

Leverage in Pyramids: When Debt Leads To Higher Dividends

Abe de Jong

Department of Finance
Rotterdam School of Management, Erasmus University
PO Box 1738, 3000 DR Rotterdam, Netherlands
ajong@rsm.nl
Phone: 31-10-408-1022

Douglas V. DeJong*

Tippie College of Business, University of Iowa
Iowa City, IA 52242, USA
douglas-dejong@uiowa.edu
Phone: 319-335-0919
Fax: 319-335-1956

Ulrich Hege

Department of Finance, HEC Paris
78351 Jouy-en-Josas Cedex, France
hege@hec.fr
Phone: 33-1 39 67 72 99

Gerard Mertens

Department of Accounting and Control
Rotterdam School of Management, Erasmus University
PO Box 1738, 3000 DR Rotterdam, Netherlands
gmertens@rsm.nl
Phone: 31-10-408-2556

Draft: November 2009

* Corresponding author.

The authors appreciate the helpful comments from Henrik Cronqvist, Ingolf Dittmann, Edith Ginglinger, Erick Lie, Giovanna Nicodano, Urs Peyer, Daniel Wolfenzon, T.J. Wong, and Yishay Yafeh, as well as from seminar participants at Chinese University of Hong Kong, Tilburg University, University of Cologne, HEC Paris, Helsinki School of Economics, and the 2008 European Accounting Association. The authors acknowledge the excellent and extensive research assistance provided by Sereparp Anantavasilp.

Leverage in Pyramids: When Debt Leads To Higher Dividends

Abstract

This paper explores the use of leverage in pyramidal control chains and its relationship to dividend policy. Analyzing a comprehensive sample of French firms, we document that leverage in holding companies constitutes an important part of the overall discrepancy between control rights and cash flow rights. We postulate that the use of leverage commits dominant owners to more generous payouts since dividends are needed to service debt in the pyramidal structure (Debt Service Hypothesis). Consistent with our hypothesis, we find that debt in pyramids leads to higher dividend payouts, whereas dividends decrease in the equity portion of the control wedge. Only a fraction of the cash made available to controlling owners is paid out to them, which is consistent with the view that servicing debt along the control chain is a primary motive for dividends.

Keywords: pyramids, payout policy, leverage, ownership structure, control wedge, disproportionality of control and cash flow rights.

JEL classification: G32, G34, G35.

Dividend payouts are an important focus of attention in studies that investigate the conflict of interests between dominant and minority shareholders in listed companies. The prevalent view, the Expropriation Hypothesis introduced by La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000), maintains that dominant owners prefer to keep cash resources within the firm rather than share them with minority shareholders. The weaker the investor protection and the larger the distance between the dominant owner's voting rights and cash flow rights, the smaller should be the payout. Empirical support, however, is mixed. On the one hand, the findings of La Porta et al. (2000) are consistent with the Expropriation Hypothesis. On the other hand, Faccio, Lang and Young (2001) present evidence that dominant owners in business groups pay larger dividends. They refer to an alternative hypothesis, the Substitution Hypothesis, which stipulates that shareholders care about the stock market value since they want to issue additional equity in the future and thus build a reputation by paying higher dividends. It is an open question how to reconcile these views and the seemingly contradictory evidence in these large-scale cross-country studies.

We consider the role of debt as a control enhancing mechanism for the ultimate owner who uses borrowed money to finance his shareholdings. In pyramidal ownership structures in particular, the presence of holding companies under control of an ultimate owner provides ample opportunity for leveraging with debt. Leveraged financing of dominant owners affects the incentives concerning the use of holding companies as well as dividend payouts of the bottom listed company in the pyramid. We introduce the Debt Service Hypothesis as an alternative view that reconciles the seemingly contradictory findings on dividend payouts. According to this hypothesis the use of leverage in pyramidal control chains commits the dominant owner to larger dividend payouts. The Debt Service Hypothesis emphasizes the need to pay higher dividends in order to service the debt

contracted in leveraged pyramids. We find that bottom listed companies characterized by a large equity-based discrepancy between control rights and cash flow rights (the equity wedge) pay out less cash, in accordance with the Expropriation Hypothesis. However, we also find that the use of leverage in the pyramidal structures increases dividend payouts. The latter finding, taken in isolation, would favor the Substitution Hypothesis. Thus, the Debt Service Hypothesis offers a middle ground that helps our understanding of the seemingly contradictory findings in earlier studies and in our own: We emphasize that pyramidal debt not only implies a commitment to dividend payouts in order to be able to service debts, it also changes the relationship between dominant owner and minority shareholder, by widening the discrepancy between cash flow and control rights which increases expropriation.

We generically refer to the *control wedge* as the disproportionality between control rights and cash flow rights. The conventional equity-based control wedge, or *equity wedge* for short, is calculated as control rights/cash flow rights, where cash flow rights are obtained by multiplying equity stakes along the control chain. Throughout this paper, we call the additional control wedge that is created by leverage in holding entities the *debt wedge*. Adjusting for debt as a control mechanism leads to the *effective control wedge* that we introduce and define as: $\text{effective control wedge} = \text{control rights} / (\text{debt-adjusted cash flow rights}) = \text{control rights} / [\text{cash flow rights} \times (1 - \text{leverage ratio})]$, where the leverage ratio is $(1 - \text{equity}/\text{total assets})$. The debt-adjusted cash flow rights are obtained by multiplying debt adjusted stakes along the control chain. Thus, debt in the holding company increases the control wedge of the ultimate owner. We calculate the debt wedge as the difference between the effective control wedge and the equity wedge. If we do not observe the capital structure of an entity, we make the conservative assumption that it has

no debt. Thus, our approach provides the lower bound on the ultimate owner's effective leverage exposure.

In order to test our hypotheses, we require that pyramids be the only reliable way to engineer a control wedge. Further, we would like pyramids to be tax neutral. Finally, we require complete transparency of the pyramid structure, i.e., ownership structure, financial structure and payout policy of privately-owned as well as publicly listed companies including holding companies. As fully detailed in Section 3.1, France is an ideal laboratory for this study due to its specific institutions.

The first contribution of our paper is the study of the role of debt in holding companies as a vehicle to enhance control of dominant owners. We find that, in France, debt in holding companies constitutes a significant part of the effective control wedge. Moreover, taking into account debt financing helps resolve the puzzling observation noted in Almeida and Wolfenzon (2006) that owners often hold overwhelming majority stakes, or even 100% stakes, in an entity along their control chain. We find that in many cases, control is actually enhanced by the use of outside debt rather than equity; in these cases, the puzzle only exists because past literature failed to consider debt's ability to magnify the control wedge.

Our second contribution is the finding that the equity wedge and the debt wedge have opposite effects on dividend payout behavior. If the equity wedge increases, dividends payouts of the bottom firm decrease. If the debt wedge increases, dividends increase. These two findings are consistent with our Debt Service Hypothesis that views the dominant owner's need for cash flow to service debt obligations in holding vehicles as determining dividend payout decisions. In contrast to our study, earlier studies only consider the equity wedge and therefore ignore debt service payments along pyramidal control chains. Neither

La Porta et al. (2000), Faccio et al. (2001) or any of the other studies on pyramids consider the implications debt and pyramids might have on a firm's dividend payout policy. Though in fairness, Faccio et al.'s (2001) sample selection criteria suggests that pyramidal firms are a significant part of their sample. We argue that the Debt Service Hypothesis helps explain the seemingly contradictory findings in earlier studies.

The third contribution of our paper is our analysis of the actual dividend payouts to controlling owners along the entire pyramidal chain. Bertrand, Mehta and Mullainathan (2002) note that actual dividend payouts are the best way to assess the impact of shareholder control on expropriation in pyramids, but they are unable to observe payouts in their data of Indian business groups.¹ In contrast, our balance sheet data of holding companies allow us to reconstruct the actual dividends that are paid by all entities along the control chain. Earlier pyramid studies only considered potential dividend payouts to controlling owners, defined as the maximum payout that they would obtain if each entity along a control chain paid out all of the cash flows received from entities below. We find that only a fraction of the cash made available to controlling owners is actually paid out to them, with a substantial part being retained within the control chain. Our findings are consistent with the Debt Service Hypothesis, an important motive for dividend payout decisions is the debt service contracted in the control chain.

Rather than pay dividends to the ultimate owner(s), holding companies may retain cash for purposes of investing in other business ventures, Almeida and Wolfenzon (2006), or to cater to different dividend preferences among shareholders.² In the robustness section,

¹ In describing their design, Bertrand, Mehta and Mullainathan state "More specifically, we lack dividend data for many observations, which is especially troublesome since dividend payments would be the most direct way for a controlling shareholder to affect final returns."

² If some owners, including minority shareholders, prefer payouts whereas a controlling owner or other blockholder prefers to retain cash, say for tax reasons, then a pyramidal structure positioned between the

we consider these two additional explanations for payout behavior. We provide evidence that both motivations exist but show that the Debt Service Hypothesis is the dominant motivation for the payout policy of the bottom listed company and the payout policies through the pyramidal chain.

Our fourth contribution concerns the valuation implications of leverage and dividend payouts in pyramids for minority shareholders in the listed bottom company. We find that dividends in general have a positive effect on firm value, consistent with the prevalent theories on dividend payouts and earlier studies. However, based on the reasoning used to develop the Debt Service Hypothesis, we argue that a leveraged dominant owner could be forced to payout higher-than-optimal dividends to service debt. Consistent with Bertrand, Mehta and Mullainathan (2002), such dividends paid to service the debt in pyramidal structures is another form of expropriation and has a negative effect on the value of minority equity. Thus, the generally positive value effects of dividend payouts could be offset by the dividends associated with the debt wedge. Our empirical findings support this hypothesis.

Concerns about self-selection biases are important for this study. Our most important concern about endogeneity is that ownership structure, the use and design of pyramids, bottom company and pyramidal leverage, and finally dividend policy might not be chosen independently. Thus, firms with different characteristics select different relations among these key variables. We undertake a series of tests and use alternative specifications to address these concerns. First, we examine whether firm characteristics that should be related with capital structure and dividend decisions play a role in our key relations. We

operating company and the dividend-averse owner is an effective structure to separate dividend preferences.

use several measures, in particular various measures of firm risk, and find them to be unrelated with ownership structure and capital structure at the bottom level and in the pyramid. Second, different types of owners might opt for different regimes for the use of pyramids and pyramidal debt. We test that our findings do not depend on the type of owner (family, individual, company, or financial). We distinguish between family firms with individual owners (as a proxy for founders) and several family members (proxy for later generation) to make sure that we take account of any possible firm life cycle effect on the use of pyramids. Since our regressions are robust to conditioning on the type of owner, we do not report any of these specifications in the tables. Third, we address the possible endogeneity of ownership structure and the use of pyramids. If they are endogenous choices, then they should adjust over time according to changes in underlying firm conditions. Exploiting the panel character of our data, we find that there is little change in the identity of the owner, ownership structure or in the use of pyramids, even though the detailed organization of pyramidal structures changes more frequently. Our regressions use ownership observations as lagged variables, and as an additional safeguard, we run our regressions with three-year instead of one-year lags. We find the result to be robust to this change in specification. Fourth, we address concerns about a possible endogenous relation between Tobin's Q and dividend policy using Heckman tests. The results provide assurance this is not an important concern.

The paper is organized as follows. Section 1 reviews the relevant literature on pyramids. Section 2 presents the theoretical arguments. Section 3 describes the study's design and data. Section 4 presents our results. Section 5 including potential additional explanations and robustness tests. Section 6 concludes.

1. Related Literature on Pyramids

Pyramids are a significant organizational form worldwide. According to La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999), 26% of the listed firms worldwide are constituted by pyramids and we argue that the proportion is probably higher due to the omission of privately held, unobservable holding companies.³ Despite their importance, pyramids are neither widely studied nor well understood; only selected aspects of their purpose and effects have been investigated.

Our paper is directly linked to prior work on dividends and the relationship between dominant shareholders and minority shareholders that includes the use of pyramids. La Porta et al. (2000) were one of the first to articulate the relevant implications of dominant and minority ownership on dividend payouts, Expropriation Hypothesis and Substitution Hypothesis, and to present large cross-country evidence in favor of the Expropriation Hypothesis. Faccio et al. (2001) find evidence in favor of substitution. Neither study considers the role of debt and its implications for dividend payouts. Faccio et al.'s (2001) findings for Europe indicate that affiliation to business groups increases dividend rates. Their first of four either/or criteria that define “group affiliation,” is whether the company is controlled by a pyramid. Effectively, their variable “group affiliation” is correlated with pyramids and it is plausible that our study supplies a partial explanation for their finding.⁴

³ There is probably a substantial undercount because the fraction of listed companies classified as pyramid-controlled by La Porta et al., (2000) and in other studies such as Faccio and Lang (2002) normally only include companies for which at least one of the holding companies in the pyramid is a publicly listed entity. By contrast, we classify all companies with holding companies as pyramids, even if all holding structures are private.

⁴ Faccio et al. (2001) only consider publicly traded firms when defining group affiliations and pyramids. Our sample consists of pyramids with both private and public holding companies which substantially increases the proportion of pyramids in our sample. Faccio et al. (2001) observe a positive relation between “group affiliation” and dividends and while their finding is consistent with the Substitution Hypothesis, they cannot explain its source. They do not observe leverage in pyramids and therefore cannot measure the full control-enhancing impact of the pyramidal structures in their sample.

The discussion over expropriation and substitution effects in general, and hence our paper, is closely linked to studies relating firm valuation to pyramidal ownership and the discrepancy between voting and cash flow rights. These studies present broad evidence showing a negative relationship between valuation and the control wedge which is generally viewed as supporting expropriation or tunneling (even though important methodological problems remain, see Adams and Ferreira, 2008). The negative valuation effect is documented by Claessens et al. (2002) for East Asia and by Lins (2003) for a multi-regional sample of emerging markets. Bennedsen and Nielsen (2006) find similar evidence for Continental Europe. While these studies do not specifically consider pyramids, pyramiding is likely to be the primary reason for the divergence of cash flow rights from control rights in these samples, Morck et al. (2005). A few papers link firm valuation more specifically to pyramidal ownership; in particular, Claessens et al. (2002), Volpin (2002) and Cronqvist and Nilsson (2003) provide evidence that firms with pyramidal ownership have lower Tobin's Q than other firms. Holmen and Hogfeldt (2005) study agency costs associated with pyramids in Sweden when the holding company as well as the companies it controls are publicly listed. They suggest that this undervaluation increases in the control wedge. These papers do not consider pyramidal debt or payout policy in their sample nor their valuation effects, variables that we find are important determinants in our sample.⁵

There is a literature focusing on the use of pyramids within business groups.⁶ Almeida and Wolfenzon (2006) recently made important strides by proposing the only formal theory on the purpose of pyramids. They suggest that pyramids are used to create

⁵ A more distant literature has examined the relationship between valuation and firm membership in business groups, without taking the group's ownership structure into account (e.g., Khanna and Palepu, 2000).

⁶ For more extended surveys, see Morck et al. (2005) and Khanna and Yafeh (2007).

new businesses from retained earnings of existing companies in the presence of imperfect capital markets, thereby taking minority investors in existing companies hostage and expropriating them in the interest of capital accumulation. Along similar lines, Bertrand, Mehta and Mullainathan (2002) document the importance of pyramids in India and their wide-spread use for tunneling or the expropriation of resources from current minority owners. Additional evidence documenting tunneling in the context of Korean chaebols is provided by Baek, Kang and Lee (2007) who find that intra-group equity issues are priced to transfer wealth to controlling shareholders, and by Bae, Kang and Kim (2002) who argue that intra-chaebol acquisitions transfer wealth from firms in which the family has low cash flow rights (typically the acquirer) to those in which the family has higher cash flow rights. None of these papers investigate debt or dividend policy in their analysis.

Related to research on tunneling in business groups, there is a literature examining the relationship between pyramidal ownership and the growth of business groups and related variables of some interest for our investigation. Almeida, Park, Subrahmanyam and Wolfenzon (2008) use data from Korean *chaebols* and investigate the role of pyramids in the financing of business groups. Consistent with the predictions of Almeida and Wolfenzon (2006), Almeida et al. (2008) provide evidence that affiliated firms owned through pyramids (those in the bottom layer of the group) have lower profitability and are more capital intensive than firms controlled without pyramids. Addressing concerns about the conventional “weakest link” measure, they introduce a “critical control threshold” to measure control rights of which our measure is a special case. There is also some evidence that affiliated firms owned through pyramids are smaller and younger than firms at the top of the group (those that own shares in other

firms). For example, Claessens, Fan and Lang (2002) find that firms with the highest separation of voting rights from ownership (i.e., those most likely to be owned through pyramids) are younger than those with less separation. Pyramidal firms also tend to be larger than unaffiliated firms and appear to be associated with larger capital investments. Attig, Fischer, and Gadhoom (2004) find evidence consistent with this implication using Canadian data. None of these papers link firm characteristics within business groups to the capital structure in pyramids or to dividend decisions.

Finally, there are a few papers that consider explicitly the capital structure in pyramidal firms, and they focus entirely on the internal capital market within business groups. Bianco and Nicodano (2006) study debt within business groups in Italy; however, their emphasis is on the internal capital allocation problem from the perspective of the external lender, taking into account that bankruptcy risk is a function of the conglomerate structure of business groups. Luciano and Nicodano (2008) present a model that links pyramidal debt to the optimal distribution of default risk within a business group, showing that debt held in affiliates provides diversification benefits. Neither paper investigates payout policy or the role of debt in facilitating the span of control exercised by the controlling shareholder. In fact, pyramidal debt is absent from recent lists of control-enhancing mechanisms that create a disproportionality between voting and cash flow rights (Adams and Ferreira, 2008; Shearman and Sterling, 2007).

2. Dividend payouts and control wedge: Theoretical considerations and hypotheses

The starting point for our theoretical explanation is that dividends limit insider expropriation because they remove wealth from the control of managers and dominant shareholders, a view pioneered by the free cash flow hypothesis of Jensen (1986). A substantial body of theory work argues that owners choose a higher level of expropriation

if the control wedge increases, e.g., Burkart and Panunzi (2006), and empirical studies of performance provide supportive evidence (see our literature review). Thus, with pyramids, theory suggests that, for a given level of voting rights, a higher control wedge provides larger incentives for the controlling shareholder to engage in expropriation or costly rent extraction. For dividends, a controlling shareholder with a control wedge who pays dividends gets only a fraction of the cash benefit compared to a controlling shareholder without a control wedge (the latter has a larger cash flow stake), but loses the same amount in control benefits. Therefore, there should be a *negative* relationship between dividends and the equity control wedge, for a given block size:

H1: The control wedge has a negative effect on dividends (Expropriation Hypothesis).

The alternative view can be traced to the notion that dividend payouts are favorably received by stock markets. According to the free cash flow hypothesis, resources paid out are resources not diverted. Also, dividends are sticky and thus, imply a long-term commitment to relatively stable payouts. This idea is the basis for the numerous dividend signaling models (e.g., Bhattacharya, 1979), the other dominant strand of non-tax dividend models.

Based on this common idea and the empirical observation that dominant owners pay dividends, La Porta et al. (2000) and Faccio et al. (2001) formulate an alternative view for a payout policy adopted by dominant shareholders, the Substitution Hypothesis. This view holds that from the large shareholder's perspective, the positive stock market value effect dominates the potential gains from expropriation. Dominant owners can and do commit to a stable dividend level and have to commit to higher dividends in order to offset the market doubts about expropriation risk. The larger the control wedge, the more

skeptical the stock market concerning the role and the incentives of large owners, and the more important the dividend payout:

H2: The control wedge has a positive effect on dividends (Substitution Hypothesis).

The Expropriation and the Substitution Hypotheses both consider and agree on the two factors that form the basis for the block holder's dividend decision. The large shareholder benefits from higher dividend payouts because dividends generate a higher stock market value (value effect). On the other hand, a dominant owner dislikes dividends because dividends reduce her discretionary control over company resources and the option to appropriate them (control effect). The difference between the two hypotheses is a disagreement about which of these effects dominates.

The Substitution Hypothesis, however, has not been subject to a formal theoretical analysis. Its theoretical underpinnings are challenging for the following reason. It is not obvious that a pyramidal owner wants to commit to generous dividend payouts, even if this commitment could generate strong positive value effects. According to the standard argument in the corporate governance literature, only the level of control, i.e. her voting rights, will determine her control benefits and hence the control effect. On the other hand, the larger the control wedge for a given level of voting rights, the smaller the consequences of the stock market reaction for the controlling owner's wealth: if a given level of control is exercised with a relatively small economic stake in the company, the controlling owner has a reduced exposure to the value effect of the dividend policy. According to this argument, the value effect fades relative to the control effect as the control wedge increases. A theoretical foundation for the Substitution Hypothesis in the context of pyramids needs to justify the opposite, i.e. that the value effect becomes relatively more important compared with the control effect. It is not clear how this part of the argument holds.

We suggest an alternative mechanism that explains why a control wedge may lead to higher dividend payouts. This hypothesis explains why the benefits of a dividend payout can be larger, for a given level of control, if the owner exercises dominance with a control wedge. This benefit does not stem, however, from valuation effects. Rather it arises if the ownership stake of the controlling owner is leveraged, because the owner directly benefits from an increased dividend payout as a source of funding to service her debt. Our alternative hypothesis, therefore, leads to a more nuanced prediction: it does not imply that a control wedge per se leads to a higher dividend payout, only a *leveraged* control wedge will.

Leveraged ownership creates a distance between voting rights and the ultimate cash flow benefits of the controlling owner, i.e. a control wedge. Just as blockholders can use minority equity in holding companies to engineer a significant distance between voting rights and cash flow right, they can also leverage their equity holding to engineer a similar effect. Both debt and equity provide the opportunity for the controlling blockholder to reduce her investment in a controlling equity stake, as well as the residual cash flow rights that she derives from it. However, the use of debt instead of equity in a pyramid leads to an important difference; debt financing in holding companies imposes explicit constraints on the controlling shareholder who, via payouts from the bottom company or cash injections in the holdings, must assure the solvency of the holdings.⁷ Otherwise, bankruptcy occurs which breaks the control chain and deprives the owner of future control benefits. We postulate, therefore, that in a leveraged holding company, the controlling shareholder effectively committed to a dividend stream sufficient to service the debt in the holding. This generates our alternative hypothesis for dividend payments, servicing the debt in the

⁷ Our focus is the capital structure of the pyramidal structure. We discuss the relationship between the capital structure in the pyramid and that in the bottom company in Section 5.

additional layers in the pyramid that allows the blockholder to leverage the ownership-control ratio even further:

H3: The equity wedge has a negative effect on dividends, but the debt wedge has a positive effect on dividends (Debt Service Hypothesis).

From this argument, we derive a number of hypotheses on the value effects of payout policy and the control wedge. First, the literature generally agrees that, starting from very low dividend payouts, an increase in dividends should have a positive value effect. The free cash flow theory and the signaling theory, the two most influential dividend theories, agree on this prediction. Both the Substitution Hypothesis and the Expropriation Hypothesis make the same prediction, because both are ultimately grounded in the free cash flow hypothesis. Based on this consensus, if a company pays out larger dividends, the value impact from the point of view of minority shareholders should be positive:

H4: Higher dividend payouts have a positive effect on firm value (Free Cash Flow/Signaling Hypothesis).

While corporate governance theories generally conclude that companies pay smaller dividends than the optimal level, corporate finance theory does not predict that dividend increases create value at *all* payout levels. Mainstream capital structure models emphasize the value of internal financing, based on asymmetric information (pecking order) and other frictions like transaction costs, and highlight the financial distress cost of companies that deplete their cash reserves and their capacity to raise financing (debt overhang). If a company persistently pays out its entire cash flow or more, then clearly there will be external financing costs or debt overhang costs, and the benefits emphasized by the signaling and free cash flow theories will be negligible. Therefore, when combining the corporate governance and the capital structure arguments, it is useful to consider an internal

optimum for dividend payouts. The dominant view expressed in Hypothesis 4 is that the typical incentives for large blockholders are to keep dividends below the internal optimum.

In the context of our analysis, it is therefore useful to introduce a distinction between voluntary payouts and debt-constrained payouts. Voluntary payouts are those that are at the full discretion of managers or, in blockowner-controlled firms, the controlling owner. Debt-constrained payouts are those that are explained by debt service obligations, as argued in our Debt Service Hypothesis. According to the dominant view, the stock market reaction to the first type of dividend decision is positive because payout ratios are below the value optimum:

H5: The larger the equity control wedge, the larger the positive effect of dividend payouts on firm value.

The same expectation is not true if dividend payouts are debt-induced, even if we assume a valuation reaction to dividend policy. The prediction must be more nuanced. It depends whether the dividends induced by the debt service are smaller or larger than the efficient payout level, in terms of firm value. Both cases may occur. While the dividend policy that maximizes total welfare is hard to determine, one can postulate that financially constrained dominant owners would be most likely to adopt a payout policy that is too high. Effectively, by paying out dividends for the purpose of serving the dominant shareholder's financial obligations but in excess of what is optimal from the viewpoint of the bottom company's financial structure, the dividend payout may become a (highly dissipative) form of tunneling, akin to the discussion in Bertrand, Mehta and Mullainathan (2002). Thus:

H6: Dividend payouts generate a negative value effect if dividend payouts are debt-constrained and stretched beyond the efficient payout level.

We suggest that the efficient or optimal dividend payout level is determined according to the standard arguments from capital structure theory, trading off signaling and commitment advantages of dividends against aspects of internal financing and financial flexibility that favor retentions.

3. Design Issues and Methodology

3.1 Pyramids in France

France is an ideal laboratory to investigate the role of pyramids in the relationship between large and small shareholders. France is a developed market, with the largest percentage of foreign stock ownership among the large European economies, and a high degree of ownership concentration in listed firms. For all practical purposes, dual class shares are not allowed. Double voting rights, a French particularity, are constrained, see Section 5 for robustness results for double voting rights. Thus, in France, the use of pyramids is the only way to reliably engineer a control wedge. Pyramids in France are also tax neutral. The tax neutrality of pyramids explains why pyramidal holding companies can conveniently be used for a leveraged financing of a controlling ownership stake. A major blockholder can fully deduct the corporate income taxes that the bottom company paid from the tax liability of the holding company on dividends received from the bottom company. As a result, there is no real cost to establishing elaborate pyramidal structures in France, where pyramids are widespread and deeply embedded. Further, French regulations, which by and large are respected, require all companies, public and private, to file their *unconsolidated* financial statements on an annual basis. Thus, the financial structure and payout policy of privately-owned as well as publicly listed companies including holding companies are accessible. The Appendix provides an example, Fimalac SA, the owner of the credit rating agency Fitch IBCA, where we

describe Fimalac's ownership structure and relevant financial structure and payout policies within the pyramidal chain.

As illustrated with Fimalac SA, French regulations require all companies, public and private, to register their list of important shareholders and shareholdings. The disclosure of important changes in shareholdings of listed firms is strictly enforced. Per French corporate laws, the following key thresholds give rise to discontinuous changes in control rights: 1) 33%: This level of control grants veto rights. It also triggers the mandatory bid rule, i.e. any owner passing through the 33% threshold is required to launch a full and unrestricted takeover offer; 2) 40%: Control is presumed if one shareholder has at least 40% of voting rights, directly or indirectly, and is the largest shareholder (according to article 355-1 of French securities law per Bloch and Kremp, 2001); 3) 50%: This constitutes majority voting rights (or legal control) and triggers notification to the French authorities; 4) 67%: Reverse of the 33% rule, by blocking any veto rights by other shareholders. This is also the highest conditional takeover offer allowed under French law since the law stipulates that 67% is absolute control and no bidder should be allowed to prevent a minority of less than 33% from tendering their shares (restricted offers are not allowed in France). As the Fimalac SA example illustrates, all these factors make France well-suited for our purposes.

3.2 Data and Methodology

Our starting point is the set of all publicly listed companies on Euronext Paris as of January 31, 2003. Our initial sample includes firms from all three tiers of the Paris market: 393 listed firms on the Premier Marché (market), 324 listed firms on the Second Marché, and 152 listed on the Nouveau Marché. We then impose one filtering criterion, which is inclusion in the WorldScope and Datastream databases over the period 1996-2005. The

final sample consisting of 355 firms (i.e. 206 Premier, 138 Second and 11 Nouveau Marché firms). We refer to these publicly listed companies as the bottom company. Next, we collect the complete ownership information for 1997, 1999, 2001 and 2003 for all companies, public and private. This information is available from the database Dafsaliens which also documents validation dates. Starting from the bottom company, we use Dafsaliens to trace the ownership of the owners of the bottom company and continue this process until we have traced the entire ownership structure to the ultimate owners. We trace ownership across all ownership classes, individual/family, public company, unlisted private company and state.

From the Diane database (Diane is the French component of the Amadeus database provided by Bureau van Dijk), we collect the unconsolidated financial statements for the private unlisted companies and for publicly listed companies in the ownership chain for 1996 to 2004. The *unconsolidated* financial data provided by Diane eliminates the effect of group debt and focuses the analysis on the capital structure of the firm itself. We refer to these companies as owning companies.⁸ The richness of the Dafsaliens and Diane information offers an important advantage over annual report-based data and company handbooks used in most previous works such as La Porta et al. (1999) and Faccio and Lang (2002), which cover only ownership information of public companies. The ownership structures are stable over time, see Section 5 for robustness results. For this reason we also use the ownership structures information collected for a specific year in the subsequent year. With our ownership data in 1997, 1999, 2001 and 2003 we measure ownership

⁸ For the sample of 355 bottom companies, we use their consolidated financial statement information, WorldScope and Datastream. If there are holdings below for any of the 355 companies, the net financial position of the holdings and the bottom company is reflected in the bottom company's consolidated financial information.

structures in 1997-2004. In our payout and valuation regressions, we use the ownership and control variables in year t to explain payout and valuation variables in year $t+1$.

In accordance with the oft-cited papers of La Porta et al. (1999), Claessens, Djankov, Lang (2000), Faccio and Lang (2002) and others, we require that a shareholder possess a substantial level of control (i.e. voting rights) in order to qualify as an ultimate owner. The typical threshold used in the literature, called the *inclusion threshold*, is 20%. Control rights are inherently discontinuous and as referenced earlier, France is no exception. To capture the discontinuous character of control rights, and using concepts developed in Almeida, Park, Subrahmanyam and Wolfenzon (2008) and Chappelle and Szafarz (2005), we introduce a second threshold that indicates the level of control above which the shareholder is said to assume absolute control over the bottom company. We call this threshold the *conversion threshold* and fix its value at 50%. Adopting this majority rule, we transform effective control rights (i.e. the sum of direct and indirect voting rights in a pyramid) of greater than 50% into full control of 100%. The other stakes are then allocated zero control. We combine a 20% inclusion threshold and 50% conversion threshold in our baseline analysis and perform robustness analyses for 33% and 40% inclusion thresholds. Our inclusion threshold is consistent with the literature and allows comparisons with prior findings; whereas, the conversion threshold reflects appropriate conversion of legal control over the bottom company.

Based on these assumptions, we analyze pyramids using standard procedures. More precisely, our procedure for the analysis of pyramids consists of three main steps. First, we identify all shareholders or entities with direct ownership in excess of 5%. We then determine whether they are entities directly or indirectly controlled by other shareholders. This process is iterated until no more directly controlling shareholders can

be found. The number of iterations needed to reach the final shareholder(s) corresponds to the number of layers of a control chain. Similarly, we use a consistent and conventional procedure to resolve cross-holdings.⁹ In the second step, we determine the level of cash flow rights and control rights of all identified ultimate owners. We obtain the integrated ownership of each ultimate owner in the bottom company by multiplying the stakes within each particular control chain and using the conversion threshold (50%) where applicable. In the case of multiple control chains, i.e. if a single ultimate owner controls the bottom company through more than one control chain, we sum up the individual stakes of the ultimate owner. In the third step, we apply the inclusion threshold in order to leave out the small shareholders who do not meet the specified level of control.

4. Results

Our main objective is to investigate the Expropriation and the Substitution Hypotheses using our detailed data on pyramidal structures in France. We then ask whether the Debt Service Hypothesis and its nuanced value predictions can help to understand and reconcile the conflicting evidence of earlier cross-country studies.

Section 4.1 and Table 1 present the summary statistics for the full sample of firms. For the full sample, Section 4.2 and Table 2 focus on the firm's dividend payout policy in light of its ownership structure and the valuation implications of the dividend payout policy and ownership structure. For pyramidal firms, Section 4.3 and Table 3 present the

⁹ Following accepted procedures, we check whether a particular stake occurs twice and stop tracing. Otherwise, the programmed routine would have an infinite loop when checking cross-holdings. Details are available from the authors upon request.

summary statistics for the bottom companies of the pyramids with particular emphasis on dividend policy and leverage. Table 4 presents the determinants of the dividend payout policy and the valuation implications of the dividend policy and leverage for the bottom companies. Section 4.4 focuses on how dividends pass through the pyramidal chain. Table 5 considers the dividends passed through the chain of control and their relationship to the debt financing in the pyramidal structures. Finally, for each entity in a pyramid, Table 6 investigates the dividends received for each entity in relationship to the debt service of that entity.

4.1 Summary Statistics

Table 1 describes the ownership structure and firm characteristics of the 355 French companies, yielding 2597 observations in our 1997-2004 window. We find that 85.6% of listed companies have a blockholder who satisfies the inclusion threshold of 20%, and only 14.4% of the firms are widely-held. Moreover, in 55.3% of our sample controlling shareholders use pyramids to control the listed company. Note that the frequency of pyramid controlled firms is about double the frequency found in La Porta et al. (1999) and Faccio and Lang (2002). The reason for this dramatic increase in the frequency of pyramidal structures is the inclusion of private holding companies in our analysis. By contrast, all earlier studies on pyramids in France only classify firms as pyramidal if at least one of the holding companies along the controlling owner's control chain is a publicly listed entity.¹⁰ We find that only 20.1% of pyramidal structures contain a listed vehicle in the control chain (not reported in tables). While perhaps an inevitable restriction for cross-country studies, restricting the pyramid definition to only structures with publicly listed

¹⁰ Besides La Porta et al. (1999) and Faccio and Lang (2002), this includes Ginglinger and Hamon (2008).

vehicles of control leads to a substantial undercount of the use of pyramids in at least the case of France.

Table 1 also classifies the controlling ultimate owners by type (individual/family, firm, and state). 47.1% of firms are controlled by either a family or an individual, roughly in line with earlier studies. Firms comprise 30.2% of ultimate owners followed by state ownership of 3.6%. Again, 14.4% of the firms do not have an ultimate owner with a stake equal to or greater than 20%.

The table next provides an overview of key financial characteristics with definitions for the companies in our sample, both in the aggregate as well as broken down according to control structure. We measure dividends relative to cash flow, net earnings and market value. We follow common practice and set payout ratios to unity when dividends are paid but cash flow or earnings are negative or less than the dividend (e.g. Megginson and Von Eije, 2008). Our measure for market valuations is Tobin's Q, defined as the book value of total assets minus book value of equity plus market value of equity, over book value of total assets. Leverage is defined as total debt obligations, scaled by book value of total assets. Sales growth is the two-year growth rate of sales.

Measured in terms of total assets, widely-held firms are substantially larger than firms with controlling owners, and they have a higher Tobin's Q and a lower sales growth rate than pyramidal firms. Widely-held firms have valuations and dividend measures comparable to the full sample means. Relative to the full sample, pyramidal companies generally pay higher dividends, but appear to have a lower valuation and grow faster. Relative to pyramidal controlled firms, block-owner controlled firms have lower dividend payouts, higher dividend yields and higher valuation. The frequency of loss firms is comparable across the subsamples. We also tabulate an industry breakdown. A wide mix of

industries is represented in the full sample as well as the subsamples of block owner-controlled and pyramidal firms.

4.2 Determinants of Dividend Payout and Firm Valuation for Full Sample

For the full sample, Table 2 presents regression results that analyze the impact of financial characteristics and ownership structure on dividend policy and firm valuation. All regressions include industry and year fixed effects and report Newey-West based robust t -values. We measure explanatory variables in year t and explained variables in year $t+1$.

In Panel A, we consider determinants of payout policy. The dependent variables are the three conventional measures used for dividend payout, dividend/cash flow, dividend/earnings, and dividend/market capitalization (dividend yield). Dividends increase in firm size and decrease with leverage. Sales growth does not have a significant influence. Companies in loss years tend to cut back on dividends. The dividend payout is also influenced by industry, with services having a lower payout and financials having a higher payout (industry effects not reported in the table).

The results for ownership structure are mixed when compared to widely-held firms. For the dividend/earnings ratio, block owner-controlled firms have lower payouts, regression (2). Pyramidal firms have a higher dividend yield, regression (3); however, as we show in Panel B this reflects a mechanical relationship based on lower market value for pyramidal controlled firms. The surprising result is that ownership structure does not appear to matter for dividend payout measured by cash flows. These results differ from the French findings of Faccio et al. (2001); based on their group affiliation criteria, only the cash flow payout ratio (measured relative to the global industrial average) was significant and its coefficient was negative. Given our hypotheses, the implications of the Expropriation Hypothesis, lower dividends, could be offset by the implications of the Debt

Service Hypothesis, higher dividends. The Substitution Hypothesis generates an analogous prediction but the basis for the prediction is the dominant shareholder's preference for value over control. Faccio et al.'s results could be explained by the limited sample size, 250 observations, and the cash flow based payout ratio measured relative to the global industrial average. At this stage of the analysis, we cannot distinguish between the three hypotheses, Substitution, Expropriation and Debt Service.

In Panel B, we consider the determinants of firm valuation (Tobin's Q) using the dividend/cash flow payout ratio. Size has a negative impact on firm valuation and there is also a weak negative impact for sales growth. We find a significant negative coefficient for pyramidal controlled companies. This finding is consistent with theories emphasizing the discretionary power of controlling owners to the detriment of minority shareholders (e.g., Shleifer and Vishny, 1986, Bolton and von Thadden, 1998, Burkart, Gromb, and Panunzi, 1997). Further, this lends support to the notion that these conflicts are reinforced by the use of pyramidal structures. Confirming many earlier studies on payout policy and consistent with H4, our free cash flow hypothesis, in regression (2) we find a positive effect for dividend payouts on firm value. However, as regression (3) shows, the valuation effect of dividends is fully attributed to dividend payouts by block owner-controlled companies who do not use pyramids. There is no comparable effect for pyramidal firms. The dividend payout itself becomes insignificant once these interaction terms are included, but the coefficient for block owner-controlled firms becomes strongly and significantly negative if they do not pay dividends. These results are again consistent with our free cash flow hypothesis, H4, which predicts a positive coefficient for dividend payouts. Regardless of organizational form, a controlling owner enjoys considerable discretion in choosing the dividend policy. Since dividends are voluntary, they have a positive effect on firm value.

On the other hand, these findings are consistent with the following interpretation from the perspective of the Debt Service Hypothesis: dividend decisions are constrained by the debt service obligations embedded in the holding structure. In this case, the valuation effect is fully captured by the fact that the controlling owner uses a pyramid and the payment of dividends has no incremental impact.

Thus, our results show that the dividend policy and valuation effects of pyramidal firms differ from the widely-held and block owner-controlled firms. Our findings suggest that the behavior of pyramidal firms could be explained by the Debt Service Hypothesis, where dividend payouts are driven by debt service obligations in the levered pyramids. We continue our investigation by focusing on pyramidal firms.

4.3 Analysis of Pyramidal Controlled Firms

In this section, we focus on pyramidal firms, bottom firms with a controlling blockholder who exceeds the 20% ownership threshold and uses pyramidal structures in the control chain. In Table 3, we present summary statistics for pyramidal firms. Although we have information in Tables 1 and 2 about 1435 firm-years of pyramid-owned firms, we continue our analysis with a sample of 1253 firm-years, a sample with sufficient information to calculate equity and debt wedges for the pyramidal structure. To be included in the refined sample, we require (1) at least 50% of the entities in the pyramidal structure are traceable in Diane and (2) the wedge variables are not outliers.¹¹ For the refined sample, 19.2% of entities on average have missing data and the median entity has no missing data. It is interesting to note that on average only 8% of the entities are exchange-listed firms, which underscores the importance of including owning private firms in our analysis.

¹¹ In particular, we impose a maximum debt wedge of 80. We run robustness analysis with alternative maximum debt wedges, e.g., 90, 70 and 50. The results do not materially change (results are available upon request from the authors).

In Table 3, we present summary statistics for pyramidal controlled firms, starting with an expansion of the financial characteristics shown in Table 1 broken down by the average, 25th percentile, median, 75th percentile and standard deviation. Table 3 shows that the controlling owner holds on average 40.391% of the voting rights in the bottom company (median: 34.170%). If we use the more demanding inclusion threshold of 33% (40%) for the largest blockholder, rather than the 20% threshold that is standard in the literature, the vast majority of these firms are still classified as pyramidal controlled firms rather than widely-held firms, more precisely 83.5% (73.3%). Control chains contain 2.555 layers on average with a 25th percentile and median of “2”, and a 75th percentile of “3.”

The equity wedge with a mean of 1.840 [25th:1.085, median:1.563, and 75th:1.996] measures the control-enhancing effect of pyramids as follows: considering only equity stakes in the pyramidal control chain, controlling owners own 1.840 times more voting rights on average than they hold cash flow rights. The debt wedge is our proposed measure to aggregate the effect of leverage throughout the pyramidal control chain. In determining the debt wedge we assume that there is zero debt in an entity in the pyramid that is not included in the Diane data; thereby presenting conservative estimates of the debt wedge. The mean debt wedge has a value of 4.149 [25th:0.449, median:1.059, and 75th:3.021]. The debt wedge says that for every one percent of cash flow rights to which the controlling owner is exposed, the use of debt in the pyramidal structure enhances the voting rights by 4.149 on average. Considering the effective control wedge (equity wedge plus debt wedge), pyramidal controlled firms in our sample have on average $4.149 + 1.840 = 5.989$ times more voting rights than cash flow rights. On average 69.3% of the effective control wedge is attributed to the use of leverage whereas only 30.7% is attributed to the participation of minority shareholders in the holding companies along the control chain. As the distribution

shows, the magnitude of the debt wedge motivates our conclusion that focusing on minority equity alone in the analysis of pyramidal control chains, as in all previous studies on pyramids, substantially underestimates the extent to which pyramids are used as a control-enhancing mechanism. The use of leverage in pyramids is highly important for France.

Table 4, Panel A presents the regression analysis for the dividend policy for the pyramidal controlled firms. We consider in particular the use of minority equity and debt as the two alternative financial tools to enhance the control wedge in pyramids. We document the opposing effects of the equity wedge and the debt wedge on the dividend policy of the bottom company. This is the key finding of our paper. The coefficients for the equity wedge are negative and significant when analyzed separately and together with the debt wedge. On the other hand, the coefficients for the debt wedge are positive and significant when analyzed separately and together with the equity wedge. The economic magnitudes of these effects are also significant. If the equity (debt) wedge changes from the 25th to the 75th percentile, the dividends change with -0.02 (+0.006), which is -16% (+5%) of the median dividend payout. Taken together, the positive sign for the debt wedge coefficient and the negative sign for the equity wedge coefficient are consistent with the Debt Service Hypothesis. These signed results are inconsistent with the other dividend hypotheses: the Expropriation Hypothesis predicts a negative sign for the equity wedge but has no direct prediction for the debt wedge. The Substitution Hypothesis predicts a positive sign for the equity wedge but has no direct prediction for the debt wedge.

To complete the discussion, the regressions confirm that dividend policy depends on other variables. Similarly to the results in Table 2, dividend payout decreases in the leverage of the bottom company and with losses in the bottom company. Though not

shown, the regressions in the two tables load the same for industry categories. Overall, our results corroborate the Debt Service Hypothesis and suggest that leverage is an important determinant of bottom companies' dividend payouts.

Table 4, Panel B investigates the valuation (Tobin's Q) implications of the pyramidal controlled firm, its dividend payout and the debt and equity wedges in the pyramid. Supporting our Free Cash Flow Hypothesis, the regression results show that the coefficient for dividend payout is always positive and significant. Inconsistent with the Expropriation Hypothesis, the coefficient for the equity wedge is always insignificant. The debt wedge has a significant and negative effect on valuation, regressions (3) and (4), but regression (5) shows that it is the interaction of the dividend payout with the debt wedge that drives this initial result. The positive valuation effects of dividend payouts are offset by the dividend payouts associated with the debt wedge. A financially constrained ultimate owner could be forced to payout higher dividends to service the debt. The effect is statistically significant at the 1% level. Also, the economic effect measured as the difference between the 25th and 75th percentiles for the dividend payout and debt wedge times the regression coefficient is about 1.1% of the pyramidal controlled firm's value. At a minimum a certain proportion of the dividend payout associated with the debt wedge is a form of tunneling, as discussed in our hypothesis section. This result supports H6, a negative value effect if debt-constrained dividend payouts induce dividend payouts beyond the efficient payout level. The results also support H5, after controlling for the equity wedge by interacting the dividend payout with the debt wedge (Table 4, panel B, model 5), dividend payouts have a positive effect on firm value.

We verify that result do not depend on our specific measure of pyramidal leverage, the debt wedge. As an alternative metric, we calculate the *equivalent bottom company*

leverage, which we define as the leverage in the bottom company that, if only the bottom company was indebted and all holdings were all-equity financed, would expose the cash flow rights of the largest ultimate owner to the same level of leverage as the combined debt in the pyramid.¹² We then calculate the *net equivalent leverage* as equivalent bottom company leverage minus bottom company leverage. In case information about leverage of an entity is missing we assume zero leverage. This metric is clearly distinct from the debt wedge as it does not use equity stakes. We find that the average equivalent bottom company leverage in our sample is 0.315 and average net equivalent leverage is 0.082. The correlation with the debt wedge is, respectively, 0.471 and 0.387. Next we replicate all regressions in Table 4, replacing the debt wedge by our alternative measures. The results (not reported) demonstrate that our key conclusions are robust to this alternative metric. In all regressions the sign of the coefficients remains unaltered. In particular, in Panel A all results remain significant at the 1% level or less. In Panel B some results become insignificant; however, the key result – the interaction between dividends and equivalent leverage in model 5 – is still significant at the 5% level.

4.4 Anatomy of Dividends Passed Through the Pyramidal Chain

We expect pyramidal ownership and leverage structures to influence not only the dividend policy of bottom companies but also dividend policy in the pyramidal control chain. Continuing our assessment of the Debt Service Hypothesis, we next address how dividends and debt policies interact in the other entities along a pyramidal control chain. We do this by looking directly into the structure of holding vehicles, in particular debt and dividends. We consider in particular two payout metrics; (1) the proportion of these dividends that are

¹² Formally, if l_0 is the leverage ratio of the bottom company, l_1 that of the first pyramidal layer, l_2 of the second layer etc., then we define the equivalent bottom company leverage as: $l_0 + (1 - l_0) * l_1 + (1 - l_0) * (1 - l_1) * l_2$, etc.

actually received by the ultimate owner, the pass-through decision, and (2) the amount of the dividends received by each entity in the pyramidal chain in relationship to the debt service obligations of that entity. Our hypothesis for both is dividends in pyramidal structures are paid to service debt.

We determine the ratio of the dividends ultimately received by the controlling shareholder at the top of the pyramid to the bottom company's dividend payout available to the controlling shareholder. We call this ratio the *received-payout ratio*. The Debt Service Hypothesis implies that the received-payout ratio should be negatively associated with leverage in the holding companies. The Debt Service Hypothesis entails no direct predictions on the complexity of layers since a substantial debt control wedge can be created by aggressively leveraging up in a very short control chain.

For these tests, we need the dividend payout for the bottom company and each entity in the pyramidal chain. For both public and private companies, we again use the unconsolidated financial statements from Diane. While the financial statements do not directly disclose the dividend payments made by an entity, French regulations and the structure of the owners' equity section of the financial statements allow us to back out the dividend payments.¹³ Due to data availability from Diane, we use the entities in the pyramidal structures for 1999, 2001 and 2003.

¹³ Net income is used to either pay dividends or is allocated among the specific owners' equity accounts. The English version of Diane's Complete Account format details the net income and allocations. We calculate dividends paid in year t from the owners' equity accounts by subtracting the change in allocations between year t and year $t-1$ from the net income in year t . This is the dividends paid if there are no other substantive changes. To insure the veracity of the dividend number, we did the following: to obtain a measure of potential substantive changes in capitalizations for year t , as a separate calculation, we compared capitalization for year t to year $t-1$. The only other event we need to consider is the potential impact on reserves that are set up or altered directly via the balance sheet (rather than the income statement). To insure the veracity of the formula and verification checks, we compared the dividend payout per the formula to the dividend payout per the annual report for a sample of public companies. Since the private companies typically have simpler capital structures, we are confident in our number. Details are available from the authors upon request.

For each ultimate owner, we calculate the received-payout ratio. The number of layers is the maximum number of layers from the bottom company to ultimate owner. The average leverage is the average of the total debt/total assets ratios for the entities in the pyramid. We include observations with a dividend payout by the bottom company; a received-payout ratio equal or less than 2; an average leverage ratio equal or less than 1; and data availability for 50% or more of the entities in the chain of control.¹⁴ For the missing entities in the chain of control, we set leverage equal to zero and the dividend received-payout ratio equal to 1, which biases against our tests.

Table 5, Panel A presents summary statistics for how dividends paid out by the bottom company are used and passed through pyramidal chains. The summary statistics for the received-payout ratio show an average of 0.655 [25th percentile: 0.299, median: 0.827 and 75th percentile: 1.00]. The average leverage is .141 [25th percentile: 0.000, median: 0.052 and 75th percentile: 0.236]. For the number of layers, the average is 2.441 [25th percentile and median: 2.00 and 75th percentile: 3.00]. The data show a wide range in received-payout ratios and leverage. Using the Diane database, we have sufficient balance sheet information for 72.9% of the entities along the pyramidal control structures. To provide an additional perspective on the implications of the missing entity data, we provide summary statistics for pyramidal chains with complete data. There are 128 observations with an average received-payout ratio of 0.471 [25th percentile: 0.114, median: 0.465 and 75th percentile of 0.755]. Average leverage is 0.211 [25th percentile: 0.049, median: 0.161 and 75th percentile: 0.310]. For the number of layers the average is 2.156 [25th, median and

¹⁴ The received-payout ratio may reach values greater than one, e.g. because the assets of entities in the pyramid are comprised of the shareholding and additional assets, leading to dividend outflows exceeding the inflow. Leverage ratios exceed one when book value of equity is negative. Our results are not sensitive to excluding these observations.

75th percentile is 2]. Using averages, the received-payout ratio is lower for the pyramidal chains with complete data. The leverage is also higher.

Table 5, Panel B presents the regression results. We find that dividends received by the ultimate owner, received-payout ratio, is negatively associated with leverage in the pyramid. The coefficient for leverage is negative and significant. The coefficient is also negative and significant for the number of layers in the pyramid. Both results are clearly consistent with the Debt Service Hypothesis.

We next turn to our second payout metric for pyramidal entities, the dividend received by each entity. At each level of a pyramidal control chain, a dividend and leverage decision is made. Our hypothesis is that dividends are set to enable the entities higher up to meet their service interest obligations. In other words, the dividend received by an owning company should be sufficient to: (1) pay interest and (2) pass dividends to the next level if needed. We expect a positive sign for funds needed to service debt. If the next layer is the ultimate owner, we expect a negative sign. According to the Debt Service Hypothesis, if the next layer is the ultimate owner, the remaining control chain is shorter (consisting only of one level) and thus, on average less dividends are needed to meet debt service obligations.

Table 6, Panel A presents the summary statistics for the determinants of the dividends received by entities in the pyramidal structures for 1999, 2001 and 2003. For each entity, we calculate the dividend received denominated in € millions (dividends paid in the lower layer times the ownership stake in the lower layer). The average (median) for the dividends received by the entity is 28.752 (1.038). Interest expense is the interest payments for the entity in € millions, average (median) of 33.240 (0.907). We next determine the importance of the entity's investment in the lower layer as a fraction of its

total assets. Specifically, we calculate the ratio of the lower layer's equity times the entity's ownership stake, divided by the entity's total assets and call it the *investment ratio*. Total assets are the book value of the entity's total assets. We include observations with an investment ratio greater than zero and less than four. The variable "ultimate owner" is an indicator variable with a value of one if the next layer is the ultimate owner, and zero otherwise. Ownership stake is the shareholder stake in the lower layer. Cash is the amount of cash and securities for the entity in € millions. We control for cash because an entity can accumulate cash for other investments and/or due to differences in dividend preferences. For each variable, Panel A provides the average, 25th percentile, median, 75th percentile and standard deviation.

Table 6, Panel B presents the regression results. The findings suggest that dividends received by the entity are increasing in the interest expense of the entity, lending support to our main hypothesis, the Debt Service Hypothesis, which implies a positive sign for funds needed to service debt. Crucially, we normalize interest expense by the investment ratio, the importance of the entity's investment in the lower layer. Moreover, the dividends received increase in the importance of the lower layer to the entity, both relative to the entity's assets, investment ratio, and in absolute terms, the ownership stake itself. By regression standards, with adjusted R^2 between 43.3% and 46.1%, we are able to explain a substantial portion of the dividends received by the individual entities in the pyramid. The results for dividends received and its clear dependence on debt service obligations in every holding vehicle along the control chain provides strong additional support for the Debt Service Hypothesis. The results are insignificant for the second variable, the next layer above being the ultimate owner. This is consistent with the idea of two countervailing

effects as discussed above: the debt service effect that leads to a negative sign, and the control wedge effect that would predict a positive sign.

5. Additional Explanations and Robustness Issues

5.1. Additional Explanations: Investment and Dividend Preferences

We provide evidence that an important motivation for dividend payouts in pyramids is the debt service obligations along the control chain. There are two additional explanations how the level of dividends received and the dividends passed-through in pyramidal entities are determined. The first corresponds to a prominent explanation for the rationale behind the use of pyramids. In this theory, dividends received in a layer and not passed through to the ultimate owner can be used to fund investments in other entrepreneurial activities. Almeida and Wolfenzon's (2006) theory postulates that pyramids are used to accumulate funds across conglomerate business groups in the presence of imperfect external capital markets. Almeida and Wolfenzon emphasize that the ultimate owner values cash more than growth opportunities in the bottom firm. The payoff and financing motives indirectly motivate the rationale for dividend payouts: dividends flow up the pyramid to where they are valued more than in the bottom company. Our argument uses the same rationale except that debt service is the driver.

According to the second explanation, dividends are not passed through because the dividend preferences of the ultimate owner differ from those of other shareholders in the bottom company. Given the tax neutrality of dividend payouts, a characteristic of pyramidal structures is their ability to accommodate divergent dividend preferences when the dominant shareholder prefers smaller dividend payouts than other shareholders. The bottom company pays out dividends that correspond to the needs of owners with high dividend preferences, including owners that only appear as minority shareholders in the

layers above the bottom company. A controlling owner with lower dividend preferences retains part or all of her dividend allocation in intermediate pyramid layers. Such retention of bottom-company payouts in intermediate layers can be used for deferred payouts, investments, or as a cash cushion should equity injections into the bottom company become desirable. While this second motivation is not unrelated to the first one, there is a difference in emphasis and timing. The investment motivation predicts immediate investment of the dividends with very little eventually paid out; dividend preferences predict initial retention of dividends with on average a larger portion of them paid out.

A raw but insightful observation concerning the investment hypothesis is the following. Following Almeida and Wolfenzon (2006), we expect holding companies to accumulate cash received from the bottom company to use for investment purposes in other operating companies besides the listed bottom company. A consequence of this behavior is that the holding company encompasses diverse interests in a variety of operating companies. However, for a given entity in the pyramidal chain, on average the investment in the single entity one layer below comprises 77% of the total assets of these pyramidal entities, which is part of the control chain we study. Thus, while pyramidal entities in our sample do have additional investments in operating assets, over three quarters of the entities' asset base is motivated by holding considerations, not diversification. In our sample, investment motives while important appear secondary to debt service obligations.

Crucial evidence emerges when we analyze, looking at individual pyramidal entities as the unit of observation, the relationship between dividends received and the various alternative uses of those dividends. In general, dividends received by a holding entity have one of four uses: (1) to pay debt service; (2) to pay dividends to the next entity above; (3) to make investments; and (4) to save by increasing cash or paying down debt. Performing

correlation analyses with these four variables, we find that the correlation between dividends received and interest rate obligations (i.e., normalized for the size of the stake in the entity below in the entity's total assets) is very high, at 0.65 (0.91 if we exclude outliers). By contrast, there is no correlation between dividends received and any subsequent increase in reserves or investments: the correlation between dividends received in year t and the increase in cash or the increase in total assets between year t and year $t+1$ is smaller than 1%.¹⁵

A similar pattern emerges from our regression analysis. One test assessing the importance of the Debt Service Hypothesis relative to the additional two motivations is contained in Table 6, Panel B. The coefficient for the interest expense normalized by the investment ratio is positive and significant in all the regressions. Further, the coefficient is always substantially larger than one. A coefficient greater than one implies that for every dollar needed to cover the entity's interest expense (in proportion to the investment ratio) more than one dollar in dividends is received. The free dividends received can be saved, passed through, or used for investments elsewhere. In other words, a coefficient greater than one indicates the interest expense is not the only determinant of payout decisions in pyramid. The fact that the coefficient is less than two is consistent with the notion that the debt service motive can account for more than half of the dividends received by each entity. Again, while our analysis does not eliminate the possibility that the two additional explanations matter for the dividend decisions within pyramidal structures, our findings suggest that the Debt Service Hypothesis plays an important role.

Finally, we provide evidence on the relative importance of the investment and dividend preference motivations by looking at the change in cash in reaction to dividend payouts.

¹⁵ Details of the analysis are available from the authors. A similar approach is used when presenting our results throughout Section 5.

Dividend preferences predict free dividends not needed for debt service are initially retained in pyramidal layers. Under the investment story, free dividends are invested elsewhere, in which case the investment constitutes the true motive for the retention. Table 6 presents evidence on dividend preferences. We consider the impact of an entity's cash holdings on dividends received. In Table 6, Equation (4), we find no significant effect for cash holdings, as we would expect for the dividend preference motive. For entities receiving a lot of dividends there is no measurable impact on the level of cash. This finding suggests that dividend preferences play a weak role in explaining the use of free dividends.

5.2. Double Voting Rights

Apart from pyramids, double voting rights are the only alternative control-enhancing mechanism that is widely used in France.¹⁶ According to French law, the company's charter can convey a double voting right to each share if the share is held for more than τ years, where τ must be between 2 and 4 years. Double voting rights are distinct from dual-class shares since they are a premium for loyalty that is non-exclusive (*every* share acquires the right after satisfying the holding requirement) and is lost when the share is sold. About two thirds of listed French companies adopt double voting rights, and they are most popular among smaller and family companies (Ginglinger and Hamon, 2008).

We assess the robustness of our results to double voting rights. We trace the actual voting rights (including double voting rights) of the dominant owner in our 2003 sample from annual reports and disclosure statements obtained from the AMF, the French stock market regulator. We find only 1.4% of the companies in our overall sample initially classified as widely held change status to blockowner-controlled when we include double

¹⁶ Two other control-enhancing devices are in principle available, but rarely used: non-voting shares are used by less than 2% of blockowner-controlled firms; voting caps are used by only about 1% (Ginglinger and Hamon, 2008).

voting rights (with the largest owner now controlling more than 20% of the votes). By contrast, for 58.9% of all firms in our sample, we find that double voting rights make no difference to the control rights allocation – either because the controlling owner already holds more than 50% of the votes and hence is attributed 100% of control rights with our methodology, or because the firm remains widely held after accounting for double voting rights. We find double voting rights change the control rights of the dominant owner for 73.9% of the companies in the remaining sample.¹⁷ But this amounts to only 30.4% of the overall sample [$.739 \times (1 - .589)$]. Moreover, for the companies where we actually observe a change in control rights, double voting rights increase the mean (median) voting rights of the dominant owner only by 17% (16%). Thus, double voting rights increase the equity wedge on average by only about 5% [$30.4\% \times 17\%$]. This control-enhancing effect is small relative to the role played by pyramidal structures, as measured by our original equity wedge and debt wedge.

We calculate modified measures for the equity wedge and the debt wedge taking into account double voting rights. We then run our main regressions of Table 2 and Table 4 with these modified measures. Unsurprisingly, given the small impact of double voting rights on the modified control wedge measures, our results are unchanged by this modification. We conclude that double voting rights play a minor role in determining the relationship between the control wedge and dividend policy.

5.3. Debt and Operating Risk

For a given control wedge, the use of debt in pyramids versus minority equity generates a different risk profile for the controlling owner's residual cash flow. Pyramidal debt increases the owner's risk. In principle, for a given risk profile for the ultimate owner's

¹⁷ We can identify the actual voting rights for 82.2% of the companies in the remaining sample.

residual cash flow, it does not matter whether the debt is located in the bottom company or any of the pyramidal layers.¹⁸ Debt securities at different layers within a single control chain appear to be perfect substitutes.

In unreported tests, we explore the relationship between bottom company debt and pyramidal debt. In principle, they could be substitutes (if owners can achieve the same leverage exposure by borrowing more in the pyramid, and less in the bottom company) or complements (if owners with a highly leveraged equity stake add debt in several entities along the control chain). We find that there is no correlation between bottom company debt and pyramidal debt, even when controlling for other variables that typically explain leverage, such as size, age, tangible asset or past profitability.

Our alternative measure of pyramidal leverage, the equivalent net leverage, is particularly well-suited to verify the relation between bottom company debt and pyramidal debt. Again, we find no correlation, negative or positive, between our measure of equivalent net leverage and the leverage ratio of the bottom company. Also, when we use equivalent net leverage instead of the debt wedge, we find no correlation with any of our various measures of operational risk.

Next, we explore the relationship between different variables measuring the cash flow risk of the bottom company and pyramidal debt. We use the 5-year average of ROA variance, the ratio of intangible assets to total assets, R&D expenditure, and the log of assets since size correlates with lower business risk. In unreported tests, we analyze the correlation between these measures of risk, the debt wedge, and the bottom company leverage. We find that almost all correlations are low, generally below 5%, and not significant. The only exception is a weak negative correlation between R&D expenditure

¹⁸ Though Luciano and Nicodano (2008) for example provide a stylized model where such is not always the case.

and bottom company leverage. However, the correlation between R&D expenditure and the debt wedge is not significant. We also replace the debt wedge by our alternative measure of pyramidal debt, the equivalent net leverage, but find no difference. Based on these tests, we conclude that differences in operating risk profiles appear not to be an important driver of the decision to use pyramidal debt.

5.4 Tests for Endogeneity

Several of our extensive tests addressing endogeneity have already been discussed elsewhere, notably in the introduction and in Section 5.3. In this section, we investigate the robustness of our results to two endogeneity concerns. In the OLS regression tests in Tables 2 and 4 that explain dividend payouts and Tobin's Q, we assume the estimations are not biased due to the endogeneity of explanatory variables. The first concern is endogeneity of the firm's dividend policy in the value regressions (Tobin's Q). The second is ownership structure (Demsetz and Lehn, 1985; Agrawal and Knoeber, 1996), which may be endogenously determined with dividend policy and Tobin's Q.

In order to measure the impact of endogeneity of dividend policy in the Tobin's Q regressions we performed Heckman (1979) tests on the regressions in Table 2 and 4, Panel B. We use the regression specification (1) in Table 2 Panel A to obtain an estimate of the Inverse Mills Ratio of the dependent variable, which we introduce as the dependent variable in Panel B of Table 2. We find that the regression coefficient for the Inverse Mills Ratio is insignificant and the other results are unaffected in all specifications. We apply a similar procedure to the analysis of Table 4, where we use specification (4) from Panel A in the first stage to obtain the Inverse Mills Ratio estimate. Again, the coefficient is insignificant and the other results are unaltered.

Endogeneity of ownership structures requires that ownership is dynamic and adjusts when conditions change. We have measures for ownership with two-year intervals. Thus, we can investigate for three two-year changes (1997 to 1999, 1999 to 2001, and 2001 to 2003) whether the classification (widely held, block-non pyramid, block-pyramid) has changed and, for pyramids what the changes in the equity wedge are. In our sample [$3 \times 350 = 1,050$ pairs], we find 960 pairs where we can investigate a change over two years. In 817 cases (85.10%) we find no change in the classification of ownership structure/use of pyramids. In this set of 960, 477 pairs are pyramids in both years (besides 340 other stable pairs, such as block-controlled firms without pyramids). In the set of 477 stable pairs of pyramids, the average absolute change in the wedge is 0.339, which is relatively small in comparison with an average wedge of 1.840. The stability of the ownership structure implies that endogeneity of this variable is not very likely to induce biased estimates. Although all regressions in Tables 2 and 4 use one-year lagged ownership measures, this lag may not be sufficient to account for reverse causality. As an additional robustness check we repeat all regressions in these tables with three-year lagged ownership measures. Obviously, we lose some power in our tests because we cannot use the first two years of our panel. The results (not reported) in Table 2 and Table 4 are robust to this three-year lag.¹⁹ In a few instances the results become insignificant; however, the signs of the coefficients remain unaltered.

6. Conclusions

The natural explanation for dividend payout policy in the presence of large shareholders and control-enhancing mechanisms is the Expropriation Hypothesis, dominant owners pay smaller dividends if their cash flow rights are small relative to their control rights.

¹⁹ Table 2, Panel A, models 1 and 2 have 1961 observations, model 3 has 1874 observations and Panel B has 1943 observations. Table 4, Panel A has 941 and Panel B has 927 observations.

However, earlier evidence shows that companies organized in business groups and pyramids pay higher dividends, suggesting a substitution effect that makes dominant owners prefer higher dividend payouts because of the positive valuation effect. Though it is unclear how such a substitution effect can work since control-enhancing mechanisms also reduce the controlling owner's exposure to the valuation effects.

We suggest an alternative explanation for these puzzling observations based on debt placed in pyramidal holding companies. Debt in pyramidal holdings allows the acquisition and maintenance of a controlling ownership stake based on leverage; debt constitutes a control-enhancing mechanism for the dominant owner. We show that debt in holding companies in France has an impact on the overall discrepancy between control rights and cash flow rights that rivals the use of minority equity in pyramidal holdings. Our alternative view, the Debt Service Hypothesis, leads to a nuanced prediction. It surmises that as the equity wedge becomes wider, the dividend payout decreases. However, as the debt wedge increases, dividend payouts should increase because dividends are needed to service the debt in the pyramidal entities. These predictions are borne out in our empirical investigation. We find that the use of debt in holdings commits the controlling block owner to larger dividend payouts, whereas a non-leveraged control wedge has the opposite effect.

We analyze the actual dividend payouts to controlling owners along the pyramidal chain, in contrast to earlier pyramid studies that only considered potential payouts. We find that only a fraction of the cash made available to controlling owners is actually paid out to them. Our valuation results suggest that bottom company dividends not only support debt service obligations in the pyramid, but also have an adverse valuation effect. This is consistent with our hypothesis that debt-induced dividend payouts may exceed the efficient payout level for the bottom company. We also provide evidence on the presence of two

additional motivations for dividend payouts in the literature, alternative investments and dividend preferences.

The ultimate shareholder's decision to use leverage in the holding company instead of minority equity in order to enhance his control is not neutral. The residual cash flow left for the dominant owner has a different risk profile. Dividends received from the bottom company in addition to being shared with minority equityholders must also service debt in the pyramidal structure. This decision alters the risk profile of the dominant owner's cash flows and her incentives for risk-taking. It alters the options of the ultimate shareholder when reacting to financial distress and raising equity in distress-like situations. There is also the question of the relationship between the debt level of the bottom company and that of holding companies. These questions we leave to future research.

References

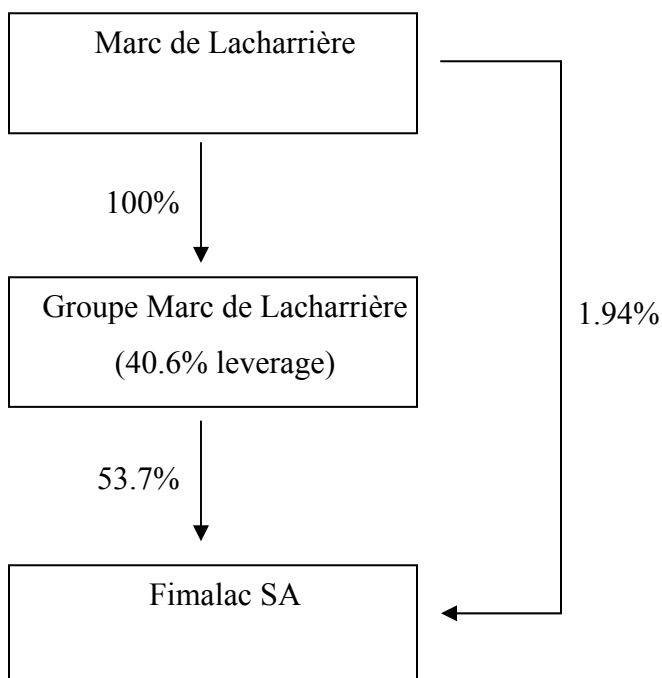
- Adams, R. and Ferreira, D., 2008, "One share, one vote: The empirical evidence," *Review of Finance* (12), 51-91
- Agrawal, A. and Knoeber, C.R. (1996) "Firm performance and mechanisms to control agency problems between managers and shareholders," *Journal of Financial and Quantitative Analysis* (31), 377 – 397.
- Almeida, H. and D. Wolfenzon, 2006, "A theory of pyramidal ownership and family business groups," *Journal of Finance* (61), 2637-2680.
- Almeida, H., S. Park, M. Subramaniam and D. Wolfenzon, 2008, "Beyond cash flow and voting rights: Valuation and performance of firms in complex ownership structures," Working paper, UIUC and NYU Stern.
- Attig, N., K. Fischer, and Y. Gadhoun, 2004, "On the determinants of pyramidal ownership: Evidence on expropriation of minority interests," Working paper, Laval University, <http://ssrn.com/abstract=434201>
- Bae, K., J. Kang, and J. Kim, 2002, "Tunneling or value added? Evidence from mergers by Korean business groups," *Journal of Finance* (5), 2695-2740.
- Baek, J.-S., J. Kang, and I. Lee, 2006, "Business groups and tunneling: Evidence from private securities offerings by Korean chaebols," *Journal of Finance* (61) 2415 - 2449.
- Bennedsen, M. and K. Nielsen, 2007, "The principle of proportional ownership, investor protection and firm value in Western Europe," working paper, Copenhagen Business School and CEBR.
- Bertrand, M., P. Mehta and S. Mullainathan, 2002, "Ferretting out tunnelling: an application to Indian business groups," *Quarterly Journal of Economics* (117), 121-148.
- Bhattacharya, S., 1997, "Imperfect information, dividend policy, and 'the bird in the hand fallacy,'" *Bell Journal of Economics* (10), 259-270.
- Bianco, M. and G. Nicodano, 2006, "Pyramidal groups and debt," *European Economic Review* (50), 937-61.
- Bloch, L. and E. Kremp, 2001, "Ownership and voting power in France," *The Control of Corporate Europe*, editors F. Barca and M. Becht, Oxford Press, UK.
- Bolton, P. and E. Von Thadden, 1998, "Blocks, liquidity and corporate control," *Journal of Finance* (53), 1-25.
- Burkart, M. and F. Panunzi, 2006, "Agency conflicts, ownership concentration, and legal shareholder protection," *Journal of Financial Intermediation* (15), 1-31.

- Burkart, M., Gromb, D. and F. Panunzi, 1997, "Large shareholders, monitoring, and the value of the firm," *Quarterly Journal of Economics* (112), 693-728.
- Chappelle, A. and A. Szafarz, 2005, "Controlling firms through majority rule," *Physica* (355), 509-529.
- Claessens, S. S. Djankow and L. Lang, 2000, "The separation of ownership and control in East Asian corporations." *Journal of Financial Economics* (58), 81-112.
- Claessens, S., S. Djankov, J. Fan, and L. Lang, 2002, "Disentangling the incentive and entrenchment effects of large shareholdings", *Journal of Finance* (57), 2741-2771.
- Claessens, Stijn, Joseph P.H. Fan, and Larry H.P. Lang, 2002, "The benefits of group affiliation: Evidence from East Asia," Working paper, University of Amsterdam.
- Corstjens, M., U. Peyer and L. van der Heyden, 2006, "Performance of family firms: evidence from the US and European firms and investors," working paper, INSEAD.
- Cronqvist, H. and Nilsson, M., 2003, "Agency costs of controlling minority shareholders," *Journal of Financial and Quantitative Analysis* (38), 695-719.
- Demsetz, H. and Lehn, K., 1985, "The structure of corporate ownership: Causes and consequences," *Journal of Political Economy*, 93, 1155 – 1177.
- Faccio, M. and L. Lang, 2002, "The ultimate ownership of Western European corporations," *Journal of Financial Economics* (65), 365-395.
- Faccio, M., L. Lang and L. Young, 2001, "Dividends and expropriation," *American Economic Review* (91), 54-78.
- Fan, J., T.J. Wong and T. Zhang, 2005, "The emergence of corporate pyramids in China," Center for Institutions and Governance working paper, Chinese University of Hong Kong.
- Ginglinger, E. and J. Hamon, 2008, "Ownership, control and market liquidity," Working paper, University Paris-Dauphine, <http://ssrn.com/abstract=1071624>
- Heckman, J., 1979, Sample selection bias as a specification error, *Econometrica*, 47, 153–561.
- Holmen, M. and P. Hogfeldt, 2005, "Pyramidal discounts: tunnelling or agency costs?" working paper, Stockholm School of Economics, <http://ssrn.com/abstract=667743>.
- Jensen, M., 1986, "Agency costs of free cash flows, corporate finance and takeovers," *American Economic Review* (76), 323-329.
- Khanna, T. and Y. Yafeh, 2007, "Business groups in emerging markets: Paragons or parasites?" *Journal of Economic Literature* (45), 331-72.

- La Porta, R., F. Lopez-de-Silanes and A. Shleifer, 1999, "Corporate ownership around the world," *Journal of Finance* (54), 471-517.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, R.W. Vishny, 2000, "Agency problems and dividend policies around the world," *Journal of Finance* (55), 1-33.
- Lins, K. V., 2003, "Equity ownership and firm value in emerging markets," *Journal of Financial and Quantitative Analysis* (38), 159-184.
- Luciano, E. and G. Nicodano, 2008, "Ownership links, leverage and credit risk", Working paper, [http:// http:// ssrn.com/ abstract=1107806](http://ssrn.com/abstract=1107806).
- Meggison, W. and H. von Eije, 2008, "Dividends and share repurchases in the European Union," *Journal of Financial Economics* (91), 347-374.
- Morck, R., D. Wolfenzon, and B. Yeung, 2005, "Corporate governance, economic entrenchment and growth," *Journal of Economic Literature* (43), 657-722.
- Shearman and Sterling, 2007, "Proportionality between ownership and control in EU listed companies: comparative legal study, External study commissioned by the European Commission," Brussels, May 2007, http://www.ecgi.org/osov/final_report.php.
- Volpin, P., 2002, "Governance with poor investor protection: Evidence from top executive turnover in Italy," *Journal of Financial Economics* (64), 61-90.

Appendix: Fimalac SA

In this example we describe the ownership structure of Fimalac SA, the owner of the credit ratings agency Fitch IBCA, which is drawn from our sample for the year 2003.



The holding vehicle, Groupe Marc de Lacharrière, has a 53.7% interest in Fimalac. The ultimate owner, Marc de Lacharrière, has a 100% interest in Groupe Marc de Lacharrière. Fimalac's other shareholders include direct ownership of 1.94% by Marc de Lacharrière, two funds of Fidelity with ownership stakes of 2.9% and 2.34%, and widely held shares. Groupe Marc de Lacharrière has debt in its capital structure with a leverage ratio of 40.6%. Since Marc de Lacharrière has complete control of Fimalac, we calculate the equity wedge (control rights/cash flow rights) as $1.0/(1.00 \times 0.537) = 1.86$. Adjusting for the debt in Groupe Marc de Lacharrière, the effective control wedge (control rights/(debt-adjusted cash flow rights)) is $1.0/[1.00 \times (0.537 \times (1.0 - 0.406))] = 3.15$. The debt wedge is $3.15 - 1.86 = 1.29$. Fimalac paid out 50.7% of its cash flows as dividends. With a 53.7% stake, Groupe Marc de Lacharrière is entitled to €17.7 million in dividends. The holding company has other assets and the 53.7% stake in the market value of Fimalac represents 72.6% of its book value. The interest payment of the holding company is €6.2 million. The holding vehicle pays a dividend of €1.73 million to Marc de Lacharrière. Without the pyramidal layer, Marc de Lacharrière would have received €17.7 million through this channel, but now only receives €1.73 million, which implies a dividend received-payout ratio = $1.73/17.7 = 0.098$.

Table 1: Summary statistics: full sample

	Full sample	Widely held companies	Block owned-no pyramid companies	Block owned-pyramid companies
<i>Ownership structure:</i>				
Widely held	0.144			
Block-owned, no pyramid	0.303			
Block-owned and pyramid	0.553			
<i>Largest owner:</i>				
- Individual/family	0.471	0.000	0.470	0.692
- Firm	0.302	0.000	0.407	0.323
- State	0.036	0.000	0.029	0.048
- Unclassified	0.049	0.000	0.094	0.037
- Widely held, no largest owner	0.144	1.000	0.000	0.000
<i>Financial characteristics:</i>				
Dividends/cash flow	0.193	0.182	0.177	0.205
	[0.116]	[0.141]	[0.104]	[0.122]
	(0.250)	(0.243)	(0.240)	(0.257)
Dividends/earnings	0.361	0.377	0.323	0.377
	[0.267]	[0.285]	[0.229]	[0.284]
	(0.349)	(0.366)	(0.340)	(0.348)
Dividend yield	0.025	0.020	0.023	0.027
	[0.018]	[0.012]	[0.016]	[0.020]
	(0.058)	(0.025)	(0.079)	(0.050)
Tobin's Q	1.599	1.630	1.962	1.392
	[1.153]	[1.222]	[1.168]	[1.122]
	(4.635)	(2.859)	(8.071)	(0.984)
Total assets	3010	8568	2689	1733
	[206]	[636]	[139]	[201]
	(9800)	(19036)	(9569)	(4404)
Leverage	0.239	0.252	0.228	0.242
	[0.218]	[0.223]	[0.196]	[0.223]
	(0.223)	(0.167)	(0.217)	(0.255)
Sales growth	0.040	0.047	0.021	0.048
	[0.037]	[0.047]	[0.035]	[0.036]
	(0.301)	(0.289)	(0.309)	(0.300)
Loss	0.091	0.104	0.102	0.082
<i>Industry:</i>				
- Primary products and construction	0.046	0.080	0.080	0.019
- Manufacturing, chemicals	0.077	0.067	0.067	0.084
- Manufacturing, equipment	0.151	0.115	0.216	0.125
- Manufacturing, other	0.219	0.152	0.217	0.237
- Trade	0.158	0.203	0.130	0.162
- Transport, comm. and energy	0.054	0.053	0.066	0.033
- Services	0.139	0.216	0.136	0.121
- Financial	0.153	0.115	0.116	0.184
<i>Observations</i>	2597	375	787	1435

This table presents the summary statistics of the full sample and of three subsamples (widely-held firms, block-owned firms without pyramidal structures and block-owned firms with pyramidal structures) in 1997-2004. Presented are the averages and for continuous variables the median (in brackets) and standard deviations (in parentheses). Dividends/cash flow is defined as cash dividend divided by net income plus depreciation. Dividend/earnings is cash dividend over net income. For both dividend measures the ratio is set to one when cash flows or earnings are negative and when the ratio exceeds one. Dividend yield is cash dividend over market value of equity. Tobin's Q is defined as the book value of total assets minus book value of equity plus market value of equity, divided by book value of total assets. Total assets is book value

of total assets. Leverage is total debt over total assets. Sales growth is the two-year growth rate of sales. The dummy variable loss equals one when net income is negative and zero otherwise. The dummy variables for largest owner equals one if the largest controlling owner is respectively, an individual or family, another firm or the state. Eight dummy variables describe the industry of the firm's main activities. The number of observations are included in the bottom row (for dividend yield and Tobin's Q the number of observations is 2528 in the full sample, 370 for widely held firms, 765 for block held firms and 1393 for the pyramids). The dividend variables and Tobin's Q are measured at $t+1$.

Table 2: Determinants of dividend payout and firm value for the full sample

Panel A: Determinants of dividend payout and yield			
	(1)	(2)	(3)
	Dividend/ cash flow	Dividend/ earnings	Dividend Yield
Ln(Assets)	0.007** (-2.32)	0.018*** (5.24)	0.0001 (0.02)
Leverage	-0.170*** (-2.95)	-0.112** (-2.35)	-0.001** (-2.25)
Sales growth	-0.008 (-0.41)	0.007 (0.32)	0.003 (0.47)
Loss	-0.070*** (-3.34)	-0.200*** (8.43)	-0.020*** (-8.47)
Block owned-no pyramid	-0.006 (-0.43)	-0.041** (-1.97)	0.002 (0.82)
Block owned-pyramid	0.009 (0.65)	-0.004 (-0.19)	0.006*** (3.14)
<i>Industry fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Observations</i>	2597	2597	2528
<i>Adjusted R²</i>	0.125	0.096	0.029

Panel B: Determinants of Tobin's Q			
	(1)	(2)	(3)
Ln(Assets)	-0.264** (-2.40)	-0.270** (-2.41)	-0.267** (-2.47)
Leverage	-0.629 (-1.65)*	-0.230 (-0.79)	-0.150 (-0.51)
Sales growth	-1.453* (-1.81)	-1.474* (-1.82)	-1.465* (-1.89)
Block owned-no pyramid	-0.064 (-0.30)	-0.074 (-0.34)	-1.381** (-2.37)
Block owner-pyramid	-0.363* (-1.89)	-0.420** (-2.12)	-0.472* (-1.83)
Dividend payout		2.360** (2.06)	-0.026 (-0.05)
Dividend payout * Block owned-no pyramid			7.325** (2.09)
Dividend payout * Block owned-Pyramid			0.594 (1.07)
<i>Industry fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Observations</i>	2528	2528	2528
<i>Adjusted R²</i>	0.047	0.062	0.089

This table presents regression results for the full sample of firms. In Panel A the explained variables are the measures for dividends. In Panel B the explained variable is Tobin's Q. All variables are defined in Table 1. The regressions include an intercept, seven industry dummies and seven year dummies (not reported). Reported are coefficients and *t*-values, with a Newey-West correction for heteroscedasticity and autocorrelation. Significance is indicated as follows: '*' is 10% significance, '**' is 5%, and '***' is 1%.

Table 3: Summary statistics - pyramidal controlled firms

	Average	25 th percentile	Median	75 th percentile	Standard deviation
Dividends/cash flow	0.196	0.000	0.118	0.235	0.253
Dividends/earnings	0.363	0.000	0.270	0.575	0.343
Dividend yield	0.026	0.004	0.019	0.034	0.050
Tobin's Q	1.396	0.967	1.123	1.451	0.973
Total assets	1619	60	184	755	4201
Leverage	0.244	0.092	0.224	0.347	0.263
Sales growth	0.043	-0.014	0.034	0.090	0.309
Loss	0.085	0.000	0.000	0.000	0.280
Direct ownership	40.391	25.677	34.170	52.536	20.544
Equity wedge	1.840	1.085	1.563	1.996	1.016
Debt wedge	4.149	0.449	1.015	3.021	9.500
Number of layers	2.555	2.000	2.000	3.000	1.034
Proportion missing entities	0.192	0.000	0.000	0.500	0.221
Proportion listed firms	0.080	0.000	0.000	0.000	0.182
Pyramid with 33% threshold	0.835	1.000	1.000	1.000	0.372
Pyramid with 40% threshold	0.733	0.000	1.000	1.000	0.442

This table describes the firms block-owned via a pyramid, and the equity and debt wedge over 1997-2004. The variable direct ownership measures the direct ownership of the largest ultimate owner. Equity wedge is the ratio of the total ultimate ownership over the direct stake of the largest controlling shareholder. Debt wedge is the ratio of the total ultimate ownership in terms of equity over the debt adjusted direct stake, minus the equity wedge. The number of layers is the number of layers in the pyramid. The proportion missing entities (listed firms) is the ratio of elements of a pyramid without leverage information (defined as publicly listed firm), scaled by the total number of layers. The variables pyramid with 33% and 40% threshold measure the proportion of firms still classified as a pyramid with other thresholds than 20%. The other variables are defined in Table 1. The sample includes observations with a proportion of missing entities of at most 0.5 and a debt wedge below 80. The number of observations is 1253; 1242 for dividend yield and Tobin's Q. The dividend variables and Q are measured at $t+1$.

Table 4: Determinants of dividend payout and firm value for pyramidal controlled firms

Panel A: Determinants of dividend payout (cash flow measure)				
	(1)	(2)	(3)	(4)
Ln(Assets)	0.002 (0.45)	0.003 (0.60)	0.0002 (0.06)	0.0003 (0.08)
Leverage	-0.141** (-2.02)	-0.141** (-2.00)	-0.143** (-2.03)	-0.142** (-2.01)
Sales growth	-0.050* (-1.66)	-0.046 (-1.53)	-0.03* (-1.76)	-0.049 (-1.62)
Loss	-0.083*** (-2.71)	-0.081*** (-2.71)	-0.087*** (-2.82)	-0.089*** (-2.88)
Equity wedge		-0.015** (-2.03)		-0.021** (-2.57)
Debt wedge			0.002* (1.92)	0.002** (2.58)
<i>Industry fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Observations</i>	<i>1253</i>	<i>1253</i>	<i>1253</i>	<i>1253</i>
<i>Adjusted R²</i>	<i>0.137</i>	<i>0.140</i>	<i>0.140</i>	<i>0.145</i>

Panel B: Determinants of Tobin's Q					
	(1)	(2)	(3)	(4)	(5)
Ln(Assets)	-0.011 (-0.85)	-0.010 (-0.74)	-0.006 (-0.42)	-0.006 (-0.41)	-0.006 (-0.45)
Leverage	-0.287 (-1.53)	-0.287 (-1.52)	-0.280 (-1.50)	-0.280 (-1.50)	-0.279 (-1.48)
Sales growth	0.98 (1.38)	0.107 (1.45)	0.112 (1.53)	0.115 (1.55)	-0.110 (1.51)
Dividend payout	0.510*** (4.54)	0.499*** (4.38)	0.521*** (4.67)	0.514*** (4.49)	0.454* (1.73)
Equity wedge		-0.032 (-1.26)		-0.018 (-0.67)	-0.041 (-1.21)
Debt wedge			-0.006*** (-4.29)	-0.005*** (-3.05)	-0.001 (-0.02)
Dividend payout * Equity wedge					0.093 (0.53)
Dividend payout * Debt wedge					-0.019*** (-2.58)
<i>Industry fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year fixed effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Observations</i>	<i>1242</i>	<i>1242</i>	<i>1242</i>	<i>1242</i>	<i>1242</i>
<i>Adjusted R²</i>	<i>0.105</i>	<i>0.105</i>	<i>0.107</i>	<i>0.107</i>	<i>0.108</i>

This table presents regression results for the subsample of firms that is owned using a pyramidal structure. Observations where more than 50% of the entities in the pyramidal structure have missing data are omitted. In Panel A the explained variable is dividend/cash flow. In Panel B the explained variable is Tobin's Q. All variables are defined in Table 1 and Table 3. The regressions include an intercept, seven industry dummies and seven year dummies (not reported). Reported are coefficients and *t*-values, with a Newey-West correction for heteroscedasticity and autocorrelation. Significance is indicated as follows: '*' is 10% significance, '**' is 5%, and '***' is 1%.

Table 5: Determinants of received-payout ratios for ultimate owners

Panel A: Descriptive statistics					
	Average	25th percentile	Median	25th percentile	Standard deviation
Received-payout ratio	0.655	0.299	0.827	1.000	0.389
Average leverage	0.141	0.000	0.052	0.236	0.186
Number of layers	2.441	2.000	2.000	3.000	0.878
Proportion missing entities	0.271	0.000	0.333	0.500	0.228

Panel B: Regression analysis			
	(1)	(2)	(3)
Intercept	0.733*** (28.25)	1.057*** (17.95)	1.095*** (18.92)
Average leverage	-0.554*** (-4.98)		-0.471*** (-4.49)
Number of layers		-0.164*** (-7.24)	-0.153*** (-6.88)
<i>Observations</i>	329	329	329
<i>Adjusted R²</i>	0.068	0.136	0.183

Panel A presents the analysis of received-payout ratios in 1999, 2001 and 2003. For each largest ultimate owner we calculate the ratio of the dividend actually received (received) and the dividend that would have been received if all dividends were passed through the chain of ownership (payout). The average leverage is the average of total debt/total assets ratios in the pyramid. The number of layers is the maximum number of layers from the bottom company to ultimate owner. The proportion missing entities is the number of entities without dividend and leverage information over the number of layers. We include observations that meet the following requirements: the bottom company pays a non-zero dividend; the proportion missing entities has a maximum of 0.5; the average leverage ratio is less than or equal to one; and the received-payout ratio is less than or equal to two. In case of missing dividend information we assume 100% payout; for missing leverage information we assume zero debt. The sample includes 329 observations. Panel B presents regression results. The explained variable is the received-payout ratio. Reported are coefficients and *t*-values, with a Newey-West correction for heteroscedasticity and autocorrelation. Significance is indicated as follows: ‘*’ is 10% significance, ‘**’ is 5%, and ‘***’ is 1%.

Table 6: Determinants of dividends received by each entity in the pyramid

Panel A: Descriptive statistics					
	Average	25 th percentile	Median	25 th percentile	Standard deviation
Dividend received	28.752	0.001	1.038	6.137	118.520
Interest expense	33.240	0.038	0.907	12.000	158.773
Investment ratio	0.772	0.216	0.640	1.035	0.754
Interest expense x Investment ratio	8.091	0.027	0.338	2.193	42.547
Total assets	2021	25	145	709	8438
Ultimate owner	0.531	0.000	1.000	1.000	0.499
Ownership stake	61.836	41.240	61.530	91.380	28.030
Cash	72.668	0.011	0.974	12.717	284.696

Panel B: Regression analysis				
	(1)	(2)	(3)	(4)
Intercept	13.911*** (3.92)	-26.125*** (-2.75)	-42.212*** (-3.45)	-51.746*** (-3.88)
Interest expense x Investment Ratio	1.833*** (22.38)	1.693*** (20.01)	1.670*** (19.62)	1.646*** (19.25)
Log(Total assets)		8.163*** (5.29)	9.924*** (5.65)	7.733*** (3.90)
Ultimate owner		0.440 (0.06)	-1.473 (-0.21)	-4.025 (-0.57)
Investment ratio			10.948** (2.09)	11.309** (2.16)
Ownership stake				0.336** (2.52)
Cash				0.014 (1.01)
<i>Observations</i>	657	657	657	657
<i>Adjusted R²</i>	0.433	0.455	0.457	0.461

Panel A presents summary statistics for dividend received and its determinants by entities in a pyramidal structure in 1999, 2001 and 2003. The dividend actually received is the dividend paid in the lower layer times the ownership stake. Interest expense is the interest payment in the entity in € million. Investment ratio is the ratio of the lower layer equity times the ownership stake, divided by the asset value of the entity. Total assets are the book value of total assets. Ultimate owner is an indicator variable with a value of one if the next layer is the ultimate owner, and zero otherwise. Ownership stake is the entity's shareholdings in the lower layer. Cash is the amount of cash and securities of the entity in € million. We include observations with an investment ratio greater than zero and less than four. Panel B presents regression results. The explained variable is the dividend received by the entity in the pyramidal structure. Reported are coefficients and *t*-values, with a Newey-West correction for heteroscedasticity and autocorrelation. Significance is indicated as follows: '*' is 10% significance, '**' is 5%, and '***' is 1%.