0.446	32	0.711
2000	111	62	0.559	49	0.441	33	0.673
2001	93	49	0.527	44	0.473	28	0.636
2002	82	45	0.549	37	0.451	21	0.568
2003	113	32	0.283	81	0.717	61	0.753
2004	90	22	0.244	68	0.756	57	0.838
2005	104	26	0.250	78	0.750	61	0.782
Before Reform Change (1999–2001):	305	167	0.548	138	0.452	93	0.674
After Reform Change (2003–2005):	307	80	0.261	227	0.739	179	0.789
Difference: (After Law Change) minus (Before Law Change)		**−0.287***** (0.015)		**0.287***** (0.015)		**0.115***** (0.033)	

II. Data

A. Sources

For the empirical analysis, I construct a unique data set of all transfers of limited liability companies in Greece from 1999 to 2005. The sample includes information on the transfer transaction and financial information on the firm, as well as information on the departing entrepreneur, his family, and the incoming entrepreneur. I obtain this information from various sources, as explained below.

First, I hand collect succession data from limited liability company announcements in the *Government Gazette* for the years 1999 to 2005. All limited liability companies are required to report their transfers in the Government Gazette. A transfer is a change in firm ownership. For privately held firms, ownership and control are usually not separate, and therefore both ownership and management is transferred from one generation to the next. Overall, I identify 694 inter vivos successions in the 1999 to 2005 period.[11] Eighty-two of these

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[11] I include all limited liability firms except from utilities and financial firms. In a few cases, the transfer event was recorded in two different announcements. I classify such events as one event

successions occur in 2002, the year of the reform, and are therefore dropped from the analysis. Thus, the main sample consists of 612 successions. The official announcements contain the departing entrepreneur's name, date of birth, address, and identification number, as well as the name and address of the successor and the family relationship, if any. Thus, from the announcements I can identify whether the departing entrepreneur is related by blood or marriage to his successor. Successions are classified into two categories: family, when the transfer of the company is to relatives of either the first degree (sibling, spouse, parent, or offspring) or second degree (grandchild, nephew, or niece), or unrelated. In our sample, there are 365 family successions and 247 unrelated successions.

To identify the gender of the first-born child of the entrepreneur, I cross-reference various sources. The first source is the disclosure statements of the companies in the *Government Gazette*, which as I note above contains information on the departing entrepreneur's successor. Because the *Government Gazette* may not include details on every child, I complement this source with information from the company websites. The Greek language uses different endings for female and male names, so the gender can be accurately determined from the name. I also contact the companies directly to verify the information on the gender of the firstborn child of the outgoing entrepreneur. Through the above sources I identify the gender of the entrepreneur's first-born child for 591 companies. For the remaining 21 companies, the information on the gender of the entrepreneur's first-born child was matched by the Ministry of Economy and Finance through the entrepreneur's past tax returns.

Next, I match the transfer data with firm financial data. Although limited liability companies in Greece are privately held, they are required to publish their financial statements both in the official *Government Gazette* and in a financial newspaper. I obtain financial information from the *Government Gazette* and ICAP, the leading company for business information in Greece. ICAP assembles the data based on the financial reports that limited liability companies are required to file at the official *Government Gazette*. Furthermore, ICAP verifies the data by directly contacting the companies and acquiring additional information on their quarterly reports and cash flows. ICAP has the most extensive database on both public and private companies in Greece and is the local provider of the Amadeus database for Greek company data. I obtain information for the period 1995 to 2007.

Finally, I obtain information on the departing entrepreneur's other sources of income from the Ministry of Economy and Finance. The Ministry of Economy and Finance collects these data from the entrepreneur's past tax returns.

because they have similar implications for tax purposes. The results are robust to the exclusion of these cases.

B. *Industry Distribution of Successions*

Table I presents the industry distribution of firms that have a succession event using the NACE1.1 primary industry classification. For comparison, in column (1), I report the industry distribution of all limited liability companies in the database. The industry distribution of the firms that undergo a succession (column (2)) is similar to the industry distribution of the sample of all limited liability firms (column (1)). Furthermore, family transfers are distributed evenly across industries. An exception is the Hotels and Restaurants category, which appears to have a much higher than average percentage of family successions. Overall, family transfers represent 57.9% of all transfers.

III. Succession Decision

A. *Reform and Effect on Succession Decisions*

The reduction in succession taxes for family transitions had a large effect on entrepreneurs' decision to sell the firm or keep it within the family. Table II reports the distribution of firm transfers during the sample period. Column (1) shows the distribution of the total number of transfers while columns (2) and (3) ((4) and (5)) show the distribution for unrelated (family) successions. Columns (6) and (7) further analyze transfers to children of the entrepreneur.

The total number of firm transfers (including transfers to family members and unrelated parties) is similar before and after the regulatory change. In the three years before 2002 (1999 to 2001), 305 transfers occurred, and in the three years after 2002 (2003 to 2005), 307 transfers occurred. Nevertheless, Table II reveals a strong "substitution effect" between family transfers and firm sales. In the 1999 to 2001 period, 45.2% of transfers were to family members. This figure jumps to 73.9% for the 2003 to 2005 period (also shown in Figure 2). This change represents a 63.4% increase in the percentage of family transfers and is statistically significant at the 1% level. Furthermore, the effect persists throughout the postreform period.

Table II also shows that most of the family transfers involve children of the entrepreneur. Column (7) indicates that, between 1999 and 2001, 67.4% of the family transfers are to children of the entrepreneur. This percentage rises to 78.9% the years following the regulatory change. The associated 17% increase is statistically significant at the 1% level.

Overall, the results of Table II show that the reduction in succession taxes had an effect on firm transfers, leading to a large increase in the fraction of firms transferred within the family.

B. *The Gender of the First-Born Child and Succession Decisions*

In Table III, I examine the succession decisions according to the gender of the departing entrepreneur's first-born child. This table shows that the gender of the first-born child, which is arguably exogenous, affects the family transition decision. Indeed, in the prereform period, departing entrepreneurs with a
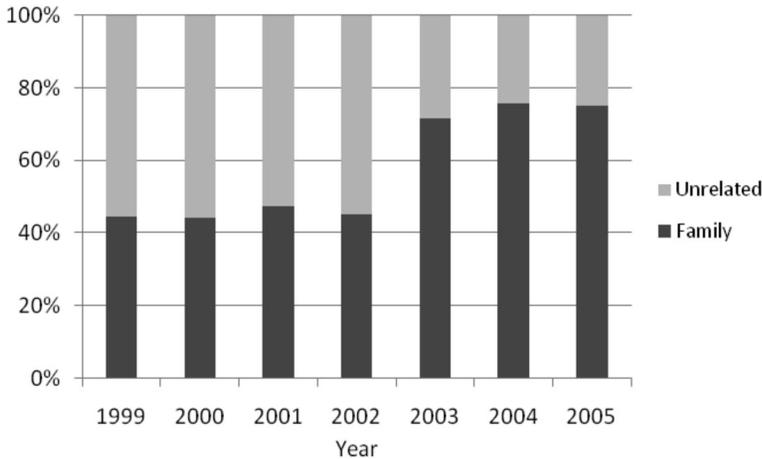
Figure 2. Distribution of successions by family ties. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, unrelated otherwise.

male first-born child have a 17.7 percentage point (significant at the 1% level) higher probability of transferring their company to family members compared to entrepreneurs with a female first-born child. In the postreform period, the difference is 15.2 percentage points, also significant at the 1% level. The table thus shows that the gender of the first-born child affects the decision of whether to transfer ownership and control to a family member. This finding is consistent with anecdotal evidence that even developed countries follow primogeniture inheritance rules.

The relation between family succession and the gender of the first-born child is stronger than in Bennedsen et al. (2007), who use Danish data. The higher reported differences in Greece are consistent with the findings of the 2007 World Economic Forum survey on gender equality, which ranks Greece 72nd among 128 countries surveyed, far behind other European countries (with the exception of Cyprus, Italy, and Malta).[12] In contrast, the same survey ranks Denmark eighth. Furthermore, in 2004, Greek women held only 15% of parliament seats, while Danish women held more than 37% of parliament seats.

C. Firm Characteristics

Table IV, Panel A provides descriptive statistics on firm characteristics for the three years prior to succession. On average, firms that experience a family succession are smaller when measured by book value of assets. In the prereform period, firms with a family succession had an average of 1.38 million euros in assets the three years prior to transition. The average book asset value

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[12] See http://www.weforum.org/pdf/gendergap/report2007.pdf.

Table III
Successions by Gender of First-Born Child

The table presents the share of family and unrelated successions by the gender of the first-born child of the departing entrepreneur. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. *** indicates significance at the 1% level.

Time Period	Number of Successions (1) 612	Family Successions		Unrelated Successions	
		Number (2) 365	Percent (3) 0.596	Number (4) 247	Percent (5) 0.404
Before Reform					
Male First-born	139	80	0.576	59	0.424
Female First-born	133	53	0.398	80	0.602
Difference male minus female:			0.177***		
			(0.059)		
After Reform					
Male First-born	136	109	0.801	27	0.199
Female First-born	134	87	0.649	47	0.351
Difference male minus female:			0.152***		
			(0.054)		

for firms transferred outside the family was 1.86 million euros.[13] The same pattern holds in the postreform period. The difference in firm size between the two groups is significant at the 5% level in the prereform period and at the 10% level in the postreform period. Firms that experience family successions are also older than firms transferred to unrelated parties. In the period prior to the reform, companies that have a family succession are on average three years older at the time of transition than firms with an unrelated succession. The difference is significant at the 1% level. The difference drops to 1.1 years for firms transferred after the reform, and is no longer statistically significant.

Investment is measured as the ratio of capital expenditures (CAPEX) in year t to beginning-of-year net PPE. In the prereform period, firms with a family succession have lower investment levels prior to succession than firms with an unrelated succession, and the difference is statistically significant at the 10% level. In the postreform period, no statistically significant difference in investment is observed. In the prereform period, firms that undergo a family succession hold 24.3% more cash in the years prior to transition than firms transferred outside the family. Furthermore, firms with a family succession have lower sales growth in the presuccession years than firms with an unrelated succession. In the postreform period, the differences in cash holdings and

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[13] Firms of this size comprise the backbone of the economy not only in Greece but in Europe in general (see the Appendix). According to estimates from Ayyagari, Beck, and Dermirguc-Kunt (2007), small and medium-size companies in Greece contribute at least 25% of GDP.

Table IV
Summary Statistics for the Years Prior to Succession

The table reports summary statistics for the three years prior to succession. Columns (1) to (4) pertain to successions that occurred before the reform and columns (5) to (8) pertain to successions that occurred after the reform. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. *Ln Assets* is the natural logarithm of the book value of assets (in euros). *Firm Age* is the difference between the succession year and the year of establishment. *Investment* is the ratio of capital expenditures in year t to beginning-of-year net PPE. *Cash Ratio* is the ratio of cash and cash equivalent to total assets. *Sales Growth* is defined as the annual percentage increase in sales. The number of observations is denoted in brackets. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Before Reform				After Reform			
	All	Family Succession	Unrelated Succession	Difference of Means	All	Family Succession	Unrelated Succession	Difference of Means
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No of Firms	305	138	167		307	227	80	
Ln Assets	13.841	13.756	13.912	−0.156**	13.911	13.873	14.020	−0.147*
	(0.030)	(0.042)	(0.043)	(0.060)	(0.034)	(0.038)	(0.073)	(0.083)
	[915]	[414]	[501]		[921]	[681]	[240]	
Firm Age	21.318	22.964	19.958	3.006***	22.967	23.256	22.150	1.106
	(0.436)	(0.690)	(0.536)	(0.874)	(0.436)	(0.507)	(0.855)	(1.001)
	[305]	[138]	[167]		[307]	[227]	[80]	
Investment	0.185	0.176	0.193	−0.017**	0.204	0.203	0.206	−0.003
(CAPEX/PPE$_{t-1}$)	(0.004)	(0.008)	(0.004)	(0.009)	(0.005)	(0.006)	(0.006)	(0.008)
	[915]	[414]	[501]		[921]	[681]	[240]	
Cash Ratio	0.164	0.184	0.148	0.036***	0.155	0.159	0.144	0.015
	(0.006)	(0.010)	(0.007)	(0.012)	(0.005)	(0.007)	(0.009)	(0.011)
	[915]	[414]	[501]		[921]	[681]	[240]	
Sales Growth	0.112	0.103	0.119	−0.016**	0.116	0.114	0.122	−0.008
	(0.004)	(0.006)	(0.004)	(0.007)	(0.004)	(0.005)	(0.006)	(0.008)
	[915]	[414]	[501]		[921]	[681]	[240]	

(Continued)

Table IV—*Continued*

| | Before Reform | | | | After Reform | | | |
	All (1)	Family Succession (2)	Unrelated Succession (3)	Difference of Means (4)	All (5)	Family Succession (6)	Unrelated Succession (7)	Difference of Means (8)
No of Firms		138	167	305		227	80	307
Number of Succeeding Persons	1.469	1.5	1.443	0.056	1.466	1.476	1.437	0.038
	(0.039)	(0.064)	(0.049)	(0.081)	(0.033)	(0.037)	(0.071)	(0.080)
Share of Ownership Held by	0.839	0.844	0.835	0.009	0.85	0.856	0.835	0.021
Outgoing Entrepreneur	(0.009)	(0.014)	(0.013)	(0.019)	(0.009)	(0.010)	(0.019)	(0.021)

sales growth between the two groups are smaller and no longer statistically significant.

Overall, Table IV shows that family successions are likely to occur in relatively smaller and older firms. The marked differences between firms that experience a family or unrelated succession indicate that the succession decision might not be random.

Turning to ownership, the average firm has 2.3 owners. In most cases the owners are members of the same household or otherwise related. In the prereform period, the outgoing entrepreneur of firms that undergo a family transfer owns on average 84.4% of the firm at the time of transition, whereas this figure is 83.5% for firms that have an unrelated succession. The means are similar in the years after the reform. The number of succeeding persons is around 1.5, and I find no significant difference in the number of succeeding persons between family and unrelated successions both before and after the reform.

IV. Methodology

The 2002 tax reform in Greece offers a quasi-experimental setting, so I can use the variation in taxes within the country for my analysis.[14] The tax reform affected the tax rate only for limited liability firms that undergo a family succession; the tax rate for limited liability firms undergoing an unrelated succession remained unaffected. An advantage of analyzing tax changes within a country is that such analysis avoids the pitfalls of comparing effective tax incidence across countries, which is complicated by differences in enforcement, exemptions, company valuation techniques, rate structures, and other factors (Gale and Slemrod (2001)). Further, unobserved differences among various countries might be present, for which many cross-country studies fail to adequately control (Rodrik (2005)). To measure the effect of the policy change on investment, I employ a DDD approach as well as an IV approach, which combines the exogenous cross-sectional variation for the succession decision provided by the instrument and the time-series variation of the transfer tax resulting from the tax reform.

A simple way to evaluate the impact of the tax on the investment of firms undergoing succession is to estimate the change (i.e., difference) in firm investment around succession in the prereform period between family and unrelated transfers. This difference estimates the change in investment around succession while controlling for time-invariant firm characteristics. However, this approach fails to control for aggregate changes in investment resulting from macroeconomic trends or succession-specific shocks. A common solution to this problem is to use a control group; one can compare the change in investment of firms that undergo a family succession to that of firms that undergo an unrelated succession. This difference-in-differences approach controls for economic trends and succession-specific patterns that might affect both groups.

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[14] Greece is similar to other European countries in family ownership of firms (http://ec.europa.eu/enterprise/policies/sme/documents/family-business/index_en.htm).

However, the difference-in-differences estimate in the prereform period does not disentangle whether the change in investment is due to the effect of the identity of the new owner (family or unrelated) or the tax. The third difference across tax regimes allows one to disentangle these two effects, because the tax rate changes for one type of succession (family successions) and remains unchanged for the other type (unrelated successions). The DDD methodology thus analyzes the change in investment around successions in response to the tax policy change across firms that undergo a family succession (the treated group) and firms transferred to unrelated entrepreneurs (the control group) before and after the policy change.

More specifically, I evaluate the effect of the reform by estimating the following specification using firm-level data:

$$
\begin{aligned}
y_i = a_1 + \beta_1 \cdot Post\_Law_i + c_1 \cdot Family_i \\
+ \delta_1 \cdot (Post\_Law_i \cdot Family_i) + X_i'\zeta_1 + \varepsilon_{1i},
\end{aligned}
\tag{1}
$$

where y_i is the difference in investment around succession, defined as the average investment postsuccession minus the average investment prior to succession.[15] *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before, and *Family* is an indicator variable equal to one for family successions and zero for unrelated successions.

The key coefficient of interest, δ_1, measures how the investment gap between family and unrelated successions changes after the tax reform. Under the null that the tax reform does not affect investment around successions, $\delta_1 = 0$. I expect δ_1 to be positive because the tax reduction for family successions should have a positive effect on their investment. Recall that I exclude from the analysis successions that occurred in 2002, when the law was first discussed and voted on. The coefficient c_1 estimates the difference in investment change around succession for family and unrelated successions under the high succession tax; I expect c_1 to be negative due to the impact of the high tax on internal financial resources of firms that experience a family succession.

The DDD method is appropriate only if the treatment is random, meaning it is not a function of observable or unobservable characteristics that also affect the outcome of interest (investment). Here, the assumption is that factors that affect the family versus unrelated succession decision do not also affect investment. This assumption is strong because omitted variables may exist that affect both investment and the decision to keep the firm within the family. Furthermore, the observed change in the relative frequencies of family successions and unrelated successions after the tax reform suggests that the succession decision is an endogenous variable.

I thus employ the IV approach to address the potential problem of omitted variables. Following Bennedsen et al. (2007), I instrument family succession

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[15] Using the average investment in the years before succession and the average investment in the years after succession is robust to the Bertrand, Duflo, and Mullainathan (2004) critique for autocorrelation in standard errors.

by the gender of the departing entrepreneur's first-born child. A valid instrument in the current context should satisfy two criteria. First, it should have a clear effect on the decision to choose family succession. As Table III shows, this criterion is clearly met; when the departing entrepreneur's first-born child is male, family succession is more likely. Furthermore, the gender of the departing entrepreneur's first-born child should be associated with investment only because it affects the decision to choose a family succession (exclusion restriction).[16] The gender of the entrepreneur's first-born child is random and unlikely to be related to the firm's investment opportunities. This is also supported by Table V, which describes the relationship between firm characteristics prior to succession and the gender of the entrepreneur's first-born child. In contrast to Table IV, Panel A, Table V shows that both before and after the reform, no difference in size, age, and investment is present between firms with male or female first-borns of the entrepreneur.

The IV estimator is implemented using two-stage least squares (2SLS). In the specification of interest (1), the endogenous family succession variable appears both alone and in an interaction term. Given that two endogenous variables exist, I instrument the endogenous dummy variable *Family* using the dummy variable *Male First-Born* and I instrument the interaction term *(Family·Post_Law)* using the interaction term *(Male First-Born·Post_Law)*. The corresponding first-stage equations are

$$Family_i = a_2 + c_2 \cdot Male\ First\text{-}Born_i$$
$$+ \delta_2 \cdot (Male\ First\text{-}Born_i \cdot Post\_Law_i) + X_i' \zeta_2 + \varepsilon_{2i}, \qquad (2)$$

$$Family_i \cdot Post\_Law_i = a_3 + c_3 \cdot Male\ First\text{-}Born_i$$
$$+ \delta_3 \cdot (Male\ First\text{-}Born_i \cdot Post\_Law_i) + X_i' \zeta_3 + \varepsilon_{3i}, \quad (3)$$

where *Family* is equal to one for family successions and zero for unrelated successions, *Male First-Born* is equal to one if the first-born is male and zero if female, and *Male First-Born·Post_Law* is the interaction between *Post_Law* and *Male First-Born*. According to Angrist and Krueger (2001), linear 2SLS estimates like those employed here have a robust causal interpretation that is not affected by the potential nonlinearity induced by dichotomous variables. By contrast, using probit or logit to generate first-stage predicted values with a dummy endogenous regressor could introduce inconsistency. To estimate the effect of the tax reduction on changes in investment around successions, I estimate (1) using IV (2SLS).

The identification exploits two sources of variation. The tax reform provides time-series variation in the transfer tax, whereas the instrument provides exogenous cross-sectional variation in the succession decision. The combination of the two sources of variation allows me to disentangle the effect of the tax

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[16] In the case of heterogeneous treatment effects, monotonicity is also required.

Table V

Summary Statistics Prior to Succession by the Gender of the First-Born Child

The table reports summary statistics for variables used in the analysis for the three years prior to succession. Columns (1) to (4) pertain to successions that occurred before the reform and columns (5) to (8) pertain to successions that occurred after the reform. Successions are classified into two categories: male, when the first-born of the departing entrepreneur is male, and female when the first-born is female. Firms for which the departing entrepreneur has no children are omitted. The variables are defined in Table IV, Panel A. The number of observations is denoted in brackets. Heteroskedasticity-robust standard errors are reported in parentheses.

	Before Reform				After Reform			
	All	Male First-Born	Female First-Born	Difference of Means	All	Male First-Born	Female First-Born	Difference of Means
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No of Firms	272	139	133		270	136	134	
Ln Assets	13.888	13.873	13.903	−0.030	13.891	13.890	13.893	−0.004
	(0.032)	(0.046)	(0.044)	(0.064)	(0.037)	(0.053)	(0.052)	(0.074)
	[816]	[417]	[399]		[810]	[408]	[402]	
Firm Age	21.757	21.698	21.819	−0.122	22.656	22.419	22.896	−0.476
	(0.471)	(0.666)	(0.670)	(0.945)	(0.464)	(0.637)	(0.677)	(0.929)
	[272]	[139]	[133]		[270]	[136]	[134]	
Investment	0.177	0.177	0.176	0.001	0.195	0.197	0.194	0.003
(CAPEX/PPE$_{t-1}$)	(0.003)	(0.005)	(0.005)	(0.007)	(0.004)	(0.006)	(0.006)	(0.008)
	[816]	[417]	[399]		[810]	[408]	[402]	
Cash Ratio	0.166	0.174	0.157	0.017	0.154	0.155	0.152	0.003
	(0.006)	(0.009)	(0.009)	(0.012)	(0.006)	(0.008)	(0.008)	(0.011)
	[816]	[417]	[399]		[810]	[408]	[402]	
Sales Growth	0.106	0.106	0.105	0.001	0.109	0.109	0.109	0.000
	(0.003)	(0.004)	(0.004)	(0.006)	(0.004)	(0.005)	(0.005)	(0.007)
	[816]	[417]	[399]		[810]	[408]	[402]	

from a host of alternatives (e.g., the ability of the new owner), and at the same time address concerns regarding endogeneity of the succession decision and influences from aggregate trends. Thus, I can establish the causal effect of succession taxes on firm investment. If one of the two sources of variation were missing, the identification would fail: if there were no variation in the succession tax, then it would be unclear whether the drop in investment was due to the tax or the different abilities or objectives of the new owner, while the exogenous cross-sectional variation in the succession decision addresses concerns that factors affecting the succession decision may also affect the variable of interest (i.e., investment).

V. Main Results

A. Unconditional Evidence

Figure 3 shows the time-series evolution of average investment around transitions for family successions and unrelated successions. Panel A pertains to successions that took place before the reform. Time is measured in years relative to the year of transition. Figure 3 shows that, when facing high succession taxes, firms transferred within the family experience a sharp decline in investment in the year of succession relative to firms transferred outside the family. The decline in investment for firms with a family succession is more than 40% of the pretransition level and persists for at least two years after succession with only a slight recovery.[17] Panel B plots the average investment around succession for family successions and unrelated successions that occur after the reform. In contrast to Panel A, Panel B shows that, when succession taxes for within-family transfers were greatly reduced, the average investment of family and unrelated succession firms follows similar patterns.

Figure 4 plots the time-series evolution of cash holdings for the two groups of firms. Cash holdings are defined as the ratio of cash plus cash equivalents to total assets. Panel A suggests that, under the high succession tax (i.e., prereform), the tax liability drains the cash reserves of firms that undergo a family succession: a sharp decline in cash holdings occurs for family successions in the year of the transition; firms slowly replenish their cash reserves in the years following transition. For unrelated successions, cash holdings move smoothly around succession. In the postreform period depicted in Panel B, the cash reserves of both groups of firms move similarly over time.

This preliminary evidence indicates that, in the presence of high taxes (prereform period), firms that undergo a family succession experience a large drop in postsuccession investment and cash holdings. The next section's DDD and IV estimates confirm these results.

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[17] In the Appendix, Figure A.1 shows that the investment distortion persists even four years after transition.
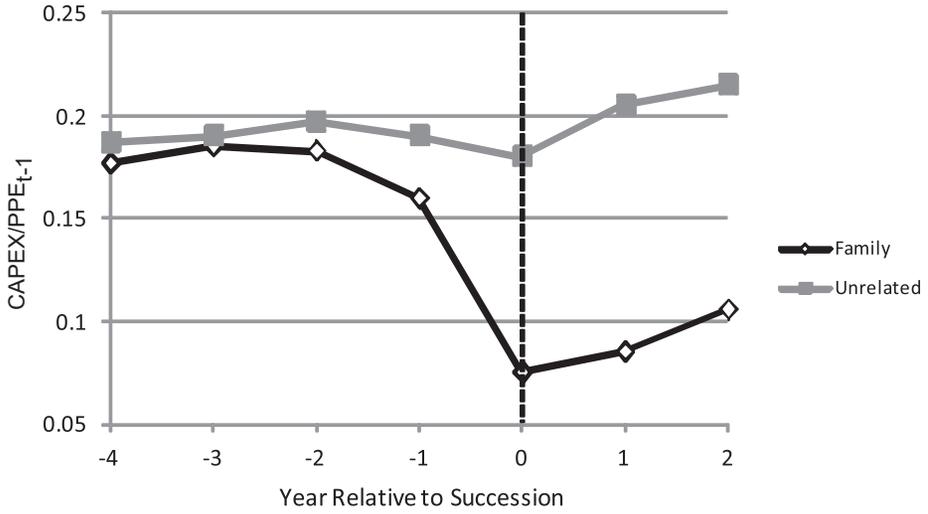
Panel A: Before the Tax Reform (High Tax for Both Family and Unrelated Successions)
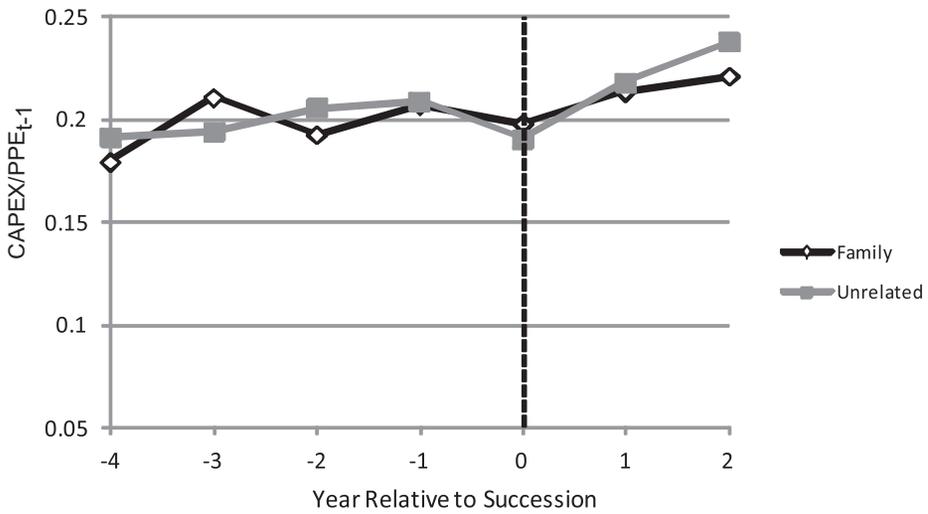
Panel B: After the Tax Reform (Low Tax for Family Successions)

Figure 3. Investment (CAPEX/PPE$_{t\text{-}1}$) for alternate succession decisions. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. Time is measured in years relative to the year of transition.
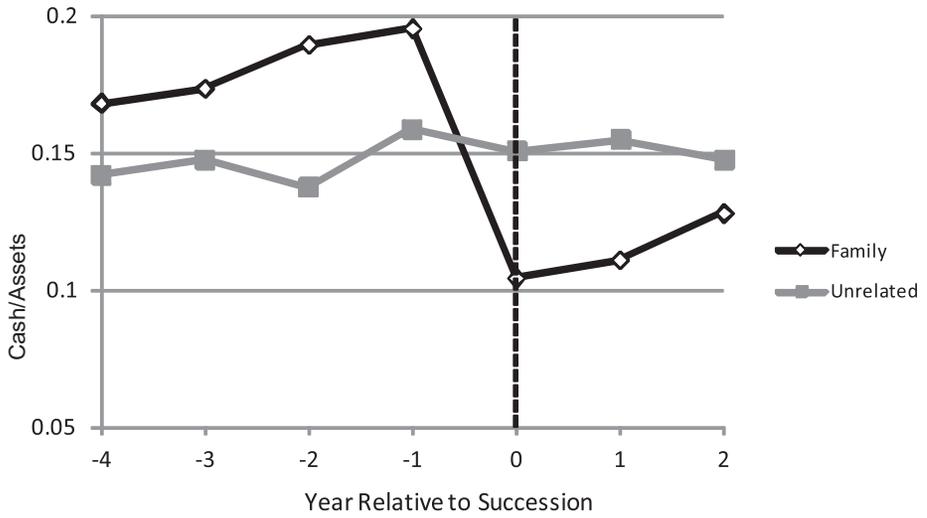
Panel A: Before the Tax Reform (High Tax for Both Family and Unrelated Successions)
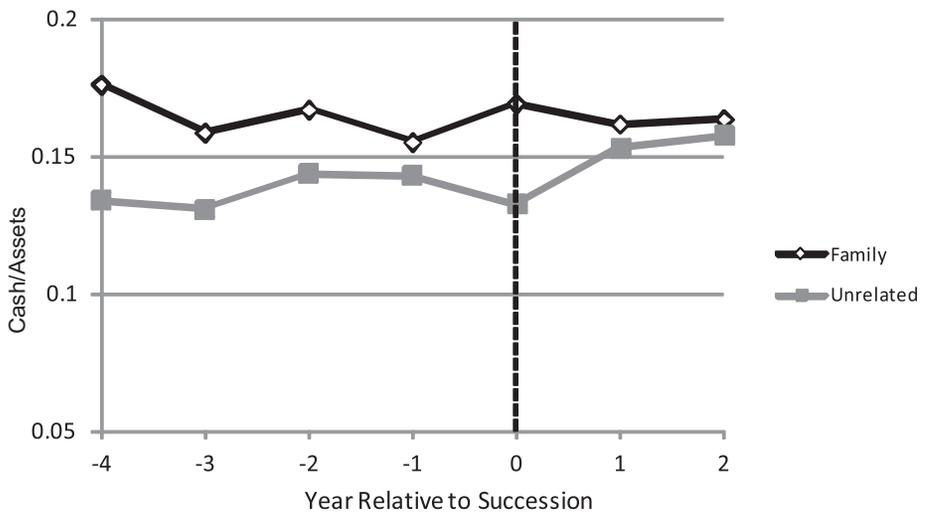

Panel B: After the Tax Reform (Low Tax for Family Successions)

Figure 4. Cash holdings (Cash/Assets) for alternate succession decisions. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. Time is measured in years relative to the year of transition.
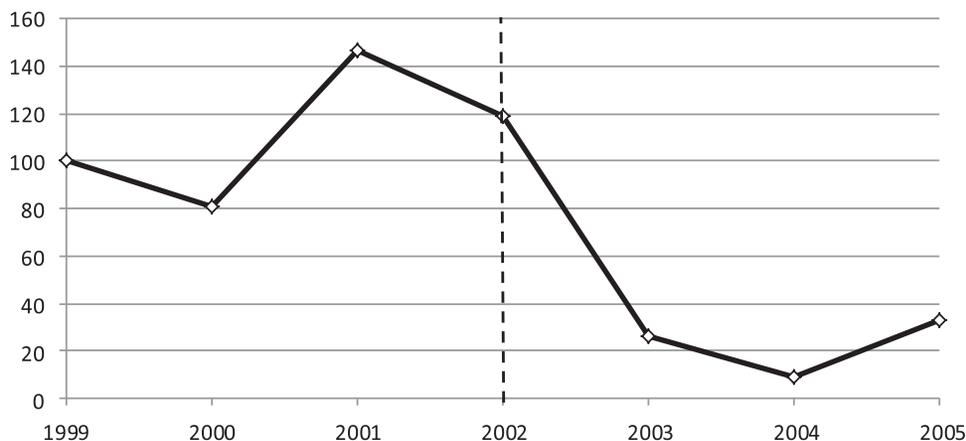
Figure 5. Average succession tax revenue per filing relative to 1999 average succession tax revenue level. The vertical axis presents the average revenue per filing normalized by the 1999 average revenue level. The horizontal axis shows calendar years. The dotted vertical line at 2002 represents the year of the reform.

B. Difference-in-Difference-in-Differences Results

To analyze the impact of succession taxes on firm investment around successions, I first examine the change in investment around succession for family and unrelated A.1 transitions, both in the prereform and postreform periods. The first row in Table VI presents the difference in two-year average investment after succession minus the three-year average before succession. Investment is defined as the ratio of capital expenditures in year t to beginning-of-year net PPE. Columns (1) to (5) correspond to transfers that occurred before the tax reform. Column (2) shows that, under the high tax, investment declines sharply around succession for firms that remain in the family. Investment drops from 17.6% of PPE three years before succession to 9.7% of PPE two years after (7.9 percentage point drop). The impact is economically significant: the implied decrease in investment ratio (0.079) is approximately 40% of the pretransition level of investment. Furthermore, this effect is statistically significant at the 1% level, and persists for at least four years after transition (see the Appendix). These results suggest that succession taxes can have a large impact on investment around family transitions. For unrelated successions, column (3) shows a slight increase in investment after succession. As a result, the average difference-in-differences suggests that, in the prereform period, family successions are associated with 9.2 percentage points lower investment relative to unrelated successions. In the postreform period, the change in investment for unrelated successions is marginally higher than that for family transitions (column (9)), but the difference is not statistically different from zero at conventional levels. In column (11), the DDD estimate shows the effect of the tax reduction on the investment levels of the two groups. As we can see, the tax reduction resulted in an 8.4 percentage point higher increase in investment

Table VI

Changes around Successions: Difference-in-Difference-in-Differences (DDD)

The table presents results of the difference-in-difference-in-differences analysis. Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, and unrelated otherwise. Columns (1) to (4) pertain to successions that occurred before the reform and columns (6) to (10) pertain to successions that occurred after the reform. Columns (1) to (3) and (6) to (8) show the changes around succession by type of succession for the following variables: *Investment*, *Ln Assets*, and *Cash Ratio*. Changes around succession are computed as the difference between the two-year average postsuccession minus the three-year average before succession. The year of succession is omitted. Column (4) is the difference between columns (2) and (3) and column (9) is the difference between columns (7) and (8) (difference-in-differences). Column (11) is the difference between column (4) and column (9) (difference-in-difference-in-differences). Columns (5), (10), and (12) present median differences. *Investment*, *Ln Assets*, and *Cash Ratio* are defined in Table IV, Panel A. Time is measured in years relative to the year of transition. The year of transition is omitted. Successions that occurred in the year of the reform are omitted. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and ** indicate significance at the 1% and 5% level, respectively.

	Before Reform					After Reform					Differences	
		Type of Succession		Mean DD	Median DD		Type of Succession		Mean DD	Median DD	Mean DDD	Median DDD
	All	Family	Unrelated			All	Family	Unrelated				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
No of Successions	305	138	167			307	227	80			612	612
Panel A. Investment (CAPEX/PP&E$_{t-1}$)												
(2-year average after) –	−0.0293	−0.0797	0.0123	−0.0921***	−0.0687***	0.0141	0.0120	0.0198	−0.0078	0.0081	0.0842***	0.0767***
(3-year average before)	(0.008)	(0.014)	(0.006)	(0.015)	(0.022)	(0.006)	(0.007)	(0.010)	(0.012)	(0.006)	(0.020)	(0.024)
Panel B. Investment (CAPEX/PP&E$_{t-1}$)												
(2-year average after) –	−0.0289	−0.0770	0.0107	−0.0878***	−0.0567***	0.0254	0.0242	0.0287	−0.0045	−0.0066	0.0832***	0.0502***
(2-year average before)	(0.009)	(0.015)	(0.009)	(0.017)	(0.017)	(0.007)	(0.008)	(0.014)	(0.016)	(0.007)	(0.023)	(0.016)
Panel C. Ln Assets												
(2-year average after) –	−0.0293	0.0197	0.1723	−0.1526**	−0.1333**	0.0141	0.1344	0.1421	−0.0076	−0.0129	0.1450*	0.1203***
(3-year average before)	(0.008)	(0.045)	(0.039)	(0.060)	(0.047)	(0.006)	(0.030)	(0.049)	(0.058)	(0.087)	(0.083)	(0.077)
Panel D. Cash Ratio												
(2-year average after) –	−0.0264	−0.0623	0.0033	−0.0656***	−0.0314***	0.0040	0.0017	0.0111	−0.0094	−0.0036	0.0562**	0.0278**
(3-year average before)	(0.007)	(0.011)	(0.008)	(0.013)	(0.010)	(0.008)	(0.009)	(0.015)	(0.018)	(0.009)	(0.023)	(0.014)

in firms with a family succession than in firms with an unrelated succession. This result indicates that the distortion in investment disappears when the succession tax on family successions is eliminated. The results are similar in Table VI, Panel B, where I use alternative time windows for the calculation of investment. The median differences in columns (5), (10), and (12) show that outliers are unlikely to be behind the results.

In Table VI, Panels C and D report results on the effects of the reform on asset growth and cash holdings respectively. Panel C shows that, under high succession taxes, firms undergoing a family succession grow less compared to firms with an unrelated succession, whereas after the succession tax for within-family transitions is reduced, asset growth of the two groups is similar. In Panel D, column (2) shows that the cash ratio drops from 18.4% of assets three years before succession to 12.2% of assets two years after. This 6.2 percentage point decrease indicates that liquidity-constrained entrepreneurs use liquid assets of the company to pay the tax. Departing entrepreneurs that sell off their businesses do not face the same constraint, because they can use part of the sale proceeds to pay the tax. The reduction of the tax for family successions removes this distortion in the postreform period.

Although the preceding DDD analysis indicates that the succession tax has a direct impact on firms' internal financial resources and investment, selection bias may contaminate the results, as firm characteristics related to investment opportunities are likely to affect the decision of whether to transfer the company to a descendant. To address this potential problem, I next use IV to analyze the effect of succession taxes on investment.

C. Instrumental Variables Main Results

C.1. First Stage

Table VII, Panel A presents first-stage results for the relationship between the gender of the entrepreneur's first-born child and the type of succession. The results are consistent with Table III. In the prereform and postreform periods, entrepreneurs with a male first-born child are more likely to appoint a family successor relative to entrepreneurs with a female first-born child. The high *F*-statistic suggests the instrument is not weak. In unreported tests I also check for a potential weak instrument problem using the Stock and Yogo (2005) test, and find that it does not indicate weakness of the instrument.

C.2. Reduced Form

In Table VII, Panel B, I explore the reduced-form correlation of the instrument with the change in investment. The estimated coefficients on the variable *Male First-Born* show that, under the high succession tax regime, firms in which the departing entrepreneur's first-born is male experience on average a 3.27 percentage point higher decline in investment around succession than firms in which the entrepreneur's first-born is female. The coefficient on the interaction between the *Male First-Born* dummy and the *Post_Law* dummy

Effect of Reform on Investment around Successions: First Stage and Reduced Form

Panel A reports first-stage results. *Male First-Born* is a dummy variable equal to one if the first-born child of the departing entrepreneur is male and zero if it is female. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. Definitions of *Ln Assets* and *Firm Age* are given in Table III. Panel B reports the estimates of the reduced form equation. The dependent variable is the difference in investment around succession estimated using the three-year average before and two-year average after firm transition. Successions that occurred in the year of the reform are omitted. Heteroskedasticity-robust standard errors are reported in parentheses. *** and ** indicate significance at the 1% and 5% level, respectively.

	Panel A. First Stage Two Endogenous Variables: Family, Post_Law·Family			
	Family (1)	Post_Law· Family (2)	Family (3)	Post_Law·Family (4)
Post_Law · Male First-Born	−0.0243 (0.080)	0.1523*** (0.0537)	−0.0187 (0.079)	0.1540*** (0.054)
Male First-Born	0.1773*** (0.059)	0.0001 (0.002)	0.1764*** (0.057)	−0.0002 (0.003)
Post_Law	0.2576*** (0.058)	0.6510*** (0.0413)	0.2503*** (0.058)	0.6486*** (0.041)
Ln Assets$_{t-3}$			−0.0447** (0.020)	−0.0132 (0.0154)
Age			0.0082*** (0.003)	0.0026 (0.002)
Pretransition Investment	YES	YES	YES	YES
F-statistic	18.23	98.68	19.51	79.52
Number of Observations	542	542	542	542

	Panel B. Reduced Form Dependent Variable: Differences in Investment (CAPEX/ Assets$_{t-1}$) around Successions	
	(1)	(2)
Post_Law · Male First-Born	0.0343** (0.014)	0.0347** (0.014)
Male First-Born	−0.0314*** (0.010)	−0.0314*** (0.010)
Post_Law	0.0341*** (0.009)	0.0336*** (0.010)
Ln Assets$_{t-3}$		−0.0029 (0.004)
Age		0.0005 (0.001)
Pretransition Investment	YES	YES
Number of Observations	542	542

indicates that, after the tax on family successions is reduced, the investment of firms whose entrepreneurs have a male first-born increases 4.4 percentage points more around succession relative to the investment of firms in which the departing entrepreneur's first-born is female.

C.3. IV

Table VIII examines the effect of succession taxes on investment around transition. Columns (1), (2), and (3) provide the OLS estimates, allowing for direct comparison with columns (4), (5), and (6), which provide the estimated coefficients using IV. In all specifications, the dependent variable is the change in investment around succession, defined as the average investment postsuccession minus the average investment prior to succession. In specifications (1), (2), (4), and (5), I control for the pretransition investment level. Furthermore, in columns (2), (3), (5), and (6), I control for age and size using the natural logarithm of lagged assets.[18] Consistent with the previous observations, in the presence of high succession taxes, all the specifications show a sharp decline in investment by firms undergoing a family succession relative to those undergoing an unrelated succession, with the difference statistically significant. Furthermore, all specifications show that the tax-induced reduction in investment for family successions is removed after the tax is reduced; the average postsuccession investment of firms undergoing a family succession greatly increases relative to that for unrelated successions after the tax reform. The sum of the two coefficients *(Family* and *Post_Law·Family)* is not statistically different from zero, which further indicates the reform removed the distortion in investment in family successions.[19]

The estimated coefficients using the IV approach are larger than those using OLS, indicating a reduction in investment of more than 18 percentage points. The gap between IV and OLS estimates suggests that, in the high-tax period, entrepreneurs that faced severe financial constraints were more likely to choose an unrelated succession. As a result, the OLS specifications underestimate the true effect of the succession tax on firm investment.

D. Timing

One potential concern is whether, after the introduction of the law, some firms may have delayed their transfer, waiting until 2003 to take advantage of the lower succession tax. To address this concern, I repeat the analysis excluding from the sample all transitions that occurred in 2003 (as well as the 2002 transitions, as before). Table IX shows that the results are similar to those in Table VIII and are statistically significant.

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[18] I use assets as a common control for firm size. Assets are likely to be correlated with changes in investment.

[19] I note that the results presented in the paper are qualitatively similar if I use industry-year fixed effects (Gormley and Matsa (2014)). Appendix Table A.III presents results from this estimation.

Table VIII

Effect of Tax on Investment around Successions: OLS and Instrumental Variables (2SLS)

Estimated coefficients in columns (1), (2), and (3) are from least squares regressions (equation (1), Estimated coefficients in columns (4), (5), and (6) are from IV-2SLS regressions. The dependent variable is the change in investment around successions. Changes in investment are computed as the difference between the average two-year postsuccession investment minus the three-year average before succession. The year of succession is omitted. *Post.Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. *Investment, Age,* and *Ln Assets* are defined in Table III. Successions that occurred the year of the reform are omitted. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Dependent Variable: Differences in Investment Around Successions (Two-Year Average Postsuccession) – (Three-Year Average Presuccession)					
	OLS			IV-2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Family	−0.0766***	−0.0801***	−0.0732***	−0.1769***	−0.1779***	−0.1784***
	(0.010)	(0.010)	(0.010)	(0.063)	(0.062)	(0.066)
Post.Law · Family	0.0849***	0.0865***	0.0826***	0.1972**	0.2037**	0.2020**
	(0.014)	(0.014)	(0.014)	(0.089)	(0.090)	(0.092)
Post.Law	0.0085	0.0076	0.0068	−0.0487	−0.0539	−0.0551
	(0.009)	(0.009)	(0.009)	(0.056)	(0.057)	(0.057)
Age		0.0010	0.0009		0.0015	0.0014
		(0.001)	(0.0005)		(0.001)	(0.001)
Ln Assets$_{t-3}$		−0.0052	−0.0046		−0.0082	−0.0078
		(0.003)	(0.004)		(0.006)	(0.005)
Pretransition Investment	YES	YES	NO	YES	YES	NO
Number of Observations	542	542	542	542	542	542

<div align="center">

Table IX

Excluding Transfers that Occurred in 2003

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Estimated coefficients in column (1) are from least squares regression. Estimated coefficients in column (2) are from IV-2SLS regression. Transfers that occurred in 2003 are excluded from the estimation. The dependent variable is the change in investment around successions as defined in Table VII. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. Successions that occurred in the year of the reform are omitted. Heteroskedasticity-robust standard errors are reported in parentheses. *** and ** denote significance at the 1% and 5% level, respectively.

	Dependent Variable: Differences in in Investment Around Succession	
	OLS (1)	IV-2SLS (2)
Family	−0.0736***	−0.1785***
	(0.010)	(0.066)
Post_Law Family	0.0756***	0.3162**
	(0.017)	(0.160)
Number of Observations	499	449

A second potential issue related to the timing of succession is whether firms perceived the tax reform as a permanent or temporary change. If firms perceived the new law as a temporary measure, they might expedite their transfer decisions. In that case, we would observe that, after the reform, much younger firms transferred to a family member. Three observations mitigate this concern. First, Table II shows that the number of successions in the years before and after the reform are similar, at 305 and 307, respectively. Second, the sharp increase in the percentage of family transfers remains stable over the years after the reform, which suggests that firms perceived the regulatory change to be a long-term change in the law. Third, Table IV, Panel A shows that firm age in the year of the succession is similar in the prereform and postreform periods, which also suggests that entrepreneurs did not expedite their successions as a result of the reform.

An additional concern is that, although the gender of the first-born child is likely to provide exogenous variation in terms of the identity of the new owner, the timing of succession is unlikely to be random. To address potential concerns related to the timing of transitions, I obtain information on all transfers that occurred as a result of the death of the entrepreneur;[20] I identify 153 such successions. Then, I examine the robustness of the above findings on the sample in which succession and the departing entrepreneur's death occur

[20] Upon the death of the entrepreneur, the firm is transferred to his family. If the family members keep the firm within the family, the transfer is classified as a family transfer. If the family members transfer the company to an unrelated party in the year of the entrepreneur's death, this transfer is classified as unrelated. In a few cases, the family members transferred the company to an outsider one or two years after the death of the entrepreneur. I omit these cases from the analysis. The results are robust to the inclusion of these cases.

Table X
Transfers upon the Death of the Entrepreneur

Estimated coefficients in column (1) are from least squares regression. Estimated coefficients in column (2) are from IV-2SLS regression. The sample consists of transfers in which succession and the departing entrepreneur's death occur in the same year. The dependent variable is the change in investment around successions as defined in Table VII. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and aero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. Successions that occurred in the year of the reform are omitted. Heteroskedasticity-robust standard errors are reported in parentheses. *** and * denote significance at the 1% and 10% level, respectively.

	Dependent Variable: Differences in Investment Around Succession	
	Succession and the Departing Entrepreneur's Death Occur in the Same Year	
	OLS (1)	IV-2SLS (2)
Family	−0.1114***	−0.2428*
	(0.023)	(0.140)
Post_Law · Family	0.0814***	0.2308
	(0.027)	(0.160)
Number of Observations	153	144

in the same year. In this sample, the endogeneity of the timing of transitions is less of a concern. The size of the sample is smaller compared to the sample with inter vivos transfers, and using the IV in this sample is a hard test. Table X reports the results. I again find that the results are similar to those in previous specifications, showing that the tax reduction resulted in an increase in postsuccession investment for family transitions.

E. Tax Evasion

Another important point to consider is how tax evasion might affect the results. I first investigate whether succession taxes were paid and whether the reform led to a reduction in the effective tax rate. Because information on taxes paid at the firm level is not available, I collect information on specific succession tax revenues from 10 tax offices in Greece.[21] These offices represent approximately 5% of the total number of tax offices in Greece (more than 9% by revenues). Figure 5 presents the average succession tax revenue per filing normalized by the 1999 average succession tax revenue. The average tax collection per filing in 1999 is 215,000 euros, which corresponds to approximately 15% of the average assets of the transferred companies. The dotted vertical line at 2002 represents the year of the reform. Figure 5 shows a substantial decrease in the average succession tax revenue per filing after the reform. The figure

[21] The data come from the Ministry of Economy and Finance. The 10 tax offices were randomly selected, with those in the areas of Athens and Thessaloniki oversampled. The final sample contains four tax offices in Athens, three in Thessaloniki, and three from the rest of Greece.

thus provides suggestive evidence that the reform did indeed lead to a large decrease in the effective tax rate that corporations undergoing successions faced. Notably, an increase in the number of filings does not drive this result, because the number of transfers is stable around the reform (see Table II). An obvious caveat concerning this evidence is that the data represent only 5% of the tax offices in Greece. Nevertheless, the sharp timing of the effects around the reform in Figure 5 supports the results above (which also occur sharply around the reform).

Next, although prior work on tax evasion (Feld and Schneider (2010), Artavanis, Morse, and Tsoutsoura (2012)) shows that a large fraction of income taxes are not paid in Greece, the taxes paid are not zero. Further, prior literature shows that collecting inheritance taxes is more efficient than collecting income taxes (Kopczuk (2013)). Thus, to the extent that succession taxes are paid, one would expect the proposed regulatory change to bind in the real data. My empirical strategy also alleviates the concern that tax evasion might be driving some of the findings. Suppose firms evade taxes to some extent and that this variable is not observed. To explain the results, such an omitted variable has to differentially affect the investment of firms that undergo a succession and have an entrepreneur whose first-born child is male and the investment of firms that undergo succession and have an entrepreneur whose first-born is female—with the difference occurring sharply around the year of the reform. I note that, although tax evasion may occur, to the extent that taxes are not zero—which Figure 5 and prior literature highlight—tax evasion is unlikely to affect my results significantly. Finally, the results in Table X on transfers that occurred upon the death of the entrepreneur mitigate concerns about planning to avoid the tax.

F. Interaction with Firm Characteristics

The previous analysis shows that transfer taxes have a large impact on firms' internal financial resources and investment decisions. This section further investigates whether the effect of succession taxes on investment varies with observed firm characteristics. Of course, a caveat with respect to the analysis based on observable characteristics is that it is based on the assumption that these observables are not endogenous to the firm's investment opportunities. Nevertheless, this investigation sheds light on which firms are more affected by succession taxes and thus on the welfare implications of succession taxes.

A natural place to start this analysis is to explore whether the decline in investment in the presence of succession taxes is greater for firms that have low debt capacity. If external financing is costly, firms with low debt capacity should experience a larger decrease in investment. In Table XI, columns (3) and (4), I test whether the decline in investment for family successions is greater for firms with low asset tangibility. Following Baker and Wurgler (2006), I measure asset tangibility by PPE over assets, (PPE/A), the year before succession. For the subsample of companies with low tangibility, I

Table XI
Interaction with Firm Characteristics

Estimated coefficients in columns (1), (3), (5), and (7) are from least squares regressions (equation (1). Estimated coefficients in columns (2), (4), (6), and (8) are from IV-2SLS regressions. The dependent variable is the change in investment around successions. Changes in investment are computed as the difference between the average two-year postsuccession investment minus the three-year average before succession. The year of succession is omitted. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. Successions that occurred in the year of the reform are omitted. Columns (1) and (2) present results for the full sample. Columns (3) and (4) present results for the subsample of firms with below median asset tangibility. Tangibility is defined as PPE over assets, the year before succession. Columns (5) and (6) present results for the subsample of firms that have entrepreneurs with below-median income from sources other than the firm. Columns (7) and (8) show results for the subsample of firms with more than \$5 million in assets. Columns (9) and (10) present results for the subsample of firms where the departing entrepreneur owned more than 90% of the firm the year before succession. Firm controls include Age and Ln Assets$_{t-3}$. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Full Sample		Low Asset Tangibility Firms		Low Other Income of Entrepreneur		Firms with Assets > 5 Million		High Ownership of Departing Entrepreneur	
	OLS (1)	IV-2SLS (2)	OLS (3)	IV-2SLS (4)	OLS (5)	IV-2SLS (6)	OLS (7)	IV-2SLS (8)	OLS (9)	IV-2SLS (10)
Family	−0.0801***	−0.178**	−0.112***	−0.215**	−0.123***	−0.299***	−0.101***	−0.1666	−0.102***	−0.251**
	(0.010)	(0.062)	(0.012)	(0.103)	(0.014)	(0.106)	(0.029)	(0.872)	(0.016)	(0.126)**
Post.Law*Family	0.0865***	0.2037**	0.112***	0.283*	0.113***	0.353**	0.108***	0.262	0.112***	0.306
	(0.014)	(0.090)	(0.019)	(0.132)	(0.023)	(0.144)	(0.037)	(0.104)	(0.020)	(0.155)
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of Observations	542	542	263	263	268	268	83	83	261	261

observe that the economic magnitude of the estimated coefficients is larger than in the full sample (reported for reference in columns (1) and (2)).

Furthermore, in columns (5) and (6), I explore whether the investment distortions are stronger for family firms owned by entrepreneurs with relatively low income from other sources. I use data on the entrepreneur's personal income from sources other than the company to classify firms according to their access to low-cost financial sources outside the firm. Although most small and medium-sized firms face financing constraints (Fazzari, Hubbard, and Petersen (1988)), the effect of the tax on investment should be mitigated for firms whose entrepreneurs can turn to sources other than external finance to pay their tax liabilities. Such income from other sources ("other income" henceforth) is defined as the total income of the departing entrepreneur the year prior to succession minus the departing entrepreneur's income from the company. Both the OLS and the IV analysis show that the investment decline is larger in firms with entrepreneurs with low income from other sources.

Taken together, the results in columns (1) to (6), which show that, the investment decline is larger for firms with low asset tangibility and firms with entrepreneurs with low income from other sources, are consistent with financial constraints exacerbating the investment distortions of succession taxes. However, it is important to note that this evidence is not conclusive as these patterns may also be consistent with other plausible explanations, such as differential foresight or long-term planning of the departing entrepreneur.

One important concern about the main results is whether they hold only for smaller firms that might face more severe frictions than larger corporations. I find, however, that this is not the case empirically. In columns (7) and (8), I repeat the analysis for firms with assets above $5 million. Column (7) shows that the OLS results for firms with assets above $5 million are similar to the results in the main specification. Thus, succession taxes affect investment both in small and intermediate companies. In the IV specification, the statistical significance of these results is weak, because there is not enough power in the sample to identify the coefficients precisely. To the extent that the direction of the estimates is informative, I conclude that succession taxes affect firm investment across the distribution of firm size.[22] Finally, I test whether the decline in investment is larger when the departing entrepreneur owns the vast majority of the firm (columns (7) and (10)). For the subsample of transfers of more than 90% of firm ownership, the estimated coefficients in both the OLS and the IV regressions are larger than those in the full sample.

G. Alternative Outcome Variables: Performance

Table XII investigates the effect of succession taxes on sales growth and firm performance. The dependent variable is the change in sales growth around succession (columns (1) and (2)) and the change in scaled operating income

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[22] In the Appendix, I also report results for the various size quintiles and show that the results hold across size quintiles.

Alternative Dependent Variables: Performance

Estimated coefficients in columns (1) and (3) are from least squares regressions. Estimated coefficients in columns (2) and (4) are from IV-2SLS regressions. The dependent variables in columns (1) to (4) are the difference between the average two-year postsuccession performance measure minus the three-year average before succession. The year of succession is omitted. Sales Growth is defined as the annual percentage increase in sales. *Operating Income/Assets$_{t-3}$* is operating income divided by the level of assets three years prior to succession. *Post_Law* is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. Successions that occurred in the year of the reform are omitted. Firm controls include *Age* and *Ln Assets$_{t-3}$*. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Sales Growth		Operating Income/Assets$_{t-3}$	
	OLS (1)	IV-2SLS (2)	OLS (3)	IV-2SLS (4)
Family	−0.041***	−0.174**	−0.035***	−0.241**
	(0.010)	(0.068)	(0.013)	(0.095)
Post_Law*Family	0.042***	0.172**	0.022*	0.231**
	(0.013)	(0.085)	(0.015)	(0.107)
Firm Controls	YES	YES	YES	YES
Number of Observations	542	542	542	542

(columns (3) and (4)). The first two columns show that, in the prereform period, firms that undergo a family succession have a 4.1 percentage point decline in sales growth relative to firms undergoing an unrelated succession, with the difference statistically significant. This tax-induced reduction in sales growth is absent after the reform. In columns (3) and (4), I use as an alternative performance measure the firm operating income divided by the level of assets three years prior to succession. Operating income is scaled by presuccession assets to isolate the effect of changes in asset value on operating income.[23] Both the OLS and IV specifications show that firms experience a decline in profitability around a family succession when transfer taxes are high. In sum, the results of Table XI demonstrate that succession taxes affect firm profitability and sales growth.

H. "Arbitraging" the Tax Liability

A final issue to consider is whether the large increase in family successions in the postreform period could be attributed to tax dodging, whereby entrepreneurs avoid paying a 20% tax on direct transfers of the firm to unrelated parties by transferring it first to family members, paying only a 1.2% or 2.4% tax, and then having it transferred to unrelated parties within a short

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[23] As Table VI, Panel C shows, succession taxes lead to slow asset growth for family transitions.

period of time. However, such a practice could be considered fraudulent and bear severe penalties for the parties involved.

Nevertheless, to address this potential issue, I track the filings in the *Government Gazette* of all sample firms transferred to family in the postreform period for the first three years after their transfer. Of the 227 firms transferred to family members in the postreform period, none changed hands in the first two years after the family transfer and only one changed hands in the third year. This evidence eases concerns about "arbitraging" the succession tax in the postreform period and is consistent with the penalties that any such arbitraging behavior would bear.[24] This observation further suggests that the jump in family transfers is a result of the desire of entrepreneurs to pass their company on to descendants, which the succession tax in the prereform period constrained.

VI. Conclusion

Inheritance taxes are the subject of a heated debate in the United States and Europe as baby boomers enter retirement. One issue that has received significant attention in the so-called "death tax" debate is the impact of such taxes on private firms. The importance attributed to the inheritance taxes on private firms, and family firms in particular, stems from the fact that these firms comprise a large part of the economy in the United States and Europe, and thus are important drivers of employment. Despite arguments that succession taxes may depress investment around succession and even force entrepreneurs to sell their firms, empirical evidence showing such a connection has been surprisingly scarce.

This paper fills this gap by using a natural experiment to establish the causal effect of succession taxes on firm investment decisions and transfers of control. The experiment is made possible by the Greek government's decision to greatly reduce succession taxes for intrafamily transfers of businesses in 2002, as well as unique microdata that combine firm-level ownership and financial data of privately held firms in Greece with entrepreneurs' family characteristics and personal income. To measure the effect of succession taxes on investment, the paper employs two methodologies: (1) a DDD methodology, and (2) an instrumental variables (IV) approach that exploits the gender of the departing entrepreneur's firstborn child as an instrument for family successions. The empirical methodology allows me to isolate the effect of succession taxes from other factors that might affect firm policies around successions (e.g., the ability of the new owner or aggregate trends).

Both the DDD and the IV estimates show a strong negative effect of succession taxes on firm investment around transitions. I find significant effects

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[24] Entrepreneurs might avoid arbitraging the tax for several reasons in addition to hefty penalties. For instance, the entrepreneur may not trust family members to execute a sale to outsiders once they have control of the firm. Infighting among family members might also jeopardize such a transaction.

across the distribution of firm size. Moreover, successions taxes are associated with lower cash reserves, a decline in profitability, and slower sales growth. The results further show that succession taxes affect firm boundaries by impacting the decision of whether to sell or keep the firm within the family. The reduction in succession taxes leads to a more than 60% increase in family transitions.

The results of the paper provide direct, new evidence that succession taxes can significantly influence firm behavior around transitions. Succession taxes affect firm investment decisions. Moreover, succession taxes affect the transfer of firms into the hands of heirs or outsiders, which can have implications for aggregate productivity and economic growth. These findings, by quantifying the relation between succession taxes and firm investment and ownership decisions, are relevant for policy makers considering an optimal succession tax policy.

Appendix

Successions are classified into two categories: family, when the transfer of the firm is to relatives of the first or second degree, unrelated otherwise. Time is measured in years relative to the year of transition. The figure plots investment for family and unrelated successions four years before and four years after the transition.

Table A.1
U.S. Estate Tax Exemption and Maximum Tax Rate, 1988–2011

Calendar Year	Exemption	Maximum Tax Rate for Taxable Estate Values Over (in $ Millions)
1988–1997	$600,000	55% over $3.0 plus 5% surtax from over $10.0 to $21.040
1998	$625,000	55% over $3.0 plus 5% surtax from over $10.0 to $17.184
1999	$650,000	"
2000	$675,000	"
2001	$675,000	"
2002	$1,000,000	50% over $2.5
2003	$1,000,000	49% over $2.0
2004	$1,500,000	48% over $2.0
2005	$1,500,000	47% over $2.0
2006	$2,000,000	46% over $2.0
2007–2008	$2,000,000	45% over $1.5
2009	$3,500,000	45% over $1.5
2010		Estate tax repealed for 2010 only
2011	$5,000,000	35%
2012	$5,120,000	35%
2013*	$1,000,000	55%

*Under current law.
Source: Estate and Gift Tax Revenues: Past and Projected, CSR Report for Congress & H.R. 4853, the Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010.

Table A.II
Asset Quartiles of Private Firms in the Eurozone

The table presents the size quartiles of private firms in the Eurozone as well as in Germany and France and the total number of firms covered. The data source is the Amadeus database for 2005. The sample includes all private firms excluding financial and insurance companies and utilities.

Size Quartiles (in Euros)	p25	p50	p75	# of Firms
Eurozone	99,213	290,602	917,505	2,656,821
Germany	91,835	287,000	955,171	333,177
France	84,000	210,000	593,000	600,006

Table A.III
Effect of Tax on Investment around Successions: OLS and Instrumental Variables (2SLS)/Industry-Year FE

Estimated coefficients in column (1) are from least squares regression. The equation (1) estimate is:

$$\begin{aligned} Investment_{it} = {} & a_1 + \beta_1 \cdot Post\_Law_i + c_1 \cdot Family_i + d_1 \cdot Post\_Succession \\ & + \delta_1 \cdot (Post\_Law_t \cdot Family_i) + \varphi_i \cdot (Post\_Law * Post\_Succession) + \Psi_i \cdot \\ & (Post\_Succession \ * \ Family) + \xi_i \cdot (Family * Post\_Law * Post\_Succession) \\ & + X_i' \zeta_1 + v_{ts} + \varepsilon_{it} \end{aligned}$$

Estimated coefficients in column (2) are from IV-2SLS regressions. The dependent variable is investment. Post_Law is an indicator variable equal to one if the succession occurs after the reform and zero if it occurs before. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. *Post_Succession* is an indicator variable equal to one for the years after succession and zero for the years before. *Investment*, *Age*, and *Ln Assets* are defined in Table III. Successions that occurred in the year of the reform are omitted. All specifications include industry-year fixed effects. Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable: Differences in Investment around Succession		
	OLS	IV-2SLS
	(1)	(2)
Family*Post_Succession	−0.0707***	−0.1395***
	(0.011)	(0.050)
Family*Post_Succession*Post_Law	0.0815***	0.1515***
	(0.012)	(0.043)
Family	−0.0369***	−0.0153
	(0.011)	(0.032)
Family*Post_Law	0.0179***	0.0330
	(0.017)	(0.058)
Post_Succession*Post_Law	0.0273	0.0273
	(0.020)	(0.020)
Post_Succession	0.0121	0.0266
	(0.012)	(0.027)

(*Continued*)

Table A.III—*Continued*

Dependent Variable: Differences in Investment around Succession		
	OLS	IV-2SLS
	(1)	(2)
Post_Law	0.0234	−0.0239
	(0.017)	(0.041)
Age	0.0010	0.0003
	(0.001)	(0.001)
	−0.0027	−0.0001
Ln Assets$_{t\text{-}3}$	(0.004)	(0.003)
Industry-Year Fixed Effects	YES	YES
Number of Observations	2,710	2,710

Table A.IV

Prereform Decline in Investment by Firm Size: OLS and Instrumental Variables (2SLS)

Estimated coefficients in column (1) are from least squares regression in the prereform period. Estimated coefficients in column (2) are from IV-2SLS regression in the prereform period. The dependent variable is the change in investment around successions. Changes in investment are computed as the difference between the average two-year postsuccession investment minus the three-year average before succession. The year of succession is omitted. *Family* is an indicator variable equal to one for family successions and zero for unrelated successions. Size quartiles are based on firm assets. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable: Differences in Investment around Succession (two-year average postsuccession) – (three-year average pre succession)		
	OLS (1)	IV-2SLS (2)
Family	−0.0969***	−0.1519**
	(0.028)	(0.054)
Family * Size Quartile2	−0.0013	−0.0682
	(0.033)	(0.167)
Family * Size Qurntile3	−0.0085	−0.0868
	(0.029)	(0.257)
Family * Size Quartile4	−0.0541*	−0.2281
	(0.032)	(0.831)
Number of Observations	305	272

BEFORE REFORM (HIGH TAX)
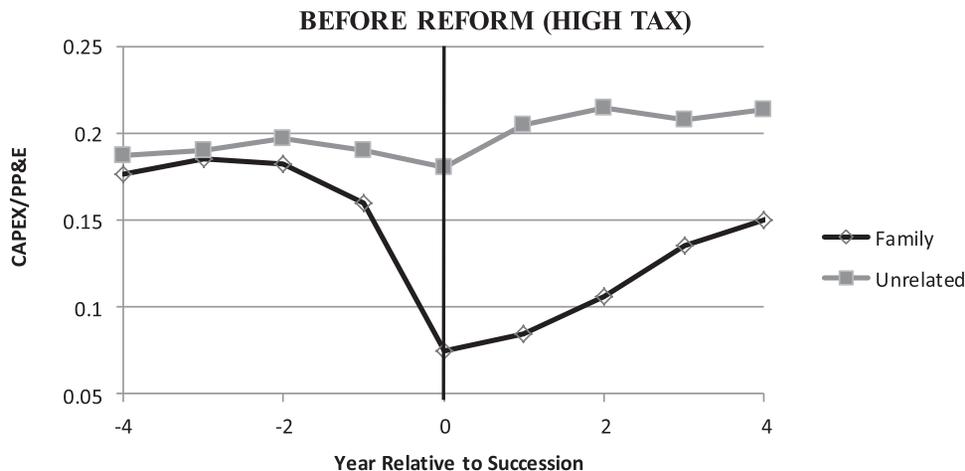
Figure A.1. Investment (CAPEX/PPE$_{t\text{-}1}$) for alternate succession decisions before the reform.

REFERENCES

Anderson, Ronald C., and David M. Reeb, 2003, Founding-family ownership and firm performance: Evidence from the S&P 500, *Journal of Finance* 58, 1301–1328.

Angrist, Joshua D., and Alan B. Krueger, 2001, Instrumental variables and the search for identification: From supply and demand to natural experiments, *Journal of Economic Perspectives* 15, 69–85.

Artavanis, Nikolaos, Adair Morse, and Margarita Tsoutsoura, 2012, Tax evasion across industries: Soft credit evidence from Greece, University of Chicago, Chicago Booth Paper 12–25.

Ayyagari, Meghana, Thorsten Beck, and Asli Demirgüç-Kunt, 2007, Small and medium enterprises across the globe, *Small Business Economics* 29, 415–434.

Baker, Malcolm, and Jeffrey Wurgler, 2006, Investor sentiment and the cross-section of stock returns, *Journal of Finance*, 61, 1645–1680.

Bennedsen, Morten, Kasper Meisner Nielsen, Francisco Perez-Gonzalez, and Daniel Wolfenzon, 2007, Inside the family firm: The role of families in succession decisions and performance, *Quarterly Journal of Economics* 122, 647–691.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan, 2004, How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics* 119, 249–275.

Bertrand, Marianne, Simon Johnson, Krislert Samphantharak, and Antoinette Schoar, 2008, Mixing family with business: A study of Thai business groups and the families behind them, *Journal of Financial Economics* 88, 466–498.

Blanchard, Olivier Jean, Florencio Lopez-de-Silanes, and Andrei Shleifer, 1994, What do firms do with cash windfalls? *Journal of Financial Economics* 36, 337–360.

Bloom, Nick, 2006, *Inherited Family Firms and Management Practices: The Case for Modernizing the UK's Inheritance Tax* (Centre for Economic Performance, Mimeo).

Bloom, Nicholas, and John Van Reenen, 2007, Measuring and explaining management practices across firms and countries, *Quarterly Journal of Economics* 122, 1351–1408.

Brunetti, Michael J., 2006, The estate tax and the demise of the family business, *Journal of Public Economics* 90, 1975–1993.

Burkart, Mike, Fausto Panunzi, and Andrei Shleifer, 2003, Family firms, *Journal of Finance* 58, 2167–2202.

Calomiris, Charles W., Charles P. Himmelberg, and Paul Wachtel, 1995, Commercial paper, corporate finance, and the business cycle: A microeconomic perspective, *Carnegie-Rochester Series on Public Policy* 42, 203–250.

Campello, Murillo, Erasmo Giambona, John R. Graham, and Campbell R. Harvey, 2011, Liquidity management and corporate investment during a financial crisis, *Review of Financial Studies* 24, 1944–1979.

Campello, Murillo, John R. Graham, and Campbell R. Harvey, 2010, The real effects of financial constraints: Evidence from a financial crisis, *Journal of Financial Economics* 97, 470–487.

Caselli, Francesco, and Nicola Gennaioli, 2005, Dynastic management, *Journal of the European Economic Association* 3, 679–689.

Coase, Ronald H., 1937, The nature of the firm, *Economica* 4, 386–405.

Ellul, Andrew, Marco Pagano, and Fausto Panunzi, 2010, Inheritance law and investment in family firms, *American Economic Review* 100, 2414–2450.

European Commission, 1994, Communication of the commission on the transfer of small and medium sized enterprises, Luxembourg, Office for Official Publications of the European Communities, Reference IP/94/1161.

European Commission, 2003, Transfer of businesses – continuity through a new beginning.

European Commission, 2006, Market for business transfers.

Faccio, Mara, and Larry Lang, 2002, The ultimate ownership of western European corporations, *Journal of Financial Economics* 65, 365–395.

Fazzari, Steven R., Glenn Hubbard, and Bruce C. Petersen, 1988, Financing constraints and corporate investment, *Brookings Papers on Economic Activity* 1, 141–195.

Feld, Lars P., and Friedrich Schneider, 2010, Survey on the shadow economy and undeclared earnings in OECD countries, *German Economic Review* 11, 109–149.

Gale, William, and Joel Slemrod, 2001, Rethinking the estate and gift tax: Overview, Working paper, University of Michigan Business School.

Gilchrist, Simon, and Charles P. Himmelberg, 1995, Evidence on the role of cash flow for investment, *Journal of Monetary Economics* 36, 541–572.

Gormley, Todd, and David Matsa, 2014, Common errors: How to (and not to) control for unobserved heterogeneity, *Review of Financial Studies* 27, 618–661.

Grossmann, Volker, and Holger Strulik, 2010 Should continued family firms face lower taxes than other estates? *Journal of Public Economics*, 94, 81–101.

Holmstrom, Bengt, and John Roberts, 1998, The boundaries of the firm revisited, *Journal of Economic Perspectives* 12, 73–94.

Holtz-Eakin, Douglas, 1999, The death tax: Investments, employment, and entrepreneurs, *Tax Notes* 84, 782–792.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firn: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305–360.

Kopczuk, Wojciech, 2013, Taxation of intergenerational transfers and wealth, in Alan Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez (eds.): *Handbook of Public Economics* 5, (Elsevier, Philadelphia, PA).

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 1999, Corporate ownership around the world, *Journal of Finance* 54, 471–517.

Morck, Randall, David A. Stangeland, and Bernard Yeung, 2000, Inherited wealth, corporate control and economic growth: The Canadian disease? in Randall Morck, ed.: *Concentrated Corporate Ownership* (University of Chicago Press, Chicago, IL).

Muller, Holger, and Karl Warneryd, 2001, Inside vs. outside ownership: A political theory of the firm, *RAND Journal of Economics* 32, 527–541.

Perez-Gonzalez, Francisco, 2006, Inherited control and firm performance, *American Economic Review* 96, 1559–1588.

Rauh, Joshua D., 2006, Investment and financing constraints: Evidence from the funding of corporate pension plans, *Journal of Finance* 61, 33–71.

Rodrik, Dani, 2005, Why we learn nothing from regressing economic growth on policies, Working paper, Harvard University.

Seru, Amit, 2014, Firm boundaries matter: Evidence from conglomerates and R&D activity, *Journal of Financial Economics* 111, 381–405.

Stock, James, and Motohiro Yogo, 2005, Testing for weak instruments in linear IV regression, in Donald W. K. Andrews and James H. Stock, eds.: *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (Cambridge University Press, New York, NY).

Villalonga, Belen, and Raphael Amit, 2006, How do family ownership, control and management affect firm value? *Journal of Financial Economics* 80, 385–417.