Market Power and Dividend Policy: a Risk-Based Perspective

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Abstract:

Over the past two decades, by some measures, paying dividends has become a less favorable choice for firms. At the same time, the business environment in which firms operate has also become more competitive. This raises an interesting question: does a firm's market power in its product market have an effect on its dividend policy, that is, is the competitive structure of the industry within which the firm operates important for financial policy? This paper investigates how and why market power affects a firm's dividend policy. We use three measures of market power, the Herfindahl-Hirschman index, the degree of import competition and the Lerner Index and find that market power positively affects the dividend decision, both in terms of the probability of paying a dividend and the amount of the dividend. We also provide evidence that the route through which market structure affects the dividend decision is business risk: more competitive firms are riskier and less likely to pay dividends than firms with market power.

Key Words: dividend policy, market power, business risk
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The strength of Intel's competitive position combined with our solid financials allows us to again reward Intel shareholders with an increase in the quarterly dividend.

Craig Barrett, Intel's chairman, Wall Street Journal, Mar21, 2008[1]

1. Introduction

The dividend policy of Corporate America has gone through significant changes over the past two decades. Fama and French (2001) document that the proportion of listed firms paying cash dividends fell from 66.5% in 1978 to 20.8% in 1999. Even after controlling for firm characteristics such as size, growth opportunities, and profitability, the propensity to pay a dividend still declined. DeAngelo et al. (2004) report that dividends have become highly concentrated among a small group of firms that experienced substantial earnings during this period. Further, Skinner (2008) argues that dividends are gradually being replaced by stock repurchases while even the big dividend payers have become increasingly conservative in their dividend payments.

Over the same period, the business environment faced by American firms has changed remarkably. Alan Greenspan (2002), at the time the Governor of the Federal Reserve Board, pointed out that

> "a wave of innovation across a broad range of technologies, combined with considerable deregulation and a further lowering of barriers to trade, fostered a pronounced expansion of competition and creative destruction."

This transformation of the competitive environment has brought new opportunities as well as challenges for both incumbents and new entrants alike. In all likelihood it has increased the business risk faced by the typical American firm. These two trends elicit an interesting question: is a firm's dividend policy influenced by its competitive environment, and in particular by its relative position in the market?

In this paper we conduct a comprehensive empirical study to investigate this linkage between market structure, risk and dividend policy. Since firms decide their financial policies to accommodate their business risk, in the sense that financial risk is layered on top of business risk,

[1] "Intel to Boost Its Dividend About 10%", Wall Street Journal, March 21, 2008.

changes in a firm or industry's competitive status should trigger changes in its financial policies. Microeconomic theory has long shown that a firm's market power affects its business risk, that is, the risk associated with operating earnings. Further survey studies (Lintner 1956 and Brav et al. 2005) have demonstrated that firms view the stability of future earnings as one of the most important determinants of their dividend policy. Consequently, a firm's market power should influence its dividend policy through its impact on business risk. This risk-based perspective can help us understand the potential link between the above two trends, both in dividend policy and the degree of market competition.

At the same time, a number of regulatory reforms and market innovations have brought in new entrants to the capital market. Reforms in the financial industry have made it easier for some firms to finance through the public markets via an initial public offering, rather than relying on the private venture capital market; consistent with the new-listing phenomenon documented by Fama and French (2001, 2004). These newly-listed firms, with predominantly unstable profitability but strong growth opportunities, are typically firms in the growth stage of their life-cycle and lack market power. Consequently, they are not proper candidates to pay dividends according to the life-cycle theory of dividends advanced by Fama and French (2001), Grullon et al. (2002), DeAngelo et al. (2006) and others.

On the other hand, challenges from domestically based new entrants, combined with an influx of foreign products due to increased international trade, impair the market power of established firms, thereby increasing their business risk. Escalating business risk experienced by existing firms would impede both their incentives to initiate dividends and raise them, regardless of their stage in the life-cycle. This view is supported by Skinner (2008) finding of increasing conservatism even by dividend payers and the findings of Aivazian et al. (2006) and others that dividends are increasingly "sticky" in the sense that dividend payers are reluctant to increase their dividend payments.

The impact of competition on business risk may vary across firms. Studies have shown that a firm with relatively higher market power should be less affected by either its competitive environment or exogenous shocks. Since the firm can pass through the shocks to its customers, it can attenuate the instability of its cash flows (Booth, 1981; Gaspar and Massa, 2006; Irvine and Pontiff, 2009). This

result is also consistent with DeAngelo et al. (2004) finding of an increasing concentration of dividends among a small group of well-established firms. Overall, the impact of market power on a firm's business risk provides a framework that enables us to understand these recent changes in dividend policy documented in the literature.

The industrial organization and international trade literatures recommend three market power measures which allows a relatively complete description of market power. At the industry level, the Herfindahl-Hirschman index (HHI) is used to capture domestic market power, by providing a more sophisticated measure of the degree of concentration within an industry than simple concentration ratios. In contrast the level of import penetration is used to capture the market power of firms exposed to challenges from foreign rivals, a feature of competition not captured by the HHI. The assumption is that the average firm in an industry with higher HHI or lower import penetration has higher market power compared to firms in other industries. Finally, firm-level market power is measured by the accounting-based approximation to the classic Lerner index, which directly captures a firm's ability to charge a market price above its marginal cost and thus the elasticity of the demand curve faced by the firm.

The empirical findings from a sample of manufacturing firms during the period 1972-2002 generally support the prediction that a firm with higher market power is more likely to pay a dividend and when it does pay more. The explanatory power of both the degree of import penetration and the Lerner index are statistically significant even when controlling for traditional firm characteristics associated with dividend policy such as the firm's profitability, size, growth opportunities, retained earnings, and current risk. This in itself is a strong result, since these firm characteristics are themselves endogenous to the firm's market structure. On the other hand, the explanatory power of the HHI is less stable; a result that could be attributed to the fact that the HHI is only available every five years and only for the short sample period 1982-1996. It may also be that the HHI is subject to the contestable market argument, associated with the fundamental changes occurring as a result of globalization and deregulation.

Investigation of the mediating channel for the impact of market power on dividend policy supports the risk-based explanation. Firms with higher market power experience less business risk in the

future, which is reflected in both higher profitability and more stable operations. Hence, the persistence and stability of earnings in the future, consequent on a firm gaining market power, can reduce a firm's reluctance to pay dividends or increase them, consistent with recent survey findings.

This paper is closely related to a recent paper by Grullon and Michaely (2008) -- it asks a similar question but from a different perspective. Grullon and Michaely (2008) focus on the corporate governance role of product market competition from an agency-based perspective. They conjecture that firms operating in highly competitive industrial sectors have higher payout ratios (either dividend or total payout), since competition constrains firms from wasting corporate resources through perquisite consumption and managerially based investment decision. In contrast, and with all else constant, firms with market power have an agency-based incentive to spend corporate resources for the benefit of managers, rather than shareholders. If this reasoning is correct, increasing competition over the past two decades should lead to better governance, more firms paying dividends, and larger dividend payments: a conjecture which contradicts the extant evidence In contrast, the risk-based explanation advanced in this paper is consistent with existing evidence both over time and across firms.

This paper contributes to the literature in several ways. First, it helps understand recent changes in dividend policy as documented in Fama and French (2001), DeAngelo et al. (2004), Avazian et al. (2006) and Skinner (2008), by suggesting that market power and industrial structure is a fundamental determinant of dividend policy through its impact on business risk. Second, this paper complements the classic life-cycle theory of dividend policy articulated by DeAngelo, DeAngelo, and Stultz (2006). The process of a firm moving to the mature stage in its life-cycle is also the process of gaining market power, where the speed of this progress is also a function of consolidation within the industry as the number of firms operating in the industry declines. Finally, this paper contributes to the literature that links industrial organization and finance, such as Booth (1981) on equity costs, Xu (2008) on capital structure, and Gaspar and Massa (2006) and Irvine and Pontiff (2009) on idiosyncratic volatility.

The remainder of this paper is organized as follows. Section 2 reviews the literature. Sample selection criteria and variable definitions are presented in Section 3. Section 4 reports the results of the impact of market power on dividend policy and the risk-based explanation. Section 5 concludes.

2. Literature Review

In an imperfectly competitive economy, a firm faces a downward-sloping demand curve for its own product, indicating that the market price of its product will increase when the firm reduces supply. This firm is regarded as having market power since at the profit-maximizing output level it can profitably charge a product price above its marginal cost.[2] Further, given this ability to partially influence its price, the firm is able to smooth the fluctuation of its operating income in the face of exogenous economy-wide and/or firm-specific shocks. The reduced business risk due to market power will be reflected in capital markets, in the form of lower systematic and/or idiosyncratic volatility of the firm's stock returns.

The impact of a firm's market power on its risk has been investigated in several empirical and theoretical studies.[3] An early empirical study by Sullivan (1978) documented a negative correlation between the CAPM beta and market power. He speculated that a firm with market power will be able to "influence or more successfully react to major changes in social, economic and political events" and hence is less subject to systematic risk. This idea was formalized by both Subrahmanyam and Thomadakis (1980) and Booth (1980 and 1981) who both looked at the impact of price uncertainty on a firm's cost of capital. Due to the non-infinite price-elasticity of demand faced by a firm with market power, the economic rents generated from the optimal output decision

[2] From an antitrust perspective, market power indicates the potential that consumers can be exploited and resources may be misallocated due to the absence of competition. However, if market power results from owning superior products or business acumen, it is justified by intellectual property and does not offend the antitrust laws (Federal Trade Commission, Protecting America's Consumers, part III, http://www.ftc.gov/opp/jointvent/classic3.shtm). Instead of investigating the social welfare implications of market power, this paper focuses on the impact of market power on a firm's corporate financial decisions, more specifically, dividend policy.

[3] The measures of market power are different in empirical studies. Sullivan (1978) defines a firm with market power as a larger firm and/or a firm in a concentrated industry. Gaspar and Massa (2006) measures market power by the Lerner index of the firm and market concentration of the industry that the firm belongs to. In Irvine and Pontiff (2009), a firm with higher market power is measured by belonging to industries with lower industry turnover or import penetration, or having higher return on assets.

allow the firm to mitigate the impact of economy-wide shocks. Therefore, the firm's systematic risk and cost of equity capital will decrease accordingly.

Using the more sophisticated techniques of asset-pricing tests, Hou and Robinson (2006) find that firms operating in more concentrated industries earn lower returns after controlling for generally-accepted risk factors. They propose a risk-based explanation that firms in concentrated industries face fewer distress risks or engage in less innovation and thus have a lower cost of capital, which is consistent with the earlier theoretical work. Further, several recent papers have investigated the potential impact of market power on a firm's idiosyncratic risk. Gaspar and Massa (2006) find that firms with higher market power have lower idiosyncratic volatility. Their explanation is that market power can help a firm hedge the firm-specific shock from its product market and/or reduce the information uncertainty faced by its investors. Irvine and Pontiff (2009) document that the increase in idiosyncratic return volatility over the past four decades is associated with a concurrent increase in the idiosyncratic volatility of fundamental cash flows, while the latter is closely related to intensive competition caused by deregulation and globalization. Peress (2007) sets up a rational expectation model under asymmetric information to formalize these recent empirical findings, where firms with more market power are able to transfer exogenous shocks in their product markets to customers and reduce the impact on their profits. Despite focusing on different aspects of a firm's risk and using different measures of market power, these papers have used more modern statistical techniques to confirm the classic result that firms with more market power are less risky.

Risk has always been an important determinant of dividend policy. In their influential book on value-investing, *Security Analysis*, Graham and Dodd (1951, p.596) give possibly the earliest discussion of the link between risk and dividend policy by pointing out that

> "a sound and realistic procedure for management would be to select some conservative dividend rate as a base which is expected to be adhered to under all but unexpected adverse developments"

The field survey conducted by Lintner (1956) shows that conservative managers usually are reluctant to increase dividends that will subsequently have to be reversed due to negative cash flow shocks. More recently Brav et al. (2005) find that more than two-thirds of the CFOs of dividend-paying firms regard the stability of future earnings as a very important factor to their dividend

policies, just second to maintaining consistency with historic dividend policy. Further, Brav et al (2008) find in a survey on the impact of the May 2003 dividend tax cut that the stability of future cash flows is regarded as the most important factor for dividend initiators.

While field work is unambiguous that business risk affects dividend policy, several recent empirical studies have investigated the link between dividend policy and both the systematic and idiosyncratic risk of its stock returns. In reexamining the information content of dividend changes, Grullon et al. (2002) find that risk decreases following a dividend increase. They interpret the result as evidence that the firm has moved to the mature stage of its life-cycle, where it has fewer growth opportunities and assets in place play a bigger role in determining the firm's value. Further, they argue that dividend changes convey information regarding the change in the future riskiness of a firm's cash flow. Hoberg and Prabhala (2009) investigate the link between a firm's propensity to pay dividends and its systematic and idiosyncratic risks. They find that firms with higher risk, systematic or idiosyncratic, are less likely to pay dividends. They claim that risk can explain almost 40% of the Fama French disappearing dividends puzzle. Similarly Booth and Xu (2007) show that firms with more idiosyncratic risk are more likely to smooth their dividends, due to the associated information asymmetries. Moreover, the explanatory power of idiosyncratic risk is economically more important than that of systematic risk. Besides, Chay and Suh (2008) find international evidence that a firm's cash flow uncertainty, measured by its current stock return volatility, affects both its decision to pay a dividend and the amount of dividend payment.

It is clear from the existing literature that there is a strong link between risk, however defined, and a firm's dividend policy. It remains to relate these results to the fundamental, which determines this risk, which we conjecture is in part the existence of market power.

3. Sample Selection and Variable Definitions

Taking the CRSP/Compustat Merged Database (Industrial Annual) as the base sample, we follow the method described in Fama and French (2001), with some minor modifications, to get the raw accounting variables and screen the sample for outliers (see Appendix A for details). The CRSP historical SIC codes are used to identify the four-digit SIC code for each firm-year observation. Due to the data availability of industry-level measures of market power from the Census of

Manufacturers and the NBER Trade Database, the sample is limited to firms operating in manufacturing industries (SIC 2011-3999) during the period 1972-2002. The final sample is an unbalanced panel comprising 27,520 firm-year observations.

Two aspects of dividend policy are considered: the likelihood to pay a dividend and the level of the dividend payment. Following Fama and French (2001), the likelihood to pay a dividend is measured by a payer dummy, which takes the value one for any year *t* if the dividend per share (Compustat data 26) of the firm in that year is positive and zero otherwise. Following Fama and French (2002), the level of dividend payments for any year *t* is the common dividends (Compustat data 21) scaled by total assets for year *t.* [4]

Market power is defined as the ability of a firm to raise the price of its product above its marginal cost. However, there is no consensus as to the proper empirical proxy for market power due to the complexity of the real world. Therefore, three proxies that have been applied in the industrial organization literature are used: the Herfindahl-Hirschman index, the level of import penetration, and the Lerner index.

Domestic competition is measured by the Herfindahl-Hirschman index (HHI), a measure widely applied in empirical studies of industrial organization (Schmalensee, 1989). It is defined as the sum of the squared market shares of all the firms in a given industry (Herfindahl 1950). An industry with a higher HHI is generally regarded to be less competitive, indicating that firms in the industry have greater market power relative to firms in more competitive industries with a lower HHI. The HHI data used in this research are collected from the 1982, 1987 and 1992 Census of Manufacturers. Compared with the Compustat-based HHI, the Census-based HHI is more accurate since it is based on information from both private and public firms in a four-digit SIC industry.[5] Regulators such as

[4] Two other popular measures are dividend yield (defined as DPS/P) and dividend payout ratio (defined as DPS/EPS). However, the noise added by price variations reduces the soundness of dividend yield as a stable measure. Due to dividend smoothing found by Lintner (1956), many firms that experience temporary negative earnings avoid changing their dividend payment. Therefore, these two measures are not used in this paper.

[5] Starting from 1997, the North American Industry Classification System (NAICS) replaced the SIC system to categorize industries in the Census. Ali et al. (2008) recently propose a method to translate the NAICS-based HHI into the SIC-based HHI. However, they neglect the fact that these two categorizing systems are not one-to-one matching, i.e.

the Department of Justice use the Census-based HHI to measure market power in designing antitrust policies. However, one limitation of using the Census-based HHI is the lack of time series variations, since it is only updated every five years and hence at most three values are available for each industry in our study. Following MacKay and Phillips (2005) and Akdogu and MacKay (2008), the same HHI is assigned to each industry until the next census year, i.e. the 1987 HHI is assigned to observations in 1987, 1988, 1989, 1990, and 1991.

Due to increasing globalization, the market power of a firm is affected not only by other domestic firms in the same industry, but also by foreign rivals that provide similar products. It has been widely accepted that international trade increases competitive pressure for domestic firms, since foreign supply pushes down the product price in the domestic market and hence reduces the market power of domestic firms (Helpman and Krugman, 1985, 1989).[6] Therefore, competitive pressure from foreign rivals should be an indispensable aspect in the analysis of market power.[7] One widely-accepted measure of industry-level competitive pressure from foreign rivals is import penetration, defined as the proportion of domestic demand that is satisfied by imports (Tybout, 2003). More specifically, import penetration of industry *i* at year *t* is defined as follows:

$$\textit{Import Penetration } (IP_{it}) = \frac{imports_{it}}{shipments_{it} - exports_{it} + imports_{it}}$$

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one NAICS code may be matched to several SIC codes, and vice versa. To avoid potential measurement errors associated with this translation, our paper only considers the time period when the SIC-based HHI is available.

[6] This idea has been formalized by many models developed in international trade under imperfectly competitive product markets.

[7] For an industry like Motor Vehicles and Passenger Car bodies (4-digit SIC code 3711), four-firm concentration ratio has always been above 90% and HHI was 2676 in year 1992 as documented by the Census of Manufacturers. Both indicators imply that this industry is highly concentrated. Further investigation on the Compustat shows that three major manufacturers have dominated this industry, i.e. General Motors, Chrysler, and Ford. However, it is improper to conclude that these firms can enjoy the market power since news on employee layoffs and branch shutdowns have been frequently reported in major journals and newspapers. Actually, increasing import has intensified competition and survival threat faced by these giant American car manufacturers. Import penetration in this industry has steadily increased from 14.68% in 1972 to 32.74% in 1996; while the average (median) import penetration across all manufacturing industries has increased from 6.63% (3.54%) to 20.97% (14.94%) during the same period. Therefore, without considering competitive pressure brought by foreign rivals, GM, Chrysler, and Ford may be incorrectly classified as firms with high market power.

where the denominator measures the domestic absorption of the products from industry *i* at year *t*. Higher import penetration implies a lower proportion of domestic product consumed in the domestic country, which indicates lower market power for domestic firms.

Import penetration data for four-digit SIC-based manufacturing industries come from two datasets compiled by Professor Peter Schott.[8] The first dataset contains import penetration data during the period 1972-1996, and it has been used by Bernard et al. (2006). The second dataset contains the data of multilateral imports and exports for the period 1989-2005. Along with the values of shipments documented in the NBER-CES Manufacturing Industry Database (1958-2002), we can calculate import penetration for the period 1989-2002.

Two datasets are not perfectly comparable since the second trade dataset uses a revised version of HS-SIC4 concordance, which provides a more complete match of the imports and exports for the relevant domestic industries.[9] As a result, these two datasets may provide different values for the import penetration of a given industry during the overlapping period 1989-1996. To obtain import penetration for the entire 1972-2002 period while minimize the potential inconsistency between two datasets, we consider the following two approaches. The first approach is to keep intact the 1989-2002 import penetration calculated from the second dataset, and decide whether to extend the time series back to 1972 by using the first dataset. For each industry, we compare the values of its import penetration in 1989 from two datasets. If the absolute value of their difference ratio ((IP from 1989-2002 dataset)/(IP from 1972-1996 dataset)-1) is lower than 25%, 1972-1988 values will be included in the study. The alternative approach that combines the two datasets is to take all the values of

[8]The first dataset is available under section "Import Penetration by SIC4 (1987 Revision) Manufacturing Industry, 1972 to 1999" at http://www.som.yale.edu/faculty/pks4/sub_international.htm. The data are actually available for year 1972-1996. Prof. Schott kindly provided us the second dataset, containing multilateral imports and exports during 1989-2005.

[9] Before 1988, imports were classified according to the Tariff Schedule of the United States Annotated (TSUSA), while U.S. exports were classified according to the "Schedule B" system. The Ominus Trade and Competitiveness Act of 1988 mandates that both imports and exports are classified under the Harmonized System (HS) afterwards (Feenstra, 1996 and 1997). The Center for International Data at UC Davis (http://www.internationaldata.org/) provides the annual data of U.S. imports and exports between 1972 and 2006. Besides TSUSA, Schedule B, and HS classification according to reporting years, these data also contain import- and export-based SIC number. However, the import- and export-based SIC number are different from domestic-based SIC codes, which are defined according to the method of processing for a good but this information is unknown for import and export (Feenstra et al. 2002). Since the value of shipments required in import penetration formula is for industries classified according to domestic-based SIC, we need import and export data identified based on domestic SIC codes. Therefore, we use the data provided by Peter Schott.

import penetration from the 1972-1996 dataset, and then decide whether to extend the time series to 2002 with data from the 1989-2002 dataset. This alternative approach requires the comparison of the values of import penetration in 1996, by following the decision criterion mentioned above.

Appendix B reports the annual mean and median of import penetration across all industries in the manufacturing sector for the period 1972-2002 according to these two approaches. In any year the distribution of import penetration across industries is positively skewed, which indicates that some industries are heavily exposed to foreign competition. Moreover importantly, on average import penetration has steadily increased and more than tripled during the sample period, with mean (median) import penetration increasing from 7.88% (3.81%) in 1972 to 26.33% (19.73%) in 2002 for the first approach; and increasing from 6.63% (3.54%) in 1972 to 27.20% (20.49%) in 2002 for the second approach. This trend implies that on average U.S. manufacturing firms have become more exposed to competitive pressures from foreign rivals as a result of globalization.

Our preference is to use the updated dataset as much as possible. Apparently, the first approach uses all the updated data, while the second approach only selectively uses the updated data after 1996. Thus, for the main test, we take the 1972-2002 value of import penetration constructed by the first approach. Nevertheless, we will also consider the values of import penetration constructed by the second approach in order to perform a robustness check on our results.

When the above two industry-level measures of market power are applied to a firm-level study, an implicit and unrealistic assumption is that every firm in a given industry has the same level of market power. To capture the cross-firm difference in market power, the Lerner index is used, defined as (P-MC)/P, where P is a firm's product price and MC is the marginal cost of production (Lerner, 1934). Theoretically, a firm's Lerner index is equal to the inverse of the price elasticity of the demand curve for its product. By definition, the Lerner index directly captures the property of market power, i.e. the ability of a firm to charge price above marginal cost. One challenge to use the Lerner index in empirical studies is that marginal costs are unobservable. Researchers generally approximate the Lerner index by the price-cost margin, where marginal cost is substituted by a measure of average variable cost. Following Gaspar and Massa (2006), the Lerner index is defined

as operating profits (before depreciation, interest, special items, and taxes) over sales. The Lerner index is estimated for each firm using data from COMPUSTAT.

[Insert Table 1 here]

Table 1 shows the pairwise correlations among the three measures of market power at the industry level. Since the Lerner index is calculated at the firm level, it is averaged across firms within each four-digit SIC industry for each year, using either equal weights (Panel B) or value weights based on sales (Panel C). The industry median value for the Lerner index is used (Panel D) to minimize the impact of outliers in all three panels. The Lerner index is negatively correlated with import penetration and positively correlated with the HHI. These findings are consistent with previous analysis that high market power can be measured by low import penetration, high market concentration, and high values for the Lerner index. Hence, the findings confirm that all three measures provide a consistent description of market power. Further, the correlation between import penetration and the HHI is negative but insignificant, indicating that competition among domestic firms and competition caused by foreign rivals are two distinct aspects of market structure.

Previous studies have identified several firm characteristics that can explain a firm's dividend policy. Fama and French (2001) emphasize that size, profitability, and growth opportunities are the three most important determinants of a firm's propensity to pay a dividend. Firm size is measured by its NYSE decile for a given year (NYP) so as to neutralize any effect of the growth in firm size over time. Profitability is measured as the ratio of a firm's earnings before interest and tax to its total assets. Investment opportunities are measured by two variables: the firm's growth rate of assets (AGR) and its market-to-book ratio (M/B). Fama and French (2001) find that larger, more profitable firms with fewer growth opportunities are more likely to pay dividends. In testing for the level of dividend payments, the Fama and French (2002) specialization is used, where the natural logarithm of a firm's total assets is used as the proxy for size.

DeAngelo et al. (2006) suggest using the ratio of retained earnings over total assets (RE/TA) as a measure of a firm's stage in its life cycle and find that it is an important determinant of the propensity to pay a dividend. Firms with low RE/TA tend to be in the early stage of their life-cycle where capital accumulation is still underway, so they are less likely to pay a dividend. Conversely,

firms with high RE/TA tend to be in the mature stage, where they have accumulated profits and become largely self-financing, so they are likely to pay a dividend. Altman et al (1977) have also used this measure as a proxy for risk consistent with the conjecture that market power is a determinant of risk and the stage in the firm's life cycle.

Hoberg and Prabhala (2009) find that a firm's systematic and idiosyncratic risk can explain its propensity to pay a dividend. Chay and Suh (2008) find international evidence that a firm's cash flow uncertainty, measured by its current stock return volatility, affects both the likelihood to pay a dividend and the amount of the dividend. To control for current stock return volatility (RETVOL), the standard deviation of a firm's monthly returns during a one-year period is used. The details for constructing these variables are given in Appendix C. All the control variables are winsorized at 1 and 99 percentile to avoid the impact of extreme values.

[Insert Table 2 Here]

Table 2 presents the descriptive statistics and correlation matrix of firm-level variables. About 61% of firm-year observations in the sample pay dividends and most firms are quite large. The correlation between profitability and RE/TA is 0.657. The high correlation is interpreted by DeAngelo et al. (2006) as RE/TA partially capturing current profitability. The Lerner index is also highly correlated with profitability, with a correlation equal to 0.750. This high correlation is unsurprising since the Lerner index is approximated by operating income over sales and profitability is defined according to Fama and French (2001) as the earnings before interest and tax over total assets. Since high correlations may indicate potential multicollinearity among these variables, variance inflation factors (VIF) are calculated for each variable. Results reported in Panel C show that the VIFs of all the variables are far below critical the value of 10. As a result, multicollinearity should not be a significant concern.

4. Empirical Results

The main focus of this research is on the impact of market power on two aspects of a firm's dividend policy: the decision to pay a dividend and the level of the dividend payment. To give a complete picture, all three measures of market power are considered both with and without controlling for other firm characteristics. The reason for this is that firm characteristics are themselves endogenous to the market structure in which the firm operates. After establishing the positive impact of market power on a firm's dividend policy, our paper shows that this relation can be further explained by the effect of a firm's market power on its future business risk.

Following Fama and French (2001), a multivariate logit model is estimated, where the dependent variable is a payer dummy, which equals one if firm *i* pays dividends in year *t* and zero otherwise. Other firm characteristics documented in the literature, such as firm size, profitability, growth, retained earnings over total assets, and current risks are also used as controls. The Fama and MacBeth (1973) procedure is applied for the estimation: the cross-sectional logit regression is estimated year-by-year and the reported coefficients are the time series averages of the annual estimates. The standard errors of the coefficients are constructed from the time series of the standard deviations of the annual estimated coefficients and are adjusted for autocorrelation using a Newey-West (1987) adjustment of two lags.

[Insert Table 3 here]

The results from the analysis are presented in Table 3. In more detail, the models presented in Panel A of Table 3 replicate regression specifications already discussed in the literature. In particular, Models A.1 and A.2 follow the specifications given in Fama and French (2001). Models A.3 and A.4 add RE/TA, the ratio of cumulative retained earnings to total assets, as an explanatory variable according to the specification given by DeAngelo et al. (2006). Models A.5 and A.6 are similar to Hoberg and Prabhala (2009), which considers current stock return volatility, and Model A.7 pools all these variables together. The results are consistent with previous findings that larger firms, more profitable firms, firms with fewer growth opportunities, firms with higher accumulated earnings, and firms with lower current risk are more likely to pay dividends.

Models in Panel B investigate the explanatory power of various market power measures without controlling for other firm characteristics. All three measures of market power have significant explanatory power for a firm's decision to pay a dividend. Their signs are consistent with the prediction that a firm with higher market power, demonstrated either by being a part of a more concentrated industry or by being a part of an industry with a smaller influx of foreign products or by being able to charge the price of its product above the marginal cost, is more likely to pay a dividend. Moreover, the test of the joint significance of the import penetration and the HHI variables in Model B.4 shows that the explanatory power of both measures remains significant, which is consistent with the fact that these two measures capture different aspects of market power.

To assess the robustness of these results, Panel C shows the results where control variables are structured in the basic form given by Fama and French (2001). These specifications are a particularly hard test for the model, since the control variables themselves are endogenous, that is, they are a function of the firm's market power. However, the results regarding the effect of import penetration remain robust. The coefficient is significant and it has the correct sign in both specifications of the control variables. When attention is turned to the Lerner index, even though its explanatory power decreases, it still retains significant with the correct sign, even when all the control variables are pooled together. Moreover, considering the high correlation between the Lerner index and profitability, if the profitability variable is not included in the regression, the explanatory power of the Lerner index increases notably. On the other hand, the coefficient estimates of the HHI are insignificant, but with the correct sign. This result may be partially attributed to the lack of variation of the Census-based HHI; data are available only for the years 1982, 1987, and 1992.

To summarize, the results of the logit models presented in Table 3 exhibit a positive relation between market power and the decision to pay a dividend. Furthermore, among the three measures of market power, the explanatory powers of import penetration and the Lerner index are found to be significant and robust to the different specification of control variables, whereas the performance of the HHI is found to be sensitive to the inclusion of control variables.

The results tabulated in Table 4 present tests of the relationship between a firm's market power and the level of its dividend payment. The dependent variable is the common dividend scaled by total assets. Time fixed-effects are used to control for common trends across all firms. Since import penetration and the HHI are industry-level measures, the industry fixed-effects are only applied for the regressions where market power is measured by the Lerner index. As suggested by Petersen (2009), clustered robust standard errors are used to account for within-firm correlation of the error terms, i.e. the observations are assumed to be independent across firms, but not within firms. Since common dividends cannot be negative, estimating the model by ordinary least squares (OLS) will lead to biased estimates of the coefficients. In order to circumvent this problem, the research design of Fenn and Liang (2001) is followed using a one-sided Tobit model for dividend payments (censored at zero). The marginal effects are reported in Table 4.[10]

[Insert Table 4 here]

The models in Panel A examine the explanatory power of the three measures of market power without controlling for other firm characteristics. The results are consistent with the prediction that firms with higher market power, as defined by any of the three measures, pay more dividends.

The models in Panel B include other firm characteristics that are relevant to dividend policy. Model [1] only examines standard firm characteristics. It shows that firms that are either larger or more profitable or with higher RE/TA pay more dividends; firms with higher asset growth rates and currently riskier firms pay lower dividends.[11] Models [2]-[5] of Panel B investigate the impact of the various market power measures on dividend payments after controlling for other firm characteristics. Although the explanatory power of the HHI becomes unstable and insignificant,

[10] We apply the OLS regression for all the specifications and get qualitatively similar results.

[11] The positive coefficient estimate of the market-to-book ratio seems contrary to the implication of the expected growth opportunities as found in Table 3. However, this positive coefficient on market-to-book has also been documented in Fama and French (2002) and Li and Zhao (2008). A firm's market value measures two parts: the value of growth opportunities and the value of assets in place. The second part implies that market-to-book ratio also contains information about current profitability. Fama and French (2002) argue that the positive coefficient of market-to-book may indicate that M/B contains more information about current profitability and less information about future growth options for dividend payers. This interpretation is consistent with the view given by Grullon et al. (2002) that a dividend payer is usually in its mature stage, where assets in place are the dominant determinant of its market value.

coefficient estimates of import penetration and the Lerner index do remain statistically significant with the expected sign even after including all control variables in the specification. Considering the high correlation between profitability and the Lerner index, the explanatory power of the Lerner index with all control variables except profitability is examined in Model [6]. Although the coefficient estimates of other variables are unchanged, the explanatory power of the Lerner index almost doubles.

The results presented in Table 3 and Table 4 show that the impact of market power on a firm's dividend policy is sensitive to the measure of market power used in the analysis. The explanatory power of the HHI is the least robust, which can be explained either by theoretical or empirical arguments. Theoretically, the classic 'high HHI – high market power' argument is challenged by the contestable market theory proposed by Baumol (1982). This theory argues that the threat of entry ensures that market power is constrained or eliminated; hence an industry with few firms may still be competitive due to the existence of potential entrants. In recent years, both globalization and deregulation have increased the threat of entry, which weakens the link between the HHI and market power. Nevertheless, the HHI still has strong explanatory power when control variables are not considered, making this reasoning less relevant. Empirically, the Census-based HHI used in our study lacks time variation since the data is available every five years during a short sample period. Thus, the impact of market power measured by the HHI may have been absorbed into other dividend determinants such as profitability, size, and lower current risk, which in turn weakens the direct explanatory power of the HHI.

The empirical evidence suggests that market power has a positive impact on a firm's dividend policy – a firm with higher market power is both more likely to pay a dividend and pay more. However, what is left unanswered is how? Microeconomic theory shows that a firm with market power is able to smooth the fluctuation of its operating performance and sustain superior profitability when facing unexpected economy-wide and/or firm-specific future shocks, i.e. high market power helps reduce a firm's business risk. With the expectation of more stable and stronger future cash flow, managers would be more confident about their ability to pay and maintain a dividend payment. This leads to the hypothesis that a firm with higher market power has lower business risk.

[Insert Table 5 here]

The models in Panels A and B of Table 5 test the validity of this hypothesis by investigating the impact of a firm's market power at year *t* on the stability and level of its operating performance during the next five years [*t*+1, *t*+5]. Two measures of operating performance are chosen consistent with Barber and Lyon (1996). The first measure is the return on assets (ROA), defined as the operating income before depreciation scaled by the average of the beginning- and ending- period book value of total assets. However, operating income is an accrual-based measure, which is subject to potential earnings manipulations. In order to avoid the bias introduced by potential earnings manipulations, Barber and Lyon (1996) suggest using the cash-flow return on assets (CFROA), defined as the operating cash flow scaled by the average of beginning- and ending-period book value of total assets (see Appendix C for details).

Regression estimates tabulated in Panels A and B support the predictions that a firm with higher market power will have more stable and better operating performance in the future, regardless of which measure of operating performance is used. The predictive power of both import penetration and the Lerner index is robust to the inclusion of controls. It can also be noticed that coefficient estimates of the HHI suggest an opposite effect on risk, when other firm controls are used. To some extent, the relative performance of the three market power measures on predicting future business risks appears to be consistent with their relative performance in the dividend policy tests. Coefficient estimates of the control variables show that more profitable, larger firms with more retained earnings have more stable and better performance in the future, whereas firms with high growth rates or currently riskier firms have higher business risk. The market-to-book variable is excluded from the regression specifications, since it contains the mixture of information on assets in place and future growth opportunities, which have opposite impacts on a firm's business risk in the future.

It is of interest to examine whether the aforementioned results are stable over time or sensitive to different ways of constructing the variables.

[Insert Table 6 here]

Table 6 reports subsample analysis. As mentioned in Variable Definitions section, the values of import penetration used in the above regressions are constructed from combining two datasets according to the first approach, which takes all the values of import penetration calculated with recently updated 1989-2002 dataset and requires a comparison at 1989 to decide whether we can take 1972-1988 values from the [1972, 1996] dataset. Appendix B clearly shows that many industries have been excluded from the 1972-1988 period due to this requirement. To ensure that our previous results are not driven by the sample selection bias caused by the requirement used to construct import penetration for the entire sample period, we relax this constrain in the subsample analysis. We divide the sample into two subsamples: [1972, 1988] and [1989, 2002]. In the 1972-1988 subsample, we will consider all the observations from industries with available values of import penetration in 1972-1996 dataset. The general results are consistent with the findings in Table 4. Moreover, it is interesting to find that the explanatory power of import penetration is stronger in the second period, which is consistent with the argument that the increased levels of competition originating from globalization have become more important.

To check the robustness of our results with respect to the construction of import penetration for the entire sample period, the regressions presented in Table 3 and Table 4 were repeated by using import penetration constructed according to the second option, which requires comparison at 1996 to decide whether use the new dataset for the period 1997-2002. The results, not presented in the paper, are similar.

In Table 3, the approach of Fama and French (2001) was followed using the dividend per share (Compustat DATA26) to identify the dividend payer. However, when investigating the level of dividend payments in Table 4, Fama and French (2002) are followed using common dividend (Compustat DATA21), scaled by total assets. The analysis presented in Table 3, was repeated by defining dividend payer dummy according to common dividends (Compustat DATA21). The results, not presented in the paper, are similar.

Finally, other combinations of control variables were used when testing for the impact of market power on a firm's decision to pay dividends. In particular, all the specifications of firm characteristics given in Panel A of Table 3 are considered separately for each of the measures of

market power. The results, not reported in the paper, are qualitatively consistent with those reported in Panel C, where import penetration offers the most robust explanation and the HHI is not robust to the inclusion of controls.

5. Conclusion

This paper investigates whether a firm's market power in its product market affects its dividend policy, and if so, how this is achieved. The study is based on a sample of manufacturing firms from 1972-2002 and considers three measures of market power suggested in the literature of Industrial Organization and International Trade. The empirical findings generally support the hypothesis that a firm with higher market power is more likely to make a dividend payment and pay more when it does. Moreover, this positive impact can be explained by the fact that firms with higher market power will expect better and more stable operating performance in the near future, which implies lower business risk. The three measures of market power differ in their performance in the tests, where import penetration and the Lerner index offer the most robust explanation while the HHI is not robust to the inclusion of controls.

The findings of this paper are also consistent with recent empirical observations. The recent evidence on various changes in dividend policy can be related to the fundamental changes that have occurred in the competitive environment during the past two decades. Furthermore, the risk-based explanation suggested in this paper also proposes a potential link between two contemporaneous trends – the increasing conservatism in dividend policy and the increasing idiosyncratic volatility.

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Table 1: Market Power Measures

These tables show descriptive statistics and pairwise correlations of three market power measures for four-digit SIC-based industries. Import penetration (IP) and Herfindahl-Hirschman Index (HHI) are industry-level measures of market power. Import penetration (IP) is defined as the proportion of domestic demand that is satisfied by imports. The Herfindahl-Hirschman Index (HHI) measures the domestic market concentration. Firm-level measure of market power, the Lerner index, is aggregated at industry-level using equal-weight average (Lerner(EW)) and sales-based value-weight average (Lerner(VW)) in each industry each year. Lerner(Median) is defined as the median of the Lerner index across all firms in each industry each year. P-value is reported in the bracket.

Panel A: Descriptive Statistics

variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile	N
IP	0.169	0.104	0.189	0.030	0.239	6445
HHI	722.70	498	657.58	243	988	3081
Lerner(EW)	0.094	0.105	0.117	0.072	0.141	6445
Lerner(Median)	0.100	0.106	0.113	0.075	0.140	6445
Lerner(VW)	0.116	0.117	0.102	0.084	0.156	6445

Panel B: Industry EW Average

	IP	HHI	Lerner(EW)
IP	1		
HHI	-0.024	1	
	[0.187]		
Lerner(EW)	-0.050	0.057	1
	[0.000]	[0.002]	

Panel C: Industry VW Average

	IP	HHI	Lerner(VW)
IP	1		
HHI	-0.024	1	
	[0.187]		
Lerner(VW)	-0.027	0.073	1
	[0.037]	[0.000]	

Panel D: Industry Median

	IP	HHI	Lerner(Median)
IP	1		
HHI	-0.024	1	
	[0.187]		
Lerner(Median)	-0.038	0.043	1
	[0.002]	[0.016]	

Table 2: Summary Statistics

These tables present summary statistics and correlations matrix of the firm-level variables used in the regressions. The sample includes all manufacturing firms with available import penetration or the HHI data during 1972-2002 after screening according to Fama and French (2001) criteria. Variables definitions are given in Appendix C. Panel A presents summary statistics of firm characteristics. Panel B presents the correlations between all the firm-level explanatory variables. P-value is reported in the bracket. Panel C presents the result of multicollinearity test.

Panel A: Summary Statistics

Variable	Mean	Median	Standard Deviation	25th Percentile	75 Percentile	N
Dividend Payer	0.609	1.000	0.488	0.000	1.000	27520
Div/TA	0.015	0.009	0.030	0.000	0.022	27503
Profitability	0.056	0.077	0.110	0.040	0.108	27520
LnAsset	5.148	5.029	2.078	3.592	6.606	27520
NYP	4.029	3.000	3.206	1.000	7.000	27520
M/B	1.460	1.139	1.036	0.903	1.592	27520
AGR	0.112	0.071	0.257	-0.012	0.171	27520
RE/TA	0.221	0.306	0.472	0.129	0.449	27520
RETVOL	0.124	0.107	0.074	0.078	0.149	27457
Lerner	0.087	0.108	0.201	0.064	0.156	27467

Panel B: The Correlation Matrix

	Profitability	LnAsset	NYP	M/B	AGR	RE/TA	RETVOL	Lerner
LnAsset	0.237	1						
	[<0.001]							
NYP	0.195	0.818	1					
	[<0.001]	[<0.001]						
M/B	-0.081	-0.022	0.196	1				
	[<0.001]	[<0.001]	[<0.001]					
AGR	0.239	0.034	0.051	0.208	1			
	[<0.001]	[<0.001]	[<0.001]	[<0.001]				
RE/TA	0.657	0.270	0.183	-0.260	0.058	1		
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]			
RETVOL	-0.348	-0.356	-0.277	0.107	0.008	-0.442	1	
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[0.183]	[<0.001]		
Lerner	0.750	0.291	0.210	-0.158	0.133	0.605	-0.315	1
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	

Panel C: Multicollinearity Diagnostic

Variable	Profitability	Lerner	RE/TA	LnAsset	RETVOL	M/B	AGR
VIF	3.03	2.60	2.21	1.58	1.53	1.31	1.16
1/VIF	0.330	0.384	0.453	0.633	0.653	0.762	0.862

Table 3: Logit analysis of the decision to pay dividends as a function of market power

This table reports the coefficient estimates of multivariate logit regressions that investigate the impacts of market power and firm characteristics on a firm's decision to pay dividends. The dependent variable is a dividend payer dummy, equal to one if firm i pays dividend (DATA 26) in year t and zero otherwise. Three measures of market power are tested – import penetration (IP), the Herfindahl-Hirschman index (HHI), and the accounting approximate of the Lerner index (Lerner). Other explanatory variables include: firm size measured by its NYSE decile (NYP), Profitability, Growth rate of assets (AGR), market-to-book ratio (M/B), the ratio of retained earnings over total assets (RE/TA), and current stock return volatility (RETVOL). Details on variable construction are given in Appendix C. Panel A reports the replications of related studies in the literature. Models in Panel B investigate the impact of market power, without any controls, on a firm's decision to pay dividends. Panel C presents the results about the impact of market power on a firm's decision to pay dividends, with some control variables. Fama and MacBeth (1973) methodology is applied for the estimation, where cross-sectional logit regression is conducted year-by-year and the reported coefficients are the time series averages of the annual estimates. The standard errors of the coefficients are constructed from time series standard deviations of annual estimated coefficients and are adjusted for autocorrelation using a Newey-West (1987) adjustment to two lags. t-statistics are presented in italic.

Panel A. Replicating Regressions Documented in the Literature

Model	NYP	Profitability	AGR	M/B	RE/TA	RETVOL	Intercept	N
A.1	0.465	7.662	-1.351				-1.257	27520
	11.87	*7.87*	*-6.24*				*-14.28*	
A.2	0.541	9.923	-0.825	-0.889			-0.586	27520
	13.86	*7.64*	*-3.29*	*-6.99*			*-4.62*	
A.3	0.439	2.662	-0.894		4.401		-2.122	27520
	12.59	*3.39*	*-4.1*		*12.78*		*-17.24*	
A.4	0.499	4.707		-0.814	4.480		-1.557	27520
	15.82	*4.54*		*-12.35*	*15.41*		*-15.14*	
A.5	0.381	6.468	-1.040			-18.542	1.257	27457
	10.95	*6*	*-5.55*			*-19.89*	*10.2*	
A.6	0.446	8.335	-0.635	-0.692		-17.391	1.609	27457
	12.65	*6.15*	*-2.68*	*-6.42*		*-18.72*	*11.05*	
A.7	0.436	4.366	-0.337	-0.664	3.793	-13.944	0.366	27457
	14.55	*4.1*	*-1.59*	*-9.1*	*13.22*	*-16.77*	*2.38*	

(Table 3, continued)

Panel B. The Decision to Pay Dividends as a Function of Market Power (No Controls)

Model	IP	HHI	Lerner	Intercept	N
B.1	-1.756			0.765	27520
	-21.18			*7.03*	
B.2		3.064		0.095	12962
		5.33		*1.03*	
B.3			8.446	-0.363	27467
			9.92	*-4.75*	
B.4	-1.831	3.617		0.385	12962
	-13.88	*5.88*		*4.99*	

Panel C. The Decision to Pay Dividends as a Function of Market Power (With Controls)

Model	IP	HHI	Lerner	NYP	Profitability	AGR	M/B	RE/TA	RETVOL	Intercept	N
C.1	-1.171			0.462	7.650	-1.362				-1.029	27520
	-6.96			*11.83*	*7.76*	*-6.33*				*-9.83*	
C.2	-1.169			0.436	4.303	-0.332	-0.681	3.846	-13.580	0.556	27457
	-6.4			*14.8*	*3.98*	*-1.56*	*-9.3*	*13.91*	*-16.45*	*3.46*	
C.3		0.294		0.515	6.166	-1.608				-1.454	12962
		0.51		*12.48*	*12.22*	*-9.71*				*-11.8*	
C.4		0.364		0.476	2.460	-0.581	-0.554	3.853	-14.860	0.149	12944
		0.39		*11.71*	*5.94*	*-4.18*	*-28.35*	*21.82*	*-17.23*	*1.02*	
C.5			1.271	0.458	6.527	-1.379				-1.280	27467
			3.91	*11.8*	*6.61*	*-6.35*				*-15.33*	
C.6			0.786	0.433	3.822	-0.356	-0.680	3.773	-14.045	0.375	27404
			2.16	*14.58*	*3.48*	*-1.66*	*-9.49*	*13.53*	*-16.85*	*2.47*	
C.7			2.531	0.428		-0.247	-0.637	3.889	-14.047	0.391	27404
			3.93	*14.52*		*-1.09*	*-9.85*	*13.44*	*-16.52*	*2.5*	
C.8	-1.087	0.713		0.510	6.132	-1.612				-1.253	12962
	-4.82	*1.13*		*12.26*	*11.64*	*-9.53*				*-9.16*	
C.9	-1.268	0.842		0.474	2.340	-0.565	-0.571	3.919	-14.515	0.344	12944
	-6.18	*0.83*		*11.81*	*5.33*	*-3.92*	*-25.67*	*23.34*	*-17.69*	*2.33*	

Table 4: Level of dividend payment as a function of market power

This table presents the results of investigating the impact of a firm's market power, without and with controls, on a firm's dividend payment level. The dependent variable is dividend payment, defined as common dividend (Compustat data 21) at year t scaled by total assets (Compustat data 6) at year t. Three measures of market power are tested – import penetration (IP), the Herfindahl-Hirschman index (HHI), and the accounting approximate of the Lerner index (Lerner). Other explanatory variables include: firm size measured by the logarithm of total assets (lnAsset), Profitability, Growth rate of assets (AGR), market-to-book ratio (M/B), the ratio of retained earnings over total assets (RE/TA) and current stock return volatility (RETVOL). Details on variable construction are given in Appendix C. Coefficients are estimated by one-sided Tobit regression (censored at zero). Marginal Effects (ME) evaluated at the means of the independent variables are reported. Clustered robust standard errors are used to account for within-firm correlation of the error terms. Year fixed-effects are included for all the regressions. Industry fixed-effects, based on two-digit SIC, are excluded in regressions that use import penetration or/and the HHI to measure market power.

Panel A: One-sided Tobit Model (no control variables)

	Dependent Variable: Div(t)/Total Assets(t)							
	[1]		[2]		[3]		[4]	
	ME	t	ME	t	ME	t	ME	t
IP	-0.020	-5.95					-0.022	-4.93
HHI			0.027	2.98			0.032	3.55
Lerner					0.078	12.29		
Year dummy	yes		yes		yes		yes	
Industry dummy	no		no		yes		no	
log likelihood	22367.09		7390.94		26340.34		7507.31	
N	27503		12955		27450		12955	
#cluster	2859		1862		2846		1862	

Panel B: One-sided Tobit Model (with control variables)

	Dependent Variable: Div(t)/Total Assets(t)											
	[1]		[2]		[3]		[4]		[5]		[6]	
	ME	t	ME	t	ME	t	ME	t	ME	t	ME	t
IP			-0.006	-4.38					-0.005	-3.13		
HHI					-0.001	-0.15			0.001	0.25		
Lerner							0.013	3.44			0.023	6.41
profitability	0.040	5.09	0.032	5.22	0.035	3.07	0.025	4.85	0.028	3.04		
lnAsset	0.002	9.92	0.002	10.38	0.002	8.02	0.002	9.70	0.002	8.01	0.002	9.45
M/B	0.002	4.23	0.001	3.31	0.002	3.38	0.002	4.46	0.001	3.18	0.002	4.95
AGR	-0.009	-5.68	-0.007	-5.74	-0.011	-3.99	-0.008	-6.48	-0.009	-3.98	-0.008	-6.31
RE/TA	0.023	14.99	0.017	15.14	0.023	10.94	0.023	14.18	0.019	10.93	0.024	14.46
RETVOL	-0.066	-8.30	-0.053	-8.59	-0.089	-5.88	-0.062	-10.06	-0.071	-5.86	-0.064	-10.02
Year dummy	yes		yes		yes		yes		yes		yes	
Industry dummy	yes		no		no		yes		no		yes	
log likelihood	27686.41		27479.18		9765.59		29758.16		9782.38		29698.24	
N	27440		27440		12937		27387		12937		27387	
#cluster	2854		2854		1858		2841		1854		2841	

Table 5: Testing the Risk-Based Explanation

This table presents the results of investigating the impact of a firm's market power and other characteristics at year t on the volatility and mean of its operating performance during the next five years [t+1, t+5]. Following Barber and Lyon (1996), operating performance is measured by two variables: return on assets (ROA) and cash-flow return on assets (CFROA). ROA is defined as the operating income before depreciation (DATA13) scaled by the average of beginning- and ending- period book value of total assets (DATA6). CFROA is defined as the operating cash flow scaled by the average of beginning- and ending-period book value of total assets. The operating cash flow is equal to the operating income before depreciation (item 13) plus the decrease in receivables (item 2), the decrease in inventory (item 3), the increase in accounts payable (item 70), the increase in other current liabilities (item 72), and the decrease in other current assets (item 68). In Panel A, stability of future operating performance is measured by the standard deviation of ROA (σ(ROA)) and the standard deviation of CFROA (σ(CFROA)) during year [t+1, t+5]. In Panel B, level of future operating performance is measured as the mean of ROA and mean of CFROA during year [t+1, t+5]. All explanatory variables are calculated at year t. Three measures of market power are import penetration (IP), the Herfindahl-Hirschman index (HHI), and the accounting approximate of the Lerner index (Lerner). Other explanatory variables include: firm size measured by the logarithm of total assets (lnAsset), Profitability, Growth rate of assets (AGR), the ratio of retained earnings over total assets (RE/TA) and current stock return volatility (RETVOL). Coefficients are estimated by OLS regression. Clustered robust standard errors are used to account for within-firm correlation of the error terms. Year fixed-effects are included for all the regressions. Industry fixed-effects, based on two-digit SIC, are excluded in regressions that use import penetration or/and the HHI to measure market power.

Panel A: the Impact of Market Power on the Stability of Future Operating Performance

	σ(ROA)													
	[1]		[2]		[3]		[4]		[5]		[6]		[7]	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
IP	0.028	5.10							0.012	2.72				
HHI			-0.027	-1.67							0.032	2.58		
Lerner					-0.086	-17.59							-0.027	-5.17
Profitability							-0.056	-6.63	-0.057	-6.62	-0.063	-5.96	-0.024	-2.67
lnAsset							-0.006	-18.13	-0.006	-18.38	-0.007	-14.25	-0.006	-17.00
AGR							0.008	4.27	0.008	4.45	0.009	3.39	0.007	4.04
RE/TA							-0.018	-7.07	-0.019	-7.30	-0.017	-5.00	-0.016	-6.19
RETVOL							0.090	8.43	0.096	9.05	0.114	6.82	0.090	8.50
year dummy	yes		yes		yes		yes		yes		yes		yes	
industry dummy	no		no		yes		yes		no		no		yes	
R2	0.0203		0.0052		0.1723		0.3095		0.297		0.3137		0.3099	
N	19805		9498		19787		19766		19766		9488		19748	
#cluster	2028		1328		2021		2022		2022		1324		2015	

	σ(CFROA)													
	[1]		[2]		[3]		[4]		[5]		[6]		[7]	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
IP	0.045	5.83							0.026	4.09				
HHI			-0.055	-2.70							0.014	0.85		
Lerner					-0.111	-17.26							-0.047	-6.37
Profitability							-0.076	-7.08	-0.075	-6.84	-0.088	-6.54	-0.023	-2.02
lnAsset							-0.008	-15.71	-0.008	-15.87	-0.008	-13.3	-0.007	-14.53
AGR							0.007	2.87	0.007	2.88	0.010	3.07	0.006	2.77
RE/TA							-0.023	-6.67	-0.023	-6.71	-0.019	-4.48	-0.019	-5.51
RETVOL							0.082	7.06	0.088	7.59	0.107	5.57	0.083	7.14
Year dummy	yes		yes		yes		yes		yes		yes		yes	
Industry dummy	no		no		yes		yes		no		no		yes	
R2	0.0287		0.0133		0.1695		0.2607		0.2496		0.254		0.2631	
N	19644		9409		19626		19605		19605		9399		19587	
#cluster	2014		1316		2007		2008		2008		1312		2001	

Panel B: the Impact of Market Power on the Level of Future Operating Performance

	mean(ROA)													
	[1]		[2]		[3]		[4]		[5]		[6]		[7]	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
IP	-0.043	-3.46							-0.021	-2.41				
HHI			0.023	0.57							-0.046	-1.50		
Lerner					0.276	27.54							0.131	12.58
profitability							0.405	25.15	0.413	24.86	0.377	17.98	0.256	14.02
lnAsset							0.004	5.72	0.004	5.46	0.006	6.56	0.003	4.01
AGR							-0.016	-5.00	-0.014	-4.41	-0.017	-3.54	-0.013	-4.31
RE/TA							0.030	7.03	0.030	6.99	0.027	4.95	0.022	5.10
RETVOL							-0.063	-4.08	-0.065	-4.18	-0.068	-2.61	-0.065	-4.27
year dummy	yes		yes		yes		yes		yes		yes		yes	
industry dummy	no		no		yes		yes		no		no		yes	
R2	0.0506		0.0103		0.3334		0.3706		0.3524		0.3283		0.39	
N	19805		9498		19787		19766		19766		9488		19748	
#cluster	2028		1328		2021		2022		2022		1324		2015	

	mean(CFROA)													
	[1]		[2]		[3]		[4]		[5]		[6]		[7]	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
IP	-0.049	-4.07							-0.024	-2.82				
HHI			0.078	2.00							-0.011	-0.36		
Lerner					0.255	27.71							0.127	13.06
profitability							0.324	21.6	0.332	21.37	0.310	16.3	0.181	10.73
lnAsset							0.008	9.92	0.007	10.01	0.009	9.31	0.006	8.22
AGR							-0.025	-8.96	-0.025	-8.56	-0.030	-7.08	-0.024	-8.61
RE/TA							0.033	8.38	0.033	8.41	0.029	5.87	0.023	6.22
RETVOL							-0.055	-3.85	-0.063	-4.27	-0.074	-2.99	-0.059	-4.13
year dummy	yes		yes		yes		yes		yes		yes		yes	
industry dummy	no		no		yes		yes		no		no		yes	
R2	0.0331		0.0114		0.3215		0.367		0.3453		0.3431		0.3862	
N	19644		9409		19626		19605		19605		9399		19587	
#cluster	2014		1316		2007		2008		2008		1312		2001	

Table 6: Subsample Analysis

This table presents the results of investigating the impact of a firm's market power and other characteristics on a firm's dividend payment level for two subsamples, [1972, 1988] and [1989, 2002]. The dependent variable is dividend payment, defined as common dividend (Compustat data 21) at year t scaled by total assets (Compustat data 6) at year t. Three measures of market power are tested – import penetration (IP), the Herfindahl-Hirschman index (HHI), and the accounting approximate of the Lerner index (Lerner). For [1972, 1988] subsample, import penetration comes from the 1972-1996 import penetration dataset posted on Peter Schott's website. For [1989, 2002] subsample, import penetration is calculated based on recently updated 1989-2005 multilateral imports and exports dataset provided by Peter Schott and the NBER-CES Manufacturing Industry Database. Other explanatory variables include: firm size measured by the logarithm of total assets (lnAsset), Profitability, Growth rate of assets (AGR), market-to-book ratio (M/B), the ratio of retained earnings over total assets (RE/TA) and current stock return volatility (RETVOL). Details on variable construction are given in Appendix C. I estimate the coefficients by one-sided Tobit regression (censored at zero). Marginal Effects evaluated at the means of the independent variables are reported. Clustered robust standard errors are used to account for within-firm correlation of the error terms. Year fixed-effects are included for all the regressions. Industry fixed-effects, based on two-digit SIC, are excluded in regressions that use import penetration or/and the HHI to measure market power

Panel A: 1972 to 1988

	Dependent Variable: Div(t)/Total Assets(t)											
	[1]		[2]		[3]		[4]		[5]		[6]	
	ME	t	ME	t	ME	t	ME	t	ME	t	ME	t
IP	-0.014	-4.27					-0.003	-1.58				
HHI			0.020	2.66					-0.003	-0.64		
Lerner					0.089	17.75					0.016	3.95
profitability							0.048	10.32	0.027	5.67	0.035	6.41
lnAsset							0.002	14.48	0.002	11.20	0.002	13.08
M/B							0.003	6.88	0.002	5.47	0.003	6.58
AGR							-0.008	-8.80	-0.008	-5.74	-0.009	-9.06
RE/TA							0.032	19.79	0.024	11.90	0.031	19.04
RETVOL							-0.063	-15.33	-0.065	-8.20	-0.061	-14.57
Year dummy	yes		yes		yes		yes		yes		yes	
Industry dummy	no		no		yes		no		no		yes	
Log likelihood	26426.17		6622.07		28869.44		32551.43		8708.10		32718.61	
N	21354		7475		21328		21285		7450		21259	
#cluster	2504		1668		2497		2498		1663		2491	

Panel B: 1989 to 2002

	Dependent Variable: Div(t)/Total Assets(t)											
	[1]		[2]		[3]		[4]		[5]		[6]	
	ME	t	ME	t	ME	t	ME	t	ME	t	ME	t
IP	-0.023	-5.31					-0.008	-4.04				
HHI			0.038	3.31					0.002	0.39		
Lerner					0.045	7.82					0.008	1.92
profitability							0.027	2.92	0.034	2.10	0.011	2.39
lnAsset							0.002	7.19	0.002	6.57	0.001	6.20
M/B							0.001	1.64	0.001	2.04	0.001	2.98
AGR							-0.008	-4.01	-0.010	-2.92	-0.006	-4.44
RE/TA							0.017	9.76	0.021	8.31	0.016	9.00
RETVOL							-0.070	-6.03	-0.106	-4.82	-0.054	-6.62
Year dummy	yes		yes		yes		yes		yes		yes	
Industry dummy	no		no		yes		no		no		yes	
Log likelihood	5913.16		3119.04		7750.39		7888.78		4307.09		9073.78	
N	12525		7449		12484		12501		7441		12460	
#cluster	1825		1370		1814		1822		1367		1811	

Appendix A. Sample Selection

We follow Fama and French (2001) for sample screening. The CRSP-Compustat sample for calendar year t includes those firms with fiscal year-ends in *t* that have the following data (COMPUSTAT data items in parentheses): total assets (6), stock price (199) and shares outstanding (25) at the end of the fiscal year, income before extraordinary items (18), interest expense (15), dividends per share by ex date (26), retained earnings[12] (36),and (a) preferred stock liquidating value (10), (b) preferred stock redemption value (56), or (c) preferred stock carrying value (130). Firms must also have (a) stockholder's equity (216), (b) liabilities (181), or (c) common equity (60) and preferred stock par value (130). Total assets must be available in year *t* and *t*-1. The other items must be available in *t*. Balance sheet deferred taxes and investment tax credit (35), income statement deferred taxes (50), purchases of common and preferred stock (115), sales of common and preferred stock (108), and common treasury stock (226) are used, but not required. Firms with book equity below $250,000 or assets (current or lagged) below $500,000 are excluded. To ensure that firms are publicly traded, the securities have to have CRSP share codes of 10 or 11.

[12] Fama and French (2001) requirement on dividends for preferred stocks (19) is ignored, while the existence of retained earnings (36) is needed to construct RE/TA ratio as in DeAngelo et al. (2006).

Appendix B. Time Series Data of Import Penetration in Manufacturing Industries

Mean (Median) is mean (median) import penetration across four-digit SIC (1987 version) manufacturing industries for a given year.

	Approach 1) Compare at 1989			Approach 2) Compare at 1996		
Year	Number of Industries	Mean	Median	Number of Industries	Mean	Median
1972	237	7.88%	3.81%	386	6.63%	3.54%
1973	237	8.37%	4.10%	386	7.03%	3.72%
1974	237	8.75%	4.98%	386	7.39%	4.04%
1975	237	8.36%	4.71%	386	7.15%	4.21%
1976	237	8.98%	5.23%	386	7.70%	4.69%
1977	237	9.35%	5.53%	386	7.90%	4.91%
1978	237	10.61%	5.91%	386	9.01%	5.37%
1979	237	10.95%	6.39%	386	9.27%	5.67%
1980	237	11.30%	6.76%	386	9.51%	5.76%
1981	237	11.78%	7.32%	386	9.88%	6.38%
1982	237	11.91%	7.42%	386	9.96%	6.27%
1983	237	12.71%	8.30%	386	10.73%	6.60%
1984	237	14.70%	10.41%	386	12.47%	7.77%
1985	237	15.97%	11.26%	386	13.56%	9.05%
1986	237	17.44%	12.17%	386	14.94%	9.78%
1987	237	17.95%	12.37%	386	15.26%	10.15%
1988	237	18.79%	12.84%	386	15.94%	10.54%
1989	405	16.26%	10.18%	405	15.84%	11.04%
1990	405	16.86%	10.03%	405	16.38%	11.14%
1991	405	17.44%	10.97%	405	16.88%	11.41%
1992	402	18.03%	11.36%	404	17.77%	11.36%
1993	402	18.51%	11.84%	404	18.06%	11.85%
1994	400	19.75%	12.69%	402	19.18%	13.31%
1995	398	20.98%	13.03%	400	21.23%	13.60%
1996	397	21.31%	13.58%	399	21.51%	14.65%
1997	383	21.39%	15.54%	317	22.32%	16.26%
1998	383	22.32%	15.77%	317	23.33%	16.47%
1999	383	23.19%	16.36%	317	24.16%	17.30%
2000	381	24.46%	17.76%	316	25.55%	18.14%
2001	379	24.57%	18.01%	313	25.43%	19.91%
2002	378	26.33%	19.73%	313	27.20%	20.49%

Note:

Two sets of import penetration data based on the NBER International Trade Database are available for four-digit SIC-based manufacturing industries. Import penetration data for the period 1972-1996 are directly available on Professor Peter Schott's website. Import penetration for the period 1989-2002 can be constructed from the updated multilateral imports and exports database (1989-2005) and the NBER-CES Manufacturing Industry Database (1958-2002). Two datasets are not perfectly comparable since the second trade dataset uses a revised version of HS-SIC4 concordance, which provides a more complete match of the imports and exports for the relevant domestic industries. Two approaches can be used to combine two datasets of import penetration while minimize the inconsistency. In approach 1), we compare the values of import penetration in 1989 from both the 1989-2002 dataset and the 1972-1996 dataset, for a given industry. If the absolute value of their difference ratio ((IP from 1989-2002 dataset)/(IP from 1972-1996 dataset)-1) is found to be lower than 25%, we will select the values of import penetration during 1972-1988 to come from the earlier dataset, and the values during 1989-2002 from new dataset; otherwise, only the data from 1989-2002 dataset will be considered in our study. In approach 2), we take all the values of import penetration from the 1972-1996 dataset, and then decide whether to extend the time series to 2002 with data from the 1989-2002 dataset. This approach requires the comparison of the values of import penetration during the year 1996, which is done by following the same decision criteria mentioned above.

Appendix C. Variable Definitions

Variables	Definition (Compustat data items in parentheses)
Dividend variables	
Dividend Payer	For any year t, dividend payer dummy is equal to 1 if dividend per share values (26) is positive, 0 otherwise. Reference: Fama and French (2001)
Dividend payment (Div/TA)	For any year t, dividend payment is common dividends (21) scaled by total assets (6) for year t. Reference: Fama and French (2002)
Market power measures	
IP	Import Penetration (IP_{it}) = $\frac{imports_{it}}{shipments_{it} - exports_{it} + imports_{it}}$ Reference: Tybout (2003), Bernard et al. (2006)
HHI	The Herfindahl-Hirschman index (HHI), defined as the sum of squared market shares of all the firms in a given industry. Reference: Census of Manufacturers
Lerner	The Lerner index is approximated by the price-cost margin, defined as operating profits (before depreciation, special items, interest, and taxes) over sales. The numerator is calculated as sales (12) minus cost of goods sold (41) minus selling, general, and administrative expenses (189). Whenever this calculation is not possible, operating income (178) is used. Reference: Gaspar and Massa (2006)
Control variables	
Profitability	(Interest Expense (15) + Income Before Extraordinary Items (18)+ Deferred Taxes (DATA50 if available))/ Total Assets(6) Reference: Fama and French (2001)
lnAsset	Size measure used in the regression about the level of a firm's dividend payments log(Total Assets (6)) Reference: Fama and French (2002)
NYP	Size measure used in the regression about a firm's decision to pay dividends The NYSE market capitalization decile that a firm belongs to, where 1 stands for the smallest decile and 10 stands for the largest decile. Reference: Fama and French (2001)
M/B	Measure for growth opportunities (Assets (6)-Book Equity(60) + Market Equity)/Assets (6), where Market Equity= Stock Price (199) times Shares Outstanding (25) Reference: Fama and French (2001)
AGR	Asset growth rate AGR(t)=Asset(t)/Asset(t-1) -1 Reference: Fama and French (2001)
RE/TA	Retained Earnings(36)/ Total Assets(6) Reference: DeAngelo et al. (2006)
RETVOL	Measure for current risk the standard deviation of a firm's monthly returns during one-year period Reference: Chay and Suh(2008), Hoberg and Prabhala (2009)
Variables used in testing risk-based explanation	
ROA	Return on asset (ROA) is defined as the operating income before depreciation (13) scaled by the average of beginning- and ending- period book value of total assets (6). Reference: Barber and Lyon (1996)
CFROA	Cash-flow return on assets (CFROA) is defined as the operating cash flow scaled by the average of beginning- and ending-period book value of total assets. The operating cash flow is equal to the operating income before depreciation (13) plus the decrease in receivables (2), the decrease in inventory (3), the increase in accounts payable (70), the increase in other current liabilities (72), and the decrease in other current assets (68). Reference: Barber and Lyon (1996)