UNIVERSIDADE CATÓLICA PORTUGUESA

Overlapping Ownership in the Euronext 100

How Overlapping Ownership and Tunneling Impact Dividend Policy

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Católica Porto Business School
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by

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Resumo

O objetivo desta dissertação é avaliar o impacto de *overlapping ownership* e de *tunneling* em políticas de dividendos. A presença de acionistas em comum leva os gestores a considerar os lucros de outras empresas quando escolhem estratégias de negócio. Isto resulta numa diminuição da competição que, por sua vez, leva a menos investimento e a uma maior dimensão e número de pagamentos de dividendos. No entanto, quando os acionistas em comum tencionam expropriar os recursos de empresas, o pagamento de dividendos prejudica a habilidade de o fazerem.

Para responder à questão de como *overlapping ownership* e *tunneling* influenciam as políticas de dividendos, um modelo de regressão *logit* foi corrido de forma a estimar os impactos no pagamento de dividendos de *overlapping ownership*, *tunneling*, rentabilidade, oportunidades de investimento, dimensão, e esquemas de compensação. Os resultados da estimação sugerem uma ligação entre *overlapping ownership, tunneling* e pagamento de dividendos. Especificamente, os resultados mostram que *overlapping ownership* tem uma influência positiva no pagamento de dividendos, enquanto *tunneling* tem uma influência negativa.

Palavras-chave: *Overlapping Ownership*, *Tunneling*, Política de Dividendos.

Abstract

The purpose of this dissertation is to assess the impacts of overlapping ownership and tunneling on dividend policy. The presence of overlapping shareholders leads managers to consider the profits of other firms when making strategic decisions. This results in a decline in competition causing less investment and higher frequency and size of dividend payments. However, when overlapping shareholders wish to "tunnel" resources out of firms, dividends may impair their ability to do so.

To answer the question of how overlapping ownership and tunneling influence dividend policy, a logit regression model was estimated to explain dividend payments using measures of overlapping ownership, tunneling, profitability, investment opportunities, size, and compensation schemes. The estimation's results suggest a link between overlapping ownership, tunneling and dividend payments. Specifically, overlapping ownership is shown to have a positive influence on dividend payments, while tunneling is shown to have a negative influence.

Keywords: Overlapping Ownership, Tunneling, Dividend Policy.

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1.Introduction

Overlapping ownership occurs when a firm holds rights in another firm (cross ownership) or when a shareholder of a firm also holds rights in another firm (common ownership). It has proliferated in recent years as asset management companies strive to diversify their holdings across many industries (Schmalz, 2018). For instance, of United Airlines' top 100 shareholders, Schmalz (2018) showed that, in 2016, only 5 did not engage in common ownership on the other top-4 airlines.

The increased frequency of overlapping shareholders among competing firms changes companies' objectives in a significant way. The overlapping ownership hypothesis posits that as shareholders value the profits of the many companies in their portfolio, so to must the managers of said companies consider the profits of their competitors when choosing business strategies (Backus et al., 2020).[1] This phenomenon raises questions regarding competition, corporate governance, and antitrust policies.

The theoretical literature shows that the lack of competition caused by overlapping ownership leads, in particular, to weaker investment and higher dividend payouts (Gutiérrez & Philippon, 2016). It also creates incentives to outright "tunnel" resources out of firms (Bertrand et al., 2002).[2] However, in the presence of tunneling incentives, controlling shareholders wish to avoid dividend payments since these impair their ability to expropriate resources (La Porta et al., 2000).

Studies on overlapping ownership have become abundant in recent years, while tunneling is still a rather unexplored topic. As for dividend policy, while

[1] The managers do so by placing profit weights (i.e., weight a manager of a firm assigns to the profits of its competitor, according to the ownership stake its shareholders have on the competitor) on each competitor.

[2] Tunneling is the expropriation of minority shareholders' wealth enacted by controlling shareholders of a firm.

the literature is extensive, dividends are still considered a "puzzle, with pieces that just do not fit together" (Black, 1976). This dissertation intends to contribute with potential influences of dividend policy by providing, to my knowledge, the first insight on how overlapping ownership and tunneling may impact dividend policy in European markets.

The purpose of this dissertation is threefold. First, it aims to assess the degree of overlapping ownership in the Euronext 100 index, since most of the previous literature focuses only on the U.S. market. Second, it aims to provide insight on what tunneling incentives may arise due to the level of overlapping ownership in this index. And third, it aims to examine how overlapping ownership and tunneling may influence dividend policy among Euronext 100 firms.

This dissertation follows the empirical framework of Backus et al. (2020) on overlapping ownership by computing the average pairwise profit weights. Analyzing the S&P500 index, Backus et al. (2020) showed a steep increase in overlapping ownership as the profit weights grew from 0.5 in 1999 to 0.7 in 2017. In this study, the profit weights show a slight rise in overlapping ownership in the Euronext 100 since they increase from 0.09 in 2000 to 0.125 in 2020.

Regarding tunneling, the assessment of Backus et al. (2020) is replicated. In a study set in the S&P500, Backus et al. (2020) show that the percentage of profit weights above 1 grew from around 4% in 2000 to 11% in 2017. In this dissertation, the percentage of profit weights above 1 decreases from 1.05% in 2000 to 0.5% in 2020.[3]

To assess the impact on dividends, Fama & French's (2001) logit regression model is adopted. This model explains dividend payments using measures of overlapping ownership, tunneling, profitability, investment opportunities, size,

[3] A firm places a profit weight above 1 on a competitor's profits when it values those profits more highly than their own.

and compensation schemes. The estimation results indicate that, despite the relatively low levels of overlapping ownership and tunneling incentives, both seem to influence dividend policy across Euronext 100 firms.

The dissertation displays the following structure: Section 2 reviews the previous theoretical and empirical literature, Section 3 presents the theoretical model and method, Section 4 provides the empirical application, and Section 5 concludes.

2. Literature Review

This section is decomposed into three subsections. The first subsection addresses the literature on overlapping ownership, and it is subdivided in an analysis of the theoretical and empirical literature. The empirical part presents the main conclusions of this literature and takes a deeper look into two specific studies to present both sides of the overlapping ownership discussion.

The second and third subsections respectively pertain to tunneling and dividend policy, and both combine theoretical and empirical literature reviews.

2.1. Overlapping Ownership

Overlapping ownership pertains either to cross ownership or common ownership. Cross ownership occurs when a firm has financial holdings in one or more firms. Common ownership occurs when a shareholder of a firm also holds rights in one or more competing firms (Brito et al., 2019).

Reynolds & Snapp (1986) studied direct financial rights (i.e., access to a share of a firm's profits, also known as cash flow rights) through the distinction between operating profit and aggregated profit. They claimed that a firm's aggregated profit includes its operating profit as well as a share of profits of the competing firms in which it holds financial rights. Bresnahan and Salop (1986) established the difference between the aforementioned financial rights and corporate control rights (i.e., the right of an owner to vote on pricing and output decisions). However, the authors did not provide insight on how to measure control rights.

Conversely, Flath (1992) analyzed the difference between direct and indirect financial rights. This allowed the author to develop a system through which it was possible to calculate the aggregate profit of each firm in the industry as a

function of the operating profit of all competing firms in which the first firm directly or indirectly detained financial rights.

Ellerman (1991), on the other hand, studied cross ownership through the lens of external owners. If a firm engages in cross ownership, it could either have financial, corporate control, or both rights over a competing firm. Similarly, if an external owner held shares of the first firm (the one engaging in cross ownership) they would ultimately have rights over the competing firms held by the first firm, or, in other words, the external owners would be engaging in common ownership. This shift in focus from firms to external owners, and from profits to rights, laid the groundwork for future common ownership research.

2.1.1. Theoretical Literature

Studies of overlapping ownership originate from Rotemberg (1984), who postulated that mutual funds could induce a drop in competition.

Before overlapping ownership became a relevant topic, one of the most common fundamentals of economic theory was that companies executed strategies to maximize their profits (Fisher, 1930).[4] Companies followed such strategies in order to fulfill their shareholders' interests of expanding their wealth. Therefore, firm f makes one strategic decision (x_f), in order to maximize its own profits, denoted π_f, which are a function of its decision and its competitors' decisions ($\pi_f(x_f, \boldsymbol{x}_{-f})$). Hence, let Q_f denote firm f's objective function:

$$Q_f(x_f, \boldsymbol{x}_{-f}) = \pi_f$$

[4] The Fisher Separation Theorem states that companies maximize their own value, regardless of shareholder preferences. By assuming that firms are price takers, Fisher claims no shareholder is harmed if companies maximize their own value.

However, if companies operate according to their shareholders' interests and their shareholders have stakes in competing companies, then these companies' managers might take their competitors' profits into consideration when choosing strategies, in order to maximize the value of their shareholders' portfolios (Azar et al., 2018).

Since the many shareholders of a firm have different objectives, conflicts between them may arise. Such conflicts originate from the fact that a shareholder with holdings of competing firms would not want the firm to enact aggressive strategies so as to not harm their portfolio's value, while a shareholder who did not engage in overlapping ownership would rather the firm be as competitive as possible (Schmalz, 2018).

These conflicts between shareholders force managers to weigh the returns of each shareholder according to the corporate control right each one respectively holds (O'Brien & Salop, 2000). [5]

If shareholder i has a share of control rights in firm f, denoted $\gamma_{i,f}$, and a share of cash flow rights in firm g, denoted $\beta_{i,g}$, then, because of overlapping ownership, firm f's objective function changes to:

$$Q_f\ (x_f, \boldsymbol{x}_{-f}) = \sum_i \gamma_{i,f} \sum_g \beta_{i,g} \pi_g$$

where $\beta_{i,g}\pi_g$ indicates the returns of shareholder i in firm g.

The weighting method shown by O'Brien & Salop (2000), later became known as "profit weights" (Backus et al., 2020). Under the theory of profit maximization (Fisher, 1930), firms should only be concerned with the effect a specific strategy has on their own profits, implying a zero profit weight on its competitors.

[5] Control rights are weights placed by a firm on a marginal euro of each shareholder, representing the control each investor has over firm decisions. Also known as Pareto weight.

However, as shown above, in the presence of overlapping ownership, firms should also consider the effect their strategies have on the profits of their competitors, implying a profit weight above 0. A profit weight of 1 on a given competitor equals the weight a merged firm would place on an acquired firm or in the case of perfect collusion (Backus et al., 2020).

Following the above computations of the objective function derived in the presence of overlapping ownership, the profit weight, denoted $k_{f,g}$, that firm f assigns to firm g's profits is equal to:

$$k_{f,g} = \frac{\sum_i \gamma_{i,f} \beta_{i,g}}{\sum_i \gamma_{i,f} \beta_{i,f}}$$

As mentioned, firm f's manager weighs the returns of shareholder i according to the control rights he/she has over firm f ($\gamma_{i,f}$), by placing a profit weight on firm g's profits ($k_{f,g}$). An in-depth analysis of the computations behind profit weights can be found in Section 3.

Overlapping shareholders can lead managers to internalize their interests in other firms, paving the way for anticompetitive behavior (Schmalz, 2018). This can happen by taking on passive investment strategies (Antón et al., 2021) or by being active in corporate governance (Brav et al., 2018). The theory of softer competition between competing firms with overlapping shareholders is known as the overlapping ownership hypothesis (Backus et al., 2020).

A firm's incentive to lower its competitiveness can be executed through manufacturing less product units, reducing the amount of investment, raising prices (or not lowering prices as much), becoming less innovative, or not exploring new market segments (Backus et al., 2019).

These manifestations of lower competitiveness can occur despite high profit margins, causing a less dynamic economy at the expense of consumers

(Gutiérrez & Philippon, 2016). Another consequence of overlapping ownership is the tunneling of minority shareholders' wealth into another firm.

Contrasting with the aforementioned economy-damaging effects of overlapping ownership, some studies have examined positive side-effects. One example is the claim that overlapping ownership can allow companies to reduce contracting difficulties (Lindsey, 2008) and may result in longer and sturdier customer-supplier relationships (Fee et al., 2006).

Furthermore, overlapping ownership is theorized to provide enhanced welfare effects, particularly in the event of technological spillovers (López & Vives, 2019). While disagreeing with the positive effects on welfare, Brito et al. (2019) state that the quality gap between two firms may decrease because of the weaker competition created by overlapping ownership. Also, profits and consumer surplus between two firms can potentially increase with overlapping ownership if the manager of the high-quality firm assigns profit weights to the low-quality firm.

2.1.2. Empirical Literature

In a study set in the S&P500 index, Backus et al. (2020) showed how the average pairwise profit weights went from slightly above 0.2 in 1980 to nearly 0.7 in 2017.[6] As mentioned, the expected profit weights of two firms in a scenario of perfect competition is 0.

Another conclusion of their research is the fact that mergers and "break-ups" of institutional shareholders, thought to influence product markets (Azar et al., 2018), have a relatively small impact on the average profit weight, and that the impact on overlapping ownership incentives would be larger in the case of

[6] The average pairwise profit weights are the average of all profit weights that each firm would assign to each other firm.

barriers in corporate governance strategies. Finally, Backus et al. (2020) also indicate how the presence of privately or foreign held firms lessens the impacts of overlapping ownership on prices.

Also examining the S&P500, Harford et al. (2011) display an increase in overlapping ownership between 1985 and 2005. Their research states that most institutional shareholders (in the S&P500, in 2005) did not wish for corporate managers to exclusively maximize their firm's value, but instead to consider the impacts on the shareholders' portfolios.

The rise of investment instruments in diversified portfolios and the higher concentration of investment managers are among the reasons for the increased frequency of overlapping ownership (Backus et al., 2019). The presence of retail investors can lead to higher concentration of investment management funds, as their control rights become more clustered (Backus et al., 2020).

In an overview assessment of the largest U.S. airlines, banks, and supermarket chains, Schmalz (2018) found that the mutual fund families were among the companies' shareholders in all three industries.[7]

Seeing as diversification is the most common risk management strategy, most investors (both experienced and newcomers) seek to diversify their portfolios, often through the use of specific instruments such as index funds or exchange-traded funds (ETFs).

In a study of the U.S.'s domestic airline industry, Azar et al. (2018) assessed the impact of common ownership on prices, caused by the asset management industry's need for diversification. Their research found that the incentives for anticompetitive behavior implied by common ownership were ten times larger than those the Federal Trade Commission (FTC) deemed "to be likely to

7 The mutual fund families mentioned in Schmalz (2018) were BlackRock, Vanguard, State Street, Fidelity, and T. Rowe Price.

enhance market power" (Azar et al., 2018, p. 4). One major consequence was the substantial increase in the airline industry's prices.

Azar et al. (2018) resonated with policy makers when they posited that shareholder diversification, firms' prioritization of shareholders' interests, and competitive product markets were unattainable goals when sought simultaneously.

Although most studies center exclusively on the impacts of overlapping ownership in the U.S.A., matching evidence can be found in other markets. For instance, Schmalz (2018) found that in the FTSE100 index, BlackRock was the largest shareholder in a third of the companies as well as a top-5 shareholder in 89 of them.[8] BlackRock was also the largest shareholder in a third of the companies of the DAX30.[9] Corresponding evidence was also found for other mutual fund families.

One of the most common indicators used to assess the anticompetitive effects arising from overlapping ownership is the Herfindahl-Hirschman Index, or HHI (Brito et al., 2018).[10] The standard version of the HHI was used to quantify industry concentration by computing the sum of the squared market shares of each firm in that industry. A lower HHI indicated a less concentrated and more competitive market (Calkins, 1983).

The HHI was deemed a relevant indicator of anticompetitive effects under the Cournot model of competition as well as in models of ordered bargaining (Brito et. al, 2018).[11] Through the HHI, scholars were able to correlate a positive relationship between industry concentration and prices, showing that, as

[8] The Financial Times Stock Exchange 100 Index (FTSE 100) is a share index comprised of the top-100 companies with highest market capitalization listed on the London Stock Exchange.

9 The Deutscher Aktienindex (DAX30) is a blue-chip stock market index containing the 30 German companies with highest market capitalization listed on the Frankfurt Stock Exchange.

[10] The HHI was introduced in 1982 on the U.S. Justice Department to complement measures of concentration.

[11] Augustin Cournot developed the Cournot model of competition to describe an industry of homogeneous products, where the prices varied exclusively because of the quantities chosen by firms.

assumed by economic theory, higher HHI values prompt monopolistic concentration and ultimately lead to higher prices.

Some researchers developed modified versions of the HHI (MHHI) to measure the effects of a cross ownership of direct financial rights (Reynolds & Snapp, 1986), direct financial and corporate control rights (Bresnahan & Salop, 1986), and direct and indirect financial rights (Dietzenbacher et al., 2000). However, the assumption behind these modified versions of the HHI was that firms only maximized their own profit, which, as stated, may not be the case for firms engaging in overlapping ownership.

Finally, as mentioned in the theoretical literature review, O'Brien & Salop (2000) developed another modified HHI that was able to measure the effects of a common ownership of direct financial rights and direct corporate control rights. This new MHHI accounted for both the market shares of firms in the same industry and the respective profit weights placed by managers of firms on their competitors' profits.

In order to better understand the empirical methods and conclusions of the literature, the two following studies are analyzed in more depth.

In a study set solely in the U.S. banking industry, Azar et al. (2019) discovered that the lower return rates of deposit products and higher banking fees were correlated with higher concentration levels of both common and cross ownership.

The study's data, set between 2002 and 2013, was obtained from RateWatch, FDIC's Summary of Deposits, and ThomsonReuters's SEC 13F filings database. It respectively detailed branch-level data on rates and fees (used as outcome variables), branch-level data regarding deposits (used to compute each bank's market share), and data related to public banks' institutional owners (used as the weighting scheme in the generalized HHI indicator, or GHHI).

The final data consisted of 4.5 million observations of fee amounts and fee thresholds from over 3000 banks, more than 60 million observations of deposit rates obtained from over 9600 banks, annual surveys of deposits completed at the branch-level by every FDIC-insured bank, and every 13F quarterly form filled out by any institution with at least $100 million invested.

Their first analysis was cross-sectional and set in 2013. It dealt with the geographic distribution of banks according to the fees and deposit rates charged. Later, the authors used the Herfindahl-Hirschman Index (HHI) to evaluate concentration through the lens of ownership. However, this indicator is centered only on own profit maximization and assumes the bank's investors are undiversified. As previously mentioned, the HHI is the sum of the squared market shares, denoted by s, of all firms, denoted by f:

$$HHI = \sum_{f} S_f^2$$

Since many banks have asset management divisions who own stakes of other banks, the authors also compute a generalized version of the HHI (GHHI) to account for overlapping ownership. Following O'Brien and Salop (2000), the GHHI assumes that firms maximize the weighted average of their shareholders' financial interests, according to their control rights and cash flow rights.

As Azar et al. (2019, p. 15) explain: "firms internalize the externalities that come from aggressive product market behavior that they impose on competitors" according to the weight their competitors have in their largest common owners' portfolios. Proving that an investor entitled to higher cash flow rights has a bigger influence over the firm's objective function.

Furthermore, the GHHI assumes a Cournot model of competition and is shown to be proportional to markups:

$$\eta \sum_{f} s_f \frac{P - C_f'(x_f)}{P} = GHHI = \sum_{f} \sum_{g} s_f s_g \frac{\sum_i \gamma_{i,f} \beta_{i,g}}{\sum_i \gamma_{i,f} \beta_{i,f}}$$

where P and C_f' respectively indicate the price and cost of a product. This means that markets with higher GHHI should charge higher prices and that marginal costs are constant across markets.

Finally, with the purpose of finding out which indicator is more accurate in capturing price variations, the authors present the following panel regression model:

$$R_{ijbt} = \beta \,.\, Concentration\ Index_{i,t} + \theta \,.\, X_{i,t} + \xi \,.\, Q_{b,t} + v_j + \zeta_t + \varepsilon_{ijbt}$$

where the $Concentration\ Index_{i,t}$ accounts for both indicators ($HHI_{i,t}$ and $GHHI_{i,t}$). The outcome variable R_{ijbt} contains fees, fee thresholds, and deposit interest rate spreads of branch j of bank b in county i in period t. Additionally, $X_{i,t}$ is a control variable containing market specifications namely log median household income and log population. $Q_{b,t}$ measures the market cap of each bank. v_j and ζ_t respectively represent branch and year fixed effects. ε_{ijbt} is the error term.

Through this regression model as well as other robustness tests, the paper shows that a bank's ownership has an impact on prices, proving that, to some extent, banks maximize their shareholders' portfolio value.

The GHHI is also shown to be more accurate in assessing common ownership than the HHI. One reason is that the difference between both indicators, denoted GHHI delta, is negatively correlated with the product market component of the HHI. Finally, the authors address policy makers and suggest that ownership structures should be taken into consideration when assessing bank concentration.

Although Azar et al.'s papers (2018, 2019) were highly influential, some doubt remained regarding the extent of their findings. Koch et al. (2020) attempted to test the association between common ownership and lower

competition through a broader look that, unlike previous studies, assessed several industries simultaneously.

The dataset of their study was also comprised of 13F filings obtained from Thomson Reuters database. Specifically, quarterly institutional holdings' reports between 1985 (1st quarter) and 2012 (4th quarter). In addition, they also collected quarterly financial statements from the CRSP/Compustat database and limited their sample to firms with at least $1 million worth of total assets, net sales above $250 thousand, and more net sales than EBIT. The sample spread across 269 industries, sorted through the firms' NAICS code obtained from Compustat.

Their work extended five different measures of overlapping ownership: density of common ownership (ratio of number of firm-pairs in an industry with at least one common institutional owner with a 5% stake in each firm), percentage of common funds (number of institutional owners in an industry who own at least 2 companies divided by that industry's total number of institutional owners), percentage of common stocks (maximum number of stocks in an industry with at least one common institutional investor divided by that industry's total number of stocks), MHHI delta (Bresnahan & Salop, 1986), and a measure denoted by C which equals the profit weights, as per Backus et al. (2020).

Regarding industry profitability, the authors rely on two estimates: markups (computed quarterly), and price-cost margin (PCM, computed quarterly). Finally, the analysis provided 20 test statistics for any event resulting in a significant increase in overlapping ownership. Of those, just 3 cases displayed significant increases in markups or PCM.

Koch et al. (2020) state that most of the evidence suggests that higher overlapping ownership does not decrease competition, increase prices, or result in higher profitability. Additionally, other potential implications of the

overlapping ownership hypothesis (e.g., capacity investment and advertising) are shown to not be significantly affected by changes in overlapping ownership.

One detail worth mentioning is that in order to include an extensive sample of industries, the authors were forced to settle for fewer product market definitions, when compared to Azar et al. (2019).

Opposite to Azar et al. (2019), Koch et al. (2020) point out that the policies currently being considered to restrict institutional overlapping ownership within certain industries are unwarranted.

2.2. Tunneling

As previously mentioned, one possible consequence of overlapping ownership is the "tunneling" of resources out of firms.

Tunneling is the process through which controlling shareholders expropriate the wealth of minority shareholders. It occurs through a transfer of resources out of a firm and into another where the controlling shareholders can reap its rewards (Johnson et al., 2000). Naturally, this expropriation is harmful for a company and its minority shareholders, and may occur, for instance, in order to pursue investment opportunities in another firm (Schmalz, 2018).

One incentive for controlling shareholders to engage in tunneling is the disparity between their cash flow rights (i.e., financial rights) and their control rights. Major shareholders intend to transfer resources from a firm in which they have high control rights and low cash flow rights to one where they have higher financial entitlements (Backus et al., 2019).

This incentive is further enhanced by overlapping ownership. For instance, cross ownership of a firm hinders outside investors from establishing control (La Porta et al., 2000), resulting in higher investor concentration and wider gaps between control rights and cash flow rights (Backus et al., 2020).

Pyramidal ownership structures facilitate tunneling by providing higher control rights than cash flow rights to controlling shareholders (Bertrand et al., 2002). In a pyramid structure, shareholders have controlling interests in a chain of firms, which enable them to remove resources out of the firms lower in the pyramid and into the ones with a higher hierarchical position (Denis & McConnell, 2003).

The expropriation of a firm's wealth can take many forms, both legally and illegally (Johnson et al., 2000). It can transpire through the actual transfer of wealth or through an increase of control by the major shareholders (Atanasov et al., 2006).

Examples of tunneling include theft, fraud, transfer pricing benefitting major shareholders, using the firm as collateral for loan guarantees, non-arm's length transactions, unrestricted executive compensation, and opportunity expropriation (Johnson et al., 2000). As for control share growth, a few ways to achieve it are dilutive share issues, unfair tender offers, insider trading, and minority freeze-outs (Atanasov et al., 2006).

Although many of these examples are illegal, they are often easy to disguise (Bertrand et al., 2002). Courts face difficulties when regulating tunneling because controlling shareholders execute it in an underhanded way, not only in developing countries but also in countries with more effective legal systems. That being said, developing countries have been shown to be more susceptible to tunneling as they have weaker control over corporate governance mechanisms (Friedman et al., 2003; Juliarto et al., 2013).

When investor protection is stronger, the most harm controlling shareholders can do is "overpay themselves, put relatives in management positions, and undertake some wasteful projects" (La Porta et al., 2000, p. 6).

One example of investor protection is preventing substantial increases in managerial ownership, which is theorized to act as a barrier to tunneling. In a

study of southeastern Asian companies, Juliarto et al. (2013) assert that when managerial ownership rises, their interests become more aligned with those of controlling shareholders, therefore facilitating resource expropriation.

Dividend payments may act as a signal that the owners are not expropriating wealth from minority shareholders (La Porta et al., 2000). As previously stated, controlling shareholders are more prone to engage in tunneling when they have high control rights paired with low financial rights. Therefore, paying dividends assures that only shareholders with financial rights are remunerated.

However, some studies set in emerging markets have also analyzed the tunneling of resources through dividend payments. Li, Chen & Chen (2017) claimed that the Chinese government used high-level dividend payments to tunnel cash out of publicly traded state-owned firms. Their reasoning was that the state could be rewarded by taking firms public by either receiving dividends or taxing other shareholders, thus pushing for higher dividend payments. Kowerski (2015), on the other hand, conducted a similar study set in Poland but found no evidence of tunneling through dividends.

The relationship between overlapping ownership and dividend policy can become counterintuitive when considering tunneling incentives. Firms with overlapping shareholders are less competitive and therefore have more use for dividends as means to prevent overinvestment, yet dividends signal a firm's ability to mitigate tunneling.

This dissertation will attempt to evaluate the impacts of overlapping ownership and tunneling incentives on firms' dividend policy.

2.3. Dividends

In order to adequately measure how overlapping ownership and tunneling affect dividend payouts, a deeper comprehension of the motivation behind dividend policy is required. The term "dividend policy" denotes "the practice

that management follows in making dividend payout decisions or, in other words, the size and pattern of cash distributions over time to shareholders" (Lease et al., 2000, p. 29).

The dividend payout policy has eluded scholars for decades, being described as a "puzzle, with pieces that just do not fit together" (Black, 1976). Modigliani & Miller (1961) were among the first to study this topic by introducing the "dividend irrelevance" hypothesis (DIH). Their research claimed that a firm's market value was not affected by its dividends but exclusively determined by its investment policy.

Later, the relationship between dividend yield and stock returns led to the same conclusion when Black and Scholes (1974) realized that dividend yield did not affect stock prices. The currently prevailing theory among managers is that payout policy is relevant to a company's market value (Brav et al., 2005).

Short et al. (2002) claimed that one possible reason for firms to pay dividends is the reduction of agency costs between shareholders and managers. When managers have excess funds available, they are more likely to pursue negative Net Present Value (NPV) projects or overinvestment strategies which could harm the shareholders' returns.

This agency conflict increases the pressure to pay dividends in order to limit managers' control over the company's free cash flow (Jensen, 1986; Short et al., 2002), preventing managers from expropriating shareholders (DeAngelo & DeAngelo, 2006). Therefore, shareholders must weigh the prospect of future earnings promoted by managers, with the possibility of paying dividends (Chang, 1993).

As a consequence, when looking for investment funding, firms are sometimes pushed toward capital markets to replace the cash paid out, which can occur by issuing new equity or debt (Easterbrook, 1984; Jensen, 1986). The mitigation of agency costs also comes from the added exposure to liquidity

risks when paying dividends, which can result in management turnover (DeAngelo et al., 2004).

However, enhanced corporate governance strategies lower the effectiveness of dividends as a tool to handle agency problems (Fama & French, 2001). One example of such strategies is managerial compensation (Bhattacharyya et al., 2008). By designing a compensation scheme which links managers' rewards with the performance of the company, shareholders can assure that managers are more prudent when investing. This implies that in the presence of these strategies, firms have less incentives to pay dividends as the reduction of agency costs is already accomplished.

The literature on dividend policy is extensive, but some topics are common across many authors. For instance, one consensus is that firms that pay dividends typically display similar characteristics in regard to their profitability, investment opportunities, and size (Fama & French, 2001; Farre-Mensa et al., 2014).

A company with higher profits and of larger size is more likely to reward its shareholders with a part of those profits in the form of dividends. On the other hand, a firm with stronger investment opportunities would most likely prefer to spend its profits on new projects, lowering the likelihood of paying dividends.

Fama & French (2001) document a substantial decline in the number of dividend-paying firms between 1978 and 1999. However, this declining trend seems to have changed in the 2000s (Farre-Mensa et al., 2014).

Nevertheless, Fama & French (2001) search for an explanation in an analysis of publicly traded non-financial and non-utilities firms, traded on NYSE, AMEX, and NASDAQ. The data used in their study was gathered from the CRSP and Compustat databases ranging from 1926 to 1999.

The authors find that the number of dividend payers had declined between 1978 and 1999, going from 66.5% to 20.8% of the sample. The purpose of their study was to find what characterizes dividend-paying firms, how these characteristics may have become scarcer, and how firms possibly became less inclined to pay dividends even if they displayed such characteristics.

To assess whether profitability, investment opportunities, and size affect the probability of a company paying dividends, Fama & French (2001) modelled the latent difference in utility between paying and not paying dividends. A firm will choose to pay dividends if the utility of paying is greater than the utility of not paying, and vice-versa. Let $y^*_{f,t}$ denote the difference in utility for firm f between paying dividends or not, the net utility is modelled as:

$$y^*_{f,t} = \beta_0 + \beta_1 Profit_{f,t} + \beta_2 Invest_{f,t} + \beta_3 MTB_{f,t} + \beta_4 Size_{f,t} + \varepsilon_{f,t}$$

where $Profit_{f,t}$ denotes the Earnings before Interest After Taxes (EBIAT) of firm f in year t, $Invest_{f,t}$ represents the asset growth rate of firm f in year t as investment opportunities, $MTB_{f,t}$ also measures investment opportunities as a proxy for Tobin's Q computed as the market-to-book ratio, $Size_{f,t}$ indicates the percent of NYSE firms with same or lower market capitalization than firm f in year t, and $\varepsilon_{f,t}$ denotes the difference between the impact of all the other unobserved factors.

Although the net utility of firm f is unobserved, the actual decision to pay dividends can be observed. Each observation can be modelled as:

$$Div_{f,t} = \begin{cases} 1, if\ y^*_{f,t} > 0 \\ 0, if\ y^*_{f,t} \leq 0 \end{cases}$$

where $Div_{f,t}$ represents a dummy variable that takes the value of 1 in year t if firm f paid dividends, and 0 otherwise.

The reason why the authors used two measures of investment opportunities was to account for the sudden rise in market-to-book ratios that took place between the 1980s and 1990s. This sudden increase was not due to better investment opportunities but to reduced cash flow discount rates. Thus, it could skew the results by overestimating the changes in dividend-payers' characteristics.

As previously stated, Fama & French (2001) narrowed down the features of dividend-payers to large and profitable firms. Conversely, the amount of investment opportunities was negatively correlated with propensity to pay dividends.

Their analysis concluded that the reason behind the declining number of dividend-payers was the generalized change in the characteristics of publicly traded firms as well as a lower propensity to pay dividends even by firms whose characteristics stay the same. Firms started to display lower earnings, smaller size, and more investment opportunities, mostly because of the rise of newly listed firms after 1978.

Finally, the authors deduced that dividends were perceived to be less beneficial than they previously were. Possible explanations include preference for capital gains over dividends and enhanced corporate governance mechanisms.

3.Theoretical Model and Method

The purpose of this dissertation is threefold. First, it aims to assess the degree of overlapping ownership in the Euronext 100 index. Second, it aims to provide insight on what tunneling incentives might arise in this index due to the level of overlapping ownership. And third, it aims to examine how overlapping ownership and tunneling may influence dividend policy among Euronext 100 firms.

This dissertation follows the empirical framework of Backus et al. (2020) to quantify overlapping ownership and tunneling. To assess the impact on dividends, Fama & French's (2001) logit regression model is adopted.

The goal is to answer the following questions: Do firms in the Euronext 100 index engage in overlapping ownership? Do they do so with the other index firms in the same industry? And if so, how have the overlapping ownership levels evolved over time?

As previously mentioned, in the generic framework of economic theory, a firm f makes one strategic decision (x_f), in order to maximize its own profits, denoted π_f, which are a function of its decision and its competitors' decisions ($\pi_f(x_f; \boldsymbol{x}_{-f})$).

In a world of overlapping ownership, firms seek to maximize the value of their shareholders' portfolios. To achieve this, a firm must consider the impact of a strategic decision not only on its own profits but on the profits of its competitors, in which its shareholders have a stake in.

In this model it is assumed that the shareholders, indexed by i, have shares of many firms. The fraction of firm f owned by shareholder i entitles him/her to a share, $\beta_{f,s}$, of firm f's profits, π_f. The value of investor i's portfolio, v_i, can therefore be computed as the sum of profits obtained from each company on

their investment portfolio, weighted by the cash flow rights that they are entitled to:

$$v_i(x_f; \boldsymbol{x}_{-f}) = \sum_f \beta_{i,f} \pi_f$$

Given the difference in the many portfolios of the firm's investors, choosing a strategy that satisfies all investors becomes a challenge. To account for this, it is assumed that firm f solves this problem as a social choice problem, and assigns control rights, $\gamma_{f,s}$, to the profits of each investor. It then maximizes the sum of its investors' profits weighted by their control rights.

As shown in Section 2, let Q_f denote the objective function of firm f, it is possible to compute the weight, denoted $k_{f,g}$, that firm f assigns to its competitor g's profits, π_g.[12]

$$\begin{aligned} Q_f(x_f, \boldsymbol{x}_{-f}) &= \sum_i \gamma_{i,f} \cdot v_i(x_f, \boldsymbol{x}_{-f}) \\ &= \sum_i \gamma_{i,f} \cdot (\sum_g \beta_{i,g} \cdot \pi_g(x_f, \boldsymbol{x}_{-f})) \\ &= \sum_i \gamma_{i,f} \beta_{i,f} \pi_f + \sum_i \gamma_{i,f} \sum_{g \neq f} \beta_{i,g} \pi_g \\ &\propto \pi_f + \underbrace{\sum_{g \neq f} \left(\frac{\sum_i \gamma_{i,f} \beta_{i,g}}{\sum_i \gamma_{i,f} \beta_{i,f}} \right)}_{\equiv k_{f,g}(\boldsymbol{\gamma}_f, \boldsymbol{\beta})} \pi_g \\ &= \pi_f + \sum_{g \neq f} \left(k_{f,g}(\boldsymbol{\gamma}_f, \boldsymbol{\beta}) * \pi_g \right) \end{aligned}$$

Implying that in the absence of overlapping ownership, own profit maximization remains the firm's objective. Another implication is the fact that investor concentration results in more influence over the firm: a shareholder with 20% corporate control over firm f is more influential than two shareholders with a 10% stake each. This concentration proves the higher influence of asset managers compared to retail investors.

[12] This study follows Brito et al. (2018), who compute the profit weight formula into vector notation (Appendix A).

The main difference between this model and the classical model are the profit weights, $k_{f,g}$, which represent the value of a euro of firm g's profit perceived by firm f's manager. As previously stated, a profit weight of 1 on a given competitor equals the weight a merged firm would place on an acquired firm or in the case of perfect collusion, yielding monopoly results (Backus et al., 2020). Conversely, a profit weight of 0 is to be expected in perfect competition.

The overlapping ownership framework posits that $k_{f,g} > 0$ when at least one shareholder in which firm f places positive value ($\gamma_{f,g} > 0$), is entitled to a share of the profits in both firm f and firm g, or, in other words, has cash flow rights in both firms: $(\gamma_{i,f}, \beta_{i,f}, \beta_{i,g}) > 0$.

The main complaints over the overlapping ownership hypothesis lie with the distinction between financial rights and corporate control rights. The most common assumption in the literature, and in this paper, is that the control shareholders have over the company is proportionate to the amount of profits they are entitled to ("one share, one vote" rule, Backus et al., 2020). Thus, for the purposes of this paper, the assumption of proportional control implies that $\gamma_{i,f} = \beta_{i,f}$.

As previously mentioned, the first goal of this dissertation is to assess the degree of overlapping ownership in the Euronext 100 index. To do so, the profit weights assigned by each company in the index to every other company in the index in the same quarter were computed. Then, the average of all profit weights assigned in each quarter was calculated in order to evaluate the evolution of overlapping ownership levels in the index.

Furthermore, a secondary analysis focusing only on Euronext 100 firms within the same industry was conducted. This analysis followed the same steps but only considered the profit weights each firm placed on other Euronext 100 firms operating in its same industry.

However, profit weights can also reach values above 1. To explain the rationale behind this notion, Backus et al. (2020) offer the following example: consider a market with two firms, both held by a large number of undiversified retail investors. Additionally, a small percentage of each firm is held by a set of M diversified investors who hold 1% of firm A and β% of firm B, as shown in Table 1.

	Firm A	**Firm B**
Investor 1	1%	β%
Investor 2	1%	β%
⋮	⋮	⋮
Investor M	1%	β%
Retail Share	(100 – M)%	(100 – M*β)%

Table 1. Tunneling example

Letting $M\beta < 100$, the profit weight matrix would be:

$$\begin{bmatrix} 1 & \beta \\ 1/\beta & 1 \end{bmatrix}$$

Therefore, if $\beta = 1$, both firms would consider a euro of the other firm's profits as valuable as a euro of their own profit. Similarly, if $\beta = 3$, then firm A would consider a euro of firm B's profit to be three times as valuable as a euro of its own profit. This phenomenon creates an incentive for tunneling resources out of firm A and into firm B.

As mentioned before, tunneling is the expropriation of assets and/or profits from one firm where the owner has low cash flow rights to another where he/she has high cash flow rights, to the detriment of minority shareholders (Johnson et al., 2000).

The aim of this analysis is to answer the following questions: Are Euronext 100 firms incentivized to tunnel resources from each other? And if so, how have the levels of tunneling incentives evolved over time?

In this dissertation, tunneling is quantified by computing the average of all profit weights above 1 that each firm assigns to any other firm belonging to the index in the same quarter. In this case there is no need to conduct an industry level analysis as the underlying theory implies that tunneling can equally occur across industries.

The literature suggests that firms invest less due to decreased competition potentially caused by overlapping ownership (Gutiérrez & Philippon, 2016). The decrease in investment should then correspond to an increase in payouts, either by dividend payments or share buybacks (Farre-Mensa et al., 2014). It is worth noting that this logic only pertains to direct competitors, as overlapping ownership across industries does not yield the same effects on investment. The following hypothesis aims to analyze this relationship:

Hypothesis 1: Overlapping ownership influences dividend policy.

On the other hand, the literature on tunneling incentives suggests that dividends can act as a signal of lack of expropriation (La Porta et al., 2000). Meaning that in the presence of tunneling incentives, controlling shareholders would not choose to pay dividends. To assess this relationship, the following hypothesis was developed:

Hypothesis 2: Tunneling influences dividend policy.

As previously mentioned, Fama & French (2001) used a logit regression model to study the reasons behind dividend payments. The logit regression modelled the latent difference in utility between paying and not paying dividends. A firm will choose to pay dividends if the utility of paying is greater than the utility of not paying, and vice-versa. As per Fama & French (2001), let

$y^*_{f,t}$ denote the difference in utility for firm f between paying dividends or not, the net utility is modelled as:

$$y^*_{f,t} = \beta_0 + \beta_1 Profit_{f,t} + \beta_2 Invest_{f,t} + \beta_3 MTB_{f,t} + \beta_4 Size_{f,t} + \beta_5 dComp_{f,t} + \beta_6 kI_{f,t} + \beta_7 kT_{f,t} + v_t + \varepsilon_{f,t}$$

where $Profit_{f,t}$ represents the net profit margin of firm f in year t, $Invest_{f,t}$ is the asset growth rate of firm f in year t, $MTB_{f,t}$ is the total market value (a proxy for Tobin's Q) of firm f in year t, $Size_{f,t}$ denotes the percentage of firms in the index with lower market cap than firm f in year t.

Also, $dComp_{f,t}$ is a dummy variable taking the value of 1 if firm f had performance-related executive compensation schemes in place in year t, and $kI_{f,t}$ denotes the mean profit weights that firm f assigns to other index firms in the same industry in year t. $kT_{f,t}$ indicates the average of profit weights above 1 that firm f assigns to other index firms in year t, and v_t is a series of dummy variables that take the value of 1 whenever an observation refers to year t, in order to account for year fixed effects. Finally, $\varepsilon_{f,t}$ represents the difference between the impact of all the other unobserved factors.

Although the net utility of firm f is unobserved, the actual decision of the sample's firms to pay dividends can be observed. Each observation can be modelled as:

$$Div_{f,t} = \begin{cases} 1, if\ y^*_{f,t} > 0 \\ 0, if\ y^*_{f,t} \leq 0 \end{cases}$$

where $Div_{f,t}$ represents a dummy variable that takes the value of 1 if firm f paid dividends in year t, and 0 otherwise.

This model follows Fama & French (2001) while also including a measure of compensation schemes based on Bhattacharyya et al. (2008).[13] It also includes measures of overlapping ownership and tunneling inspired by Backus et al. (2020) and adds year fixed effects. The model will be estimated through a logit regression following a maximum likelihood approach.

One alternative to the measures of overlapping ownership used in this dissertation are the methods adopted by Azar et al. (2019), who compute a generalized HHI indicator (GHHI). However, the GHHI was not considered suitable for this study as it makes assumptions regarding market structure and competition conduct. By assuming a Cournot model of competition, the GHHI implies homogeneous products and symmetric marginal costs. In that regard, the profit weights based on Backus et al. (2020) are more reliable as they focus solely on the firm's objective function.

[13] However, Net profit margin replaced Fama & French's (2001) Earnings Before Interest and After Tax (EBIAT) due to technical difficulties of gathering information.

4.Empirical Application

The following subchapters present the types of data collected, the data's limitations, conclusions for the research questions introduced throughout this dissertation, and estimation results of the logit regression model.

The data used in this dissertation regards two types of information: (i) ownership related information, namely the "Shareholders History Report" (obtained via Refinitiv Eikon), and (ii) data regarding the explanatory variables used for the logit regression model (obtained via Refinitiv Eikon and Refinitiv Eikon Datastream).[14]

4.1. Overlapping Ownership and Tunneling

4.1.1. Data Description

The first type of data was used to construct the Euronext 100 index and assess which shareholders were common among the index's firms. The data was collected in a quarterly format set between the last quarter of the year 2000 and the third quarter of 2020, totaling a dataset of 80 quarters.[15]

It comprised the shareholders of each firm in the index and each ownership percentage of outstanding shares for the requested quarter.

[14] Refinitiv comprises a collection of financial software products containing data on global financial markets. It is partially owned by Thomson Reuters and Blackstone Group

[15] The Euronext 100 index was created on October 10th, 2000 (Euronext, 2020).

The number of investors in the sample significantly grew over the analyzed period (Figure 1). A larger number of investors could partially justify an increase in mean profit weights, since a bigger sample would provide a broader scope of overlapping ownership.

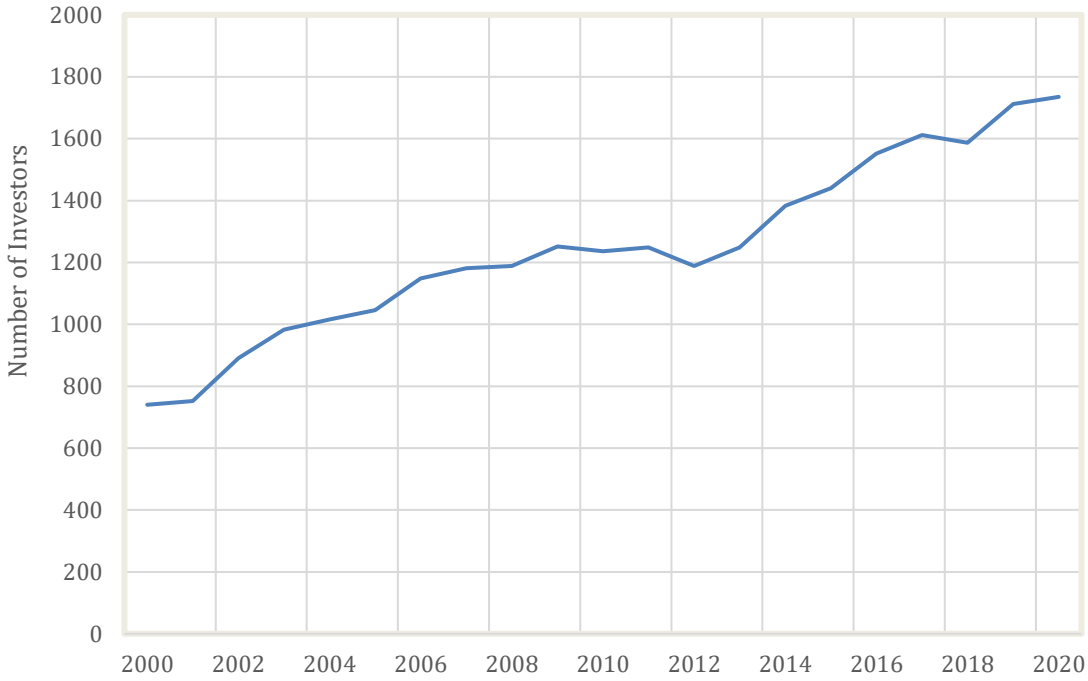

Figure 1. Number of investors with holdings in Euronext 100 firms.

Throughout the development of this dissertation, the data collection faced several difficulties. Most obstacles pertained to gaps in the Thomson Reuters database. Some "Shareholders History Reports" were blank or unattainable. This was especially common in the first years of the sample (Figure 2).

Seeing as the Euronext 100 index was always comprised of 100 firms, Figure 2 proves the ownership information was easier to obtain for recent years than in the first years of the analysis.

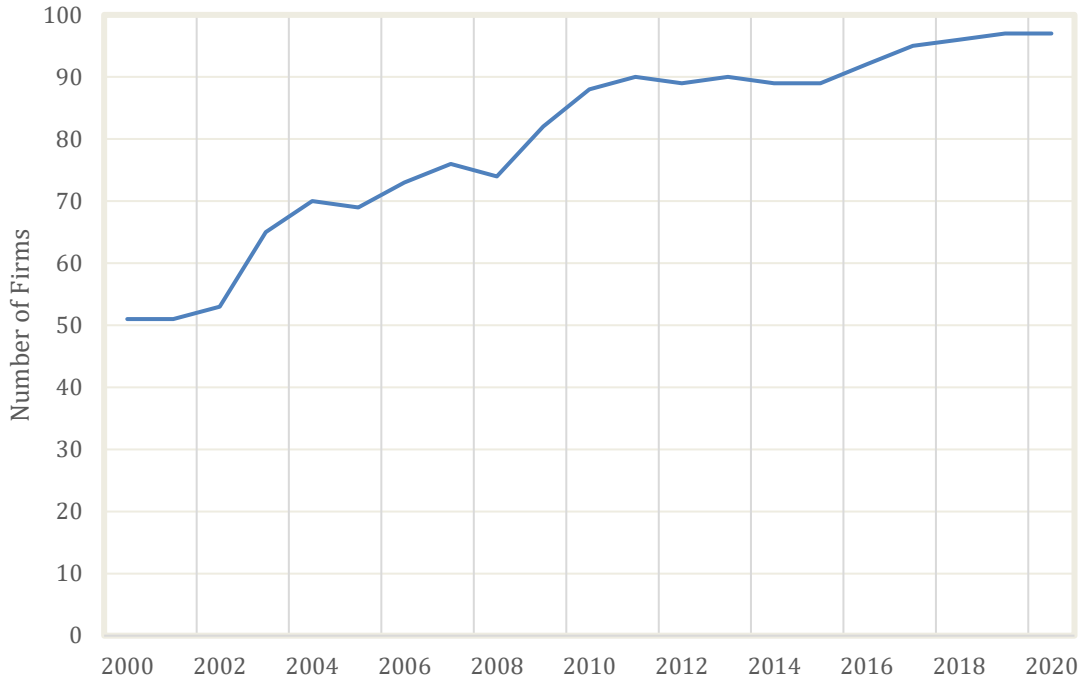

Figure 2. Number of firms in the Euronext 100 sample over time.

Some ownership reports had to be removed from the sample because they indicated that more than 100% of outstanding shares of some firms were owned by sample investors.

Figure 3 displays the share of the index owned by the investors present in the Reports weighted by market capitalization. It is clear that throughout the analyzed period the information provided by the "Shareholders History Reports" accounts for a considerable percentage of the index firms' shareholders.

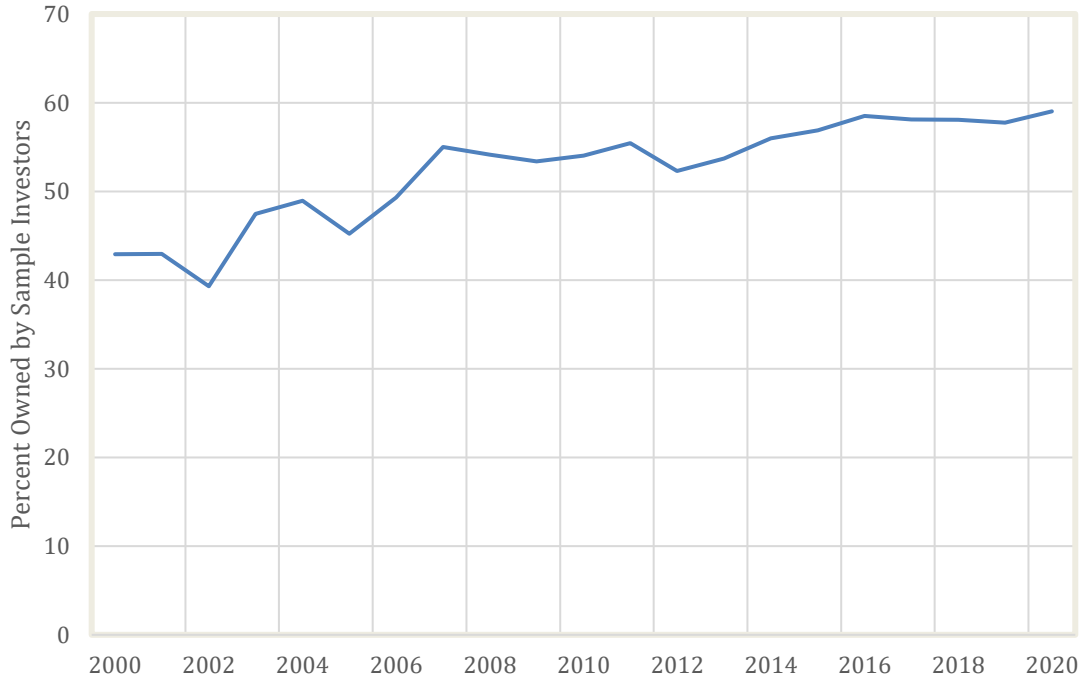

Figure 3. Share of Euronext 100 index owned by sample investors over time.

4.1.2. Data Analysis

Figure 4 displays the quarterly mean profit weights, denoted by k, across all pairs of firms in the Euronext 100 index (except own profit weights which take the value of 1). The calculations regarding profit weights mentioned in Section 3 were computed using GNU Octave.[16]

As previously mentioned, the mean profit weights in Backus et al. (2020)'s study were shown to increase from 0.5 in 1999 to 0.7 in 2017. Although the displayed values of mean profit weights are considerably lower than those presented by Backus et al. (2020), Figure 4 shows a slight upward tendency across the analyzed period.

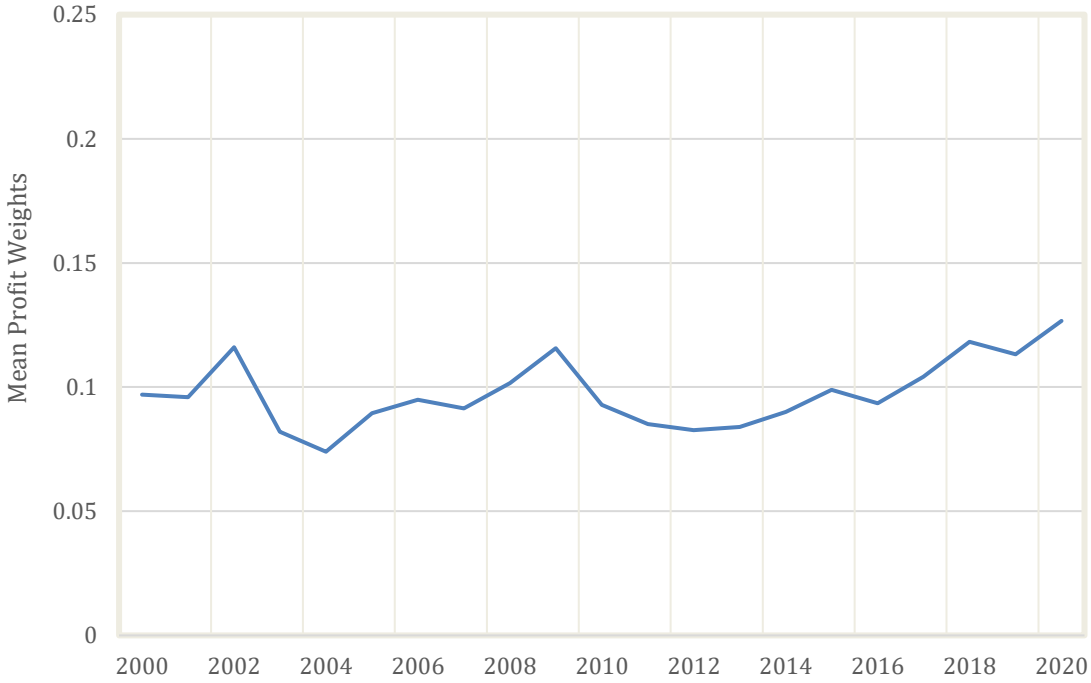

Figure 4. Mean pairwise profit weights over time.

Despite only exhibiting a slight increase from 0.09 in 2000 to 0.125 in 2020, the maximum value was found in the 3rd quarter of 2008 with an average profit weight of 0.199. In a scenario of perfect competition, the mean pairwise profit weights would take the value of 0.

[16] GNU Octave is an open-source software intended for numerical computations.

However, the implications of the underlying theory incite an industry-level analysis as well. Figure 5 compares the mean pairwise profit weights presented above with the mean pairwise profit weights assigned only to other index firms operating in the same industry. In this case, both averages are computed annually.

While the non-industry-based profit weights reach a maximum value higher than the industry-level profit weights (around 2008), the latter are shown, on average, to be higher than the former after 2013. This suggests that, in recent years, Euronext 100 firms valued the profits of their direct competitors more highly than those of commonly owned firms in other industries.

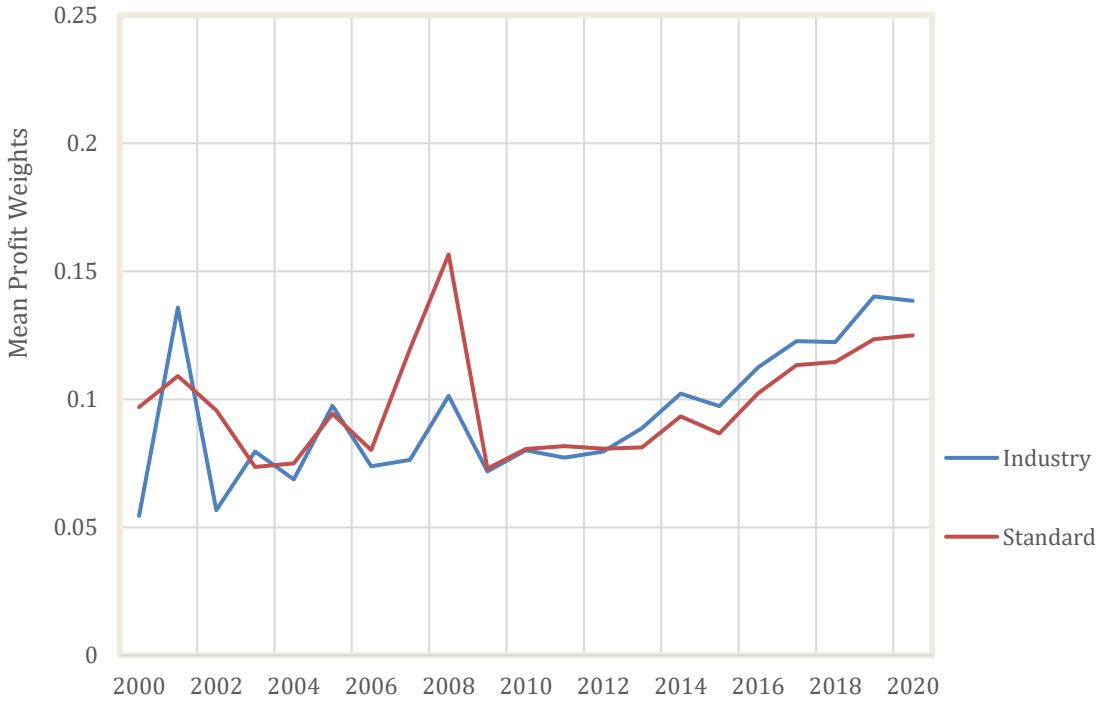

Figure 5. Mean pairwise profit weights and mean pairwise industry-level profit weights over time.

To answer the questions drawn in Section 3: the data suggests that firms in the Euronext 100 index do engage in overlapping ownership, albeit at relatively low levels, and that the presence of overlapping ownership has grown over the analyzed period.

Furthermore, the data shows a rising trend in the average pairwise profit weights placed on direct competitors between 2002 and 2020. The industry-level profit weights grew from slightly above 0.05 in 2000 to nearly 0.14 in 2020.

As previously mentioned, a profit weight above 1 ($k > 1$) indicates that a firm's manager values a euro of another firm's profits more highly than one of his/her own firm. This is perceived as an incentive to engage in tunneling activities. Such tunneling activities are enacted to the benefit of the other firm and the detriment of the minority shareholders of the firm placing the profit weight $k > 1$.

Figure 6 reveals the evolution of tunneling incentives throughout the observed period. The values displayed are computed annually and signify the number of pairwise profit weights higher than 1 as a percentage of the total number of profit weights (except for own profit weights).

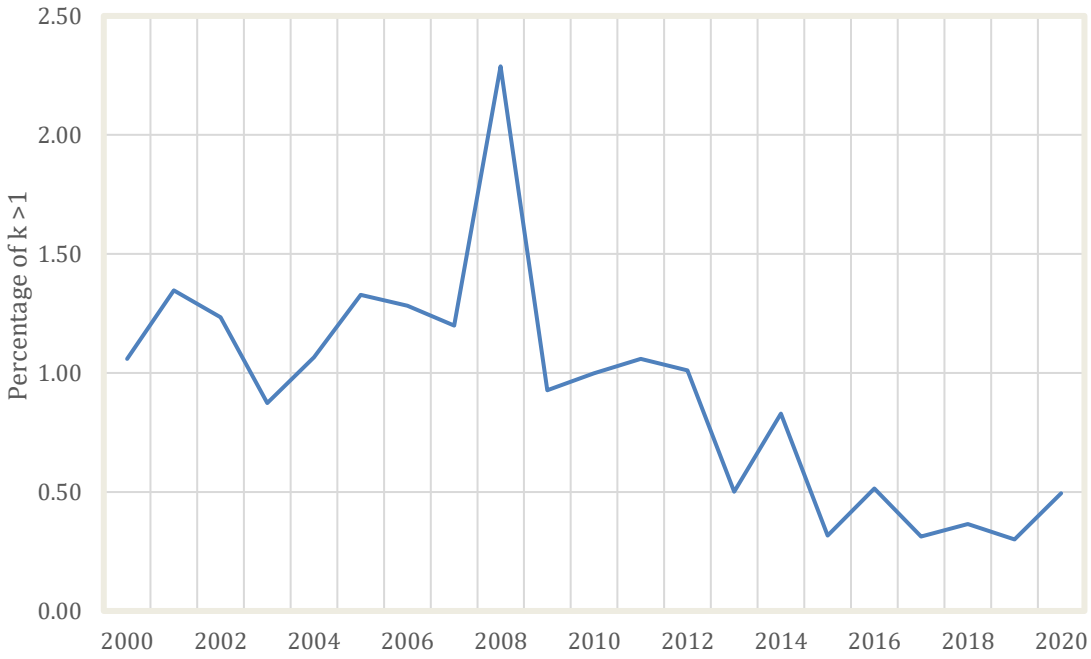

Figure 6. Potential tunneling incentives.

The tunneling incentives seem to follow a similar trend to the overlapping ownership mean profit weights (Figure 4) before reaching a maximum value of 2.28% in 2008. After that, the incentives appear to substantially decrease, which contrasts with the positive trend of Figure 4 for the same period. The data implies that some firms in the Euronext 100 index have incentives to tunnel resources from their peers but that those incentives have gradually declined over the analyzed period.

These results are considerably lower than those presented by Backus et al. (2020). In their study, the tunneling incentives were shown to grow from nearly 4% to 11% between 2000 and 2017. Assessing the same period, Figure 6 exhibits an opposite trend going from slightly above 1% to below 0.5%, except for the peak in 2008.

Nevertheless, the attribution of positive profit weights hints at less competitive behavior from both firms, especially given the rise in industry-level profit weights over time (Figure 5). The lack of competition can take many forms, reduced investment being one of the most intuitive (Gutiérrez & Philippon, 2016).

From the current standpoint, theory suggests that the lack of investment combined with the drop in tunneling incentives would result in more frequent dividend payments. This follows the logic of dividend payments as means to prevent overinvestment (Short et al., 2002), and of shareholders with tunneling motivations being averse to dividend payments (La Porta et al., 2000).

4.2. Dividends

4.2.1. Data Description

The second type of data contained the inputs for the explanatory variables of the logit regression model. It consisted of annual data for all firms that at some point, between 2000 and 2019, belonged to the Euronext 100 index.[17] It regarded net profit margins, asset growth rates, market capitalization, total assets, total liabilities, common equity, performance-related compensation schemes, total cash dividends paid, net income, and four-digit industry GICS codes.[18] All monetary variables were collected in (or exchanged to) EUR.

The cash dividends data was used to compute a dummy variable equal to 1 if firm f paid dividends in year t, and 0 otherwise. The performance-related compensation variable was also modified into a dummy variable where 1 meant that the firm rewarded executives according to the firm's performance. The regression model used to answer the research question was computed using Gretl.[19]

The control variables for the logit regression model followed Fama & French (2001). The asset growth rates were used as a measure of investment opportunities. Total market value was computed by dividing the sum of total liabilities and common equity by total assets as a second measure of investment opportunities. Finally, a variable indicating the percentage of firms in the index with lower market capitalization was computed to account for size.

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[17] Usually, dividend payments are more common at the end of the year but given that the analyzed period only goes as far as Q3:2020, many firms in the sample had no data regarding dividend payments in that same year. However, this does not affect the estimation results because the observations set in 2020 had already been eliminated from the sample during the data cleaning.

[18] The Primary Global Industry Classification Standard (GICS) sector description classifies companies with increasing granularity by Sector, Industry Group, Industry, and Sub-industry

[19] Gretl is an open-source software package mainly used to interpret econometric data.

However, differing from Fama & French (2001), net profit margin was used to measure profit. Other distinctions were the measure of performance-related compensation schemes stemming from Bhattacharyya et al. (2008) and the industry-level overlapping ownership and tunneling analysis adapted from Backus et al. (2020). After cleaning the data, the sample was left with 1273 firm-year observations spread across 24 industries.

4.2.2. Data Analysis

As shown in Figure 7, dividend-paying firms were always abundant, going from 96% of all firms in the sample in 2000 to 79% in 2020.

These results are more similar to the conclusions of Farre-Mensa et al. (2014) than those of Fama & French (2001). However, not only was Fama & French (2001)'s study set in the U.S. it was also set in another time period.

Another possible reason is the fact that the Euronext 100 index encompasses the largest stocks traded on the Euronext stock-exchange, meaning that all firms in the sample display the characteristics of dividend-paying firms to some extent. Moreover, the presence of institutional shareholders may also pressure

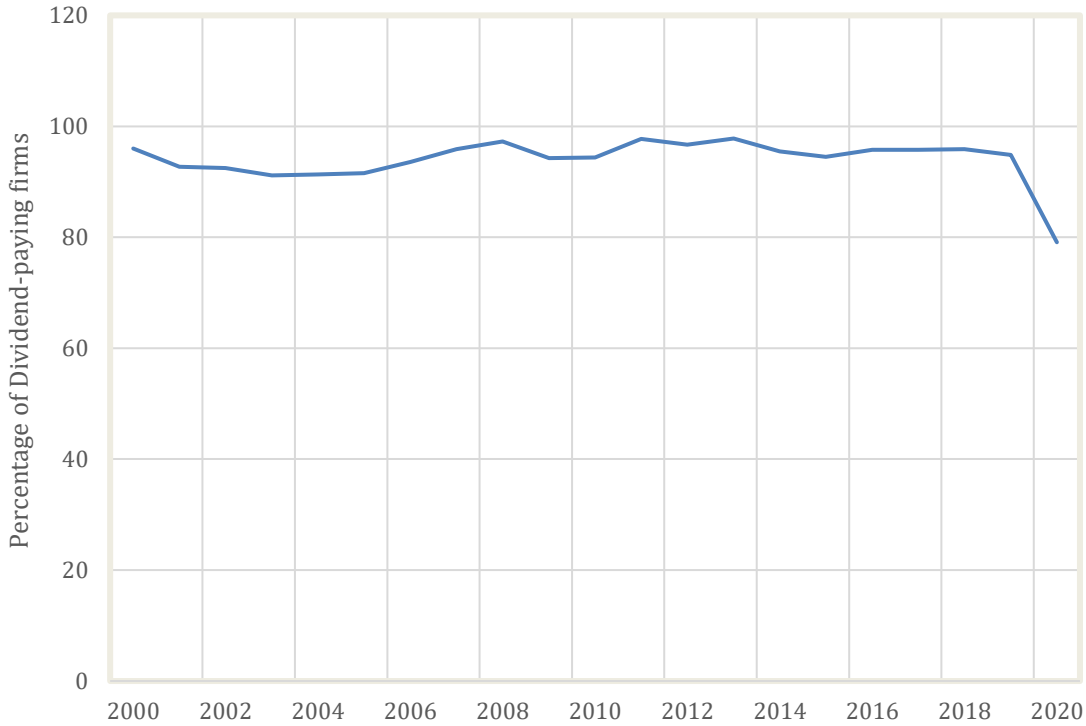

Figure 7. Percentage of dividend payers over time.

managers to increase dividend payouts (Short et al., 2002).

In order to get a better grasp of the impact of overlapping ownership and tunneling incentives on dividend policy, a logit regression model was estimated. Table 2 provides descriptive statistics of the main variables included in the model.

	Mean	Median	Std. Deviation	Minimum	Maximum
Div	0.9576	1.0000	0.2016	0.0000	1.0000
Profit	0.0988	0.0615	0.2255	-0.9015	3.3672
Invest	0.0749	0.0338	0.3091	-0.5883	7.5649
MTB	1.5038	1.2752	0.7836	0.6785	8.2658
Size	0.4949	0.4945	0.2878	0.0000	0.9897
dComp	0.8570	1.0000	0.3502	0.0000	1.0000
kI	0.0805	0.0228	0.1275	0.0000	1.3613
kT	0.3518	0.0000	0.7456	0.0000	4.9712

Table 2. Summary Statistics

Table 2 suggests that the median firm in the data, in the median year, pays dividends and has a net profit margin of 6.15%, its assets annually grow at a rate of 3.38%, it has a total market value of 1.2752 times its total assets, and a higher market cap than about 49.5% of firms in the index. Finally, it has an executive compensation scheme related to its performance, places a mean profit weight of 0.0228 on the other index firms within its industry, and has no tunneling incentives.

The high levels of standard deviation are most likely caused by the comprehensive nature of the sample. Taking place across 20 years and encompassing 154 companies, the dispersion of each variable was bound to be high.

4.2.3 Preliminary Analysis

Table 3 provides a more detailed analysis of what characterizes firms that pay dividends.

	Mean	Median	Std. Deviation	Minimum	Maximum
Panel A: Firms who do not pay dividends					
Profit	0.0335	0.0325	0.0844	-0.1551	0.2630
Invest	0.0422	0.0298	0.1720	-0.2423	0.7283
MTB	1.7098	1.2297	1.2565	0.8556	8.2658
Size	0.4036	0.4442	0.2520	0.0000	0.9565
dComp	0.8519	1.0000	0.3586	0.0000	1.0000
kI	0.0226	0.0037	0.0425	0.0000	0.1816
kT	0.4328	0.0000	0.9710	0.0000	4.9712
Panel B: Firms who pay dividends					
Profit	0.1017	0.0622	0.2294	-0.9015	3.3672
Invest	0.0764	0.0338	0.3138	-0.5883	7.5649
MTB	1.4946	1.2788	0.7553	0.6785	8.0860
Size	0.4990	0.5000	0.2887	0.0000	0.9897
dComp	0.8573	1.0000	0.3500	0.0000	1.0000
kI	0.0831	0.0255	0.1294	0.0000	1.3613
kT	0.3482	0.0000	0.7343	0.0000	3.6333

Table 3. Summary Statistics by Dividend payment occurrence. The statistics presented for Panel A were computed across 54 observations, while Panel B was obtained from 1219 observations.

The data seems to imply that the median firm, in the median year, that does not pay dividends is less profitable and of lower size than the median firm that pays dividends, as suggested by Fama & French (2001). Moreover, it places a lower average profit weight on its competitors than the median firm who pays dividends.

However, results vary when assessing investment opportunities. When observing the total market value (MTB) of the mean firm, firms who do not pay dividends invest more than dividend payers. On the other hand, when assessing the median firm, both asset growth rates and total market values indicate that firms who do not pay dividends invest less than firms that do pay,

contrasting with the literature. Also, both types of firms seem to have executive performance-related compensation schemes in place.

Finally, neither median firm has tunneling incentives as measured by the average of all profit weights above 1 placed on another firm in the index.

4.2.4. Estimation Results

Table 4 presents the estimation results of the logit regression model for four different specifications of the equation detailed in Section 3.

Specification (i) explains dividend payments using profitability, investment opportunities, and size. Just as Fama & French (2001), the results suggest that both profitability and size have a positive impact on dividend payouts, while investment opportunities have a negative influence. The model also shows how total market value is a better measure of investment opportunities than the asset growth rate, since the latter's coefficient is not statistically significant.

Specification (ii) follows the previous model and adds a measure of performance-related compensation schemes to the Fama & French model, based on Bhattacharyya et al. (2008). However, this measure is shown to have no impact on dividend payouts.

In specification (iii), the model explains dividend payments using the previous models' variables and adding measures of overlapping ownership and tunneling incentives. Both measures are shown to be statistically significant and display the presumed relationship implied by the theoretical framework.

The mean industry-level profit weights are shown to have a statistically significant positive impact on dividend payouts, while tunneling incentives exhibit a statistically significant negative impact. However, by adding these variables the size measure loses explanatory power.

Finally, in specification (iv) the model maintains all the previous specification's variables while adding year-fixed effects. While this regression negatively affects the explanatory power of investment opportunities, it provides different coefficients which implies endogeneity issues in the previous regression models.

	Logit			
Variables	**(i)**	**(ii)**	**(iii)**	**(iv)**
Profit	4.9583***	4.9787***	5.0371***	5.3888***
	(1.3862)	(1.3921)	(1.4604)	(1.6646)
Invest	0.7597 (0.9266)	0.7834	0.5782	0.6602
		(0.9402)	(0.8958)	(0.9085)
MTB	-0.4264***	-0.4420***	-0.4274***	−0.3716**
	(0.1363)	(0.1407)	(0.1494)	(0.1658)
Size	1.2332**	1.2499**	0.9075*	0.9189*
	(0.5132)	(0.5149)	(0.5252)	(0.5434)
dComp	-	-0.1976	-0.3246	-0.5941
		(0.4078)	(0.4053)	(0.4510)
kI	-	-	12.9273***	12.6548***
			(3.9736)	(3.9387)
kT	-	-	-0.4528**	-0.4613**
			(0.1835)	(0.1914)
Year Fixed-Effects	No	No	No	Yes
Log L	-210.8548	-210.7328	−198.9609	−190.0572
Pseudo R-squared	0.0565	0.0571	0.1097	0.1496

Table 4. Logit Estimation results (All specifications include a constant term and are based on 1273 observations. Standard-errors in parentheses. *** denote p-values < 0.01, ** denote p-values < 0.05, and * denote p-values < 0.1.). Values displayed are estimated coefficients.

The increasing Log likelihood implies that by adding new variables, the fit increases. Given that specification (iv) is the most complete, the conclusions drawn in this dissertation will stem from it. The hypotheses presented in

Section 3 cannot be rejected, as overlapping ownership and tunneling are shown to influence dividend policy.

5. Conclusion

The overlapping ownership hypothesis has gained relevance in recent years as scholars attempt to alert authorities to its implications. The increase in prices, declining investment, and loss of a competitive dynamic are the most frequent implications in the literature.

Since overlapping ownership can influence a firm's objective function and induce managers to "internalize the externalities of aggressive product market behavior" (Azar et al., 2019, p. 15), its implications on corporate governance must also be considered.

Taking overlapping ownership into consideration may help find answers in other areas of economic and financial research. One example is the "puzzle" of dividend policy. Also, it could provide a deeper comprehension of how controlling shareholders execute tunneling strategies.

The theoretical framework of this dissertation posits that overlapping ownership results in a decline in investment (Gutiérrez & Philippon, 2016). Given that controlling shareholders use dividends to prevent competitive (over)investment (Short et al., 2002), a higher level of overlapping ownership should correspond to a higher number and size of dividend payments.

On the other hand, since controlling shareholders sometimes have incentives to tunnel resources out of firms where they have low financial rights (Backus et al., 2019), it is likely that dividend payments are not in their best interest since these return cash back to the shareholders with financial rights.

Using the Euronext 100 index as a proxy for the European market, the levels of overlapping ownership, measured by the mean pairwise profit weights, are shown to have increased from 0.09 in 2000 to 0.125 in 2020. However, tunneling incentives have dropped from nearly 1% of all pairwise profit weights to just below 0.5%.

Nevertheless, the results of the logit regression model suggest a statistically significant influence of both overlapping ownership and tunneling on dividend policy. Just as suggested by the underlying theory, overlapping ownership is shown to have a positive influence on dividend payments while tunneling is proven to have a negative impact.

Regarding dividend policy, performing a similar research on firms which do not pay dividends as often as the Euronext 100 firms could provide greater insights on the impacts of overlapping ownership and tunneling on dividend decisions. Additionally, future studies on the processes through which tunneling can occur would be a valuable contribution to the literature.

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Appendix

A.

As per Brito et al. (2018), let C denote a MxN matrix of control rights and F denote a MxN matrix of financial rights (where M represents the number of investors and N represents the number of firms), then:

$$W = diag(C^T F)^{-1} C^T F,$$

where W represents the NxN normalized weight matrix comprised of the weights that each firm places on itself and other firms.

B.

The theory of reduced investment originating from overlapping ownership has stronger foundations when assessing firms in the same industry. Therefore, the following variable was computed to analyze overlapping ownership in direct industry competitors.

The profit weight matrix (W) was adapted to only include firms in the same industry. Its average was computed as:

$$\frac{[\sum(\mathrm{W^T})^\mathrm{T}]}{\mathrm{N}},$$

where N refers to the number of companies in the index for each year, belonging to the same industry as firm i.

As for tunneling incentives, the theoretical relationship with dividend policy pertains to any firm with an assigned profit weight above 1 (k >1). Thus, an industry-level scope is unnecessary.

In regard to tunneling: (i) a dummy variable was computed to be equal to 1 whenever firm i in year t assigned at least one profit weight above 1 to another firm in the index, and 0 otherwise; (ii) for all the companies that met the

previous criterion, the average of all profit weights above 1 for year t was calculated as well.

(i) $W_1 = \sum(W > 1)^T$

(ii) $W_2 = \frac{\sum[[(W>1)*W]^T]^T}{W_1}$