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Export Impact on Dividend Policy for Big Colombian Exporting Firms, 2006-2014*

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Abstract

This paper studies the impact of exogenous export demand shocks on firms' dividend policy using firm specific real exchange rate variation as instrumental variable. The exclusion restriction is plausibly satisfied because real exchange rate shocks were unanticipated -partly explained because of international oil price fluctuation-, and first stage statistics confirm relevance condition fulfillment. The results indicate that big private Colombian exporting firms initiated to decree effectively paid dividends as a way to mitigate the *agency cost* generated by exogenous exports via higher free cash flow and higher cash flow volatility. Heterogeneous specifications support the 'outcome model' within the agency cost theory.

Keywords: dividends, exports, agency cost, volatility, management.

JEL Codes: F14, F10, G30, G32, G14, G35.

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1 Introduction

The lack of consensus about why firms pay dividends despite extensive academic research is known as the *"dividend puzzle"*[1]. In order to solve this puzzle, Allen et al. (2010)[2] suggest: *"instead of inquiring whether dividends are good or bad, perhaps we should be asking when it makes sense to pay high or low dividends"* (Allen et al., 2010, p.873), and two literature review papers (Al-Najjar & Kilincarslan, 2019; El Attar & Jabbouri, 2018) recommend to develop new perspectives and to conduct more studies for developing countries. Although more recent studies have brought new elements into the debate, like managers' career concerns (Dang et al., 2020)[3], the international trade topic is conspicuous by its absence. To the best of the author's knowledge, only two papers relate international trade and dividend payout.

From the import perspective, Booth et al. (2013) estimates the sectoral import penetration impact on the probability that firms pay dividends, finding that between 33% and 40% of the *"disappearing dividends"* phenomenon occurred in US[4] between 1978 and 1999 could be attributed to import competition rise. They suggest that competition from imports rise

[1] *"The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together"* (Black, 1976, p.5)

[2] Also, they list the dividend payout as one of the most important unresolved topics in the corporate finance literature.

[3] They suggest that managers career concerns could explain that S&P1500 firms either maintained or increased dividend payment during COVID-19 crisis.

[4] The proportion listed US firms that pay dividends decreased from 66.5% in 1978 to 20.8% in 1999. This reduction can be explained for a mix of new publicly firms with typical non-paying dividends characteristics (small size, low earnings, and high growth) and a lower probability to pay dividends of existing firms (Fama & French, 2001).

uncertainty in future performance preventing firms to pay dividends. From the export perspective, Goldman & Viswanath (2015) found that cashflow diversification through exports (due to the low correlation between domestic and international demand shocks) increased the dividend payout in India between 2000 and 2009. However, from the author's point of view, the potential endogeneity of the main independent variables in these papers (sectoral import penetration ratio and sales diversification[5]) is not addressed, hence, it is not possible to infer robust causality.

For this reason, the main novelty of this paper is to estimate export value effect on dividend policy through two-stage least squares (2SLS), which allows to address export value's endogeneity generated by non-observable variables that influence export value and dividend policy. This methodology is framed within the recommendations for future research mentioned before; the *new methodological perspective* to analyze dividend payout is implemented for Colombia[6], a *developing country* where exogenous international demand shocks provide a proper natural experiment, which allow to evaluate firms' dividend policy adjustment and help to reply the *when* question.[7]

[5] *ExpIntenRel = 1-2/expintensity-0.5/* is used as a proxy variable for sales diversification.

[6] Jaramillo (2021) also explores Colombian dividend payment determinants with the same financial statement dataset used in this paper. However, Jaramillo (2021)'s main focus is not international trade (although one of the explanatory variables included in the regression is the aggregate nominal exchange rate between Colombia and USA, whose coefficient is not statistically significant).

[7] Some stylized facts allow to infer that international demand shocks are more appropriate than local demand shocks to study firm's dividend policy adjustment. For example, export share is positive and statistically correlated with cash flow volatility (see appendix 10), which is an important dividend policy determinant (see section 3). Also, public information (e.g. customs data) allow to measure exogenous export demand shocks precisely.

The instrumental variable is firm specific real exchange rate weighted by export destination countries shares in total firms' exports in its first sample year, which plausibly satisfy the exclusion restriction because real exchange rate variation occurred during 2006-2014 was partly driven by oil price fluctuation and Colombian trading partners' macroeconomic conditions oscillation. As the export shares are fixed at initial year, the instrument does not oscillate due to endogenous manager decisions. This instrumental variable follows the methodology implemented by Jiang et al. (2010), who analyzes how export demand shocks associated with the Asian financial crisis impacted Chinese exporters (in terms of productivity, workers, capital, among others variables) through similar firm-specific exchange rate shocks constructed with the precrisis export destination's shares.

This empirical approach permits to verify accurately the testable predictions of the agency cost and signaling dividend theories. Unfortunately, dividend theories that discuss capital gains will not be empirically address because of data limitations.[8] This paper proceeds as follows. Section 2 describes the Colombian dividend payment regulation, section 3 presents the theoretical framework and the potential links between exports and dividend payout, section 4 shows the descriptive statistics, section 5 details the empirical methodology, section 6 analyzes the results, and section 7 concludes.

[8]Information about the quantity and the nominal value of the shares (or participative quotas) issued when firms not listed at the stock market were founded and the private transactions of these shares carried out by the shareholders is not public. Also, stock market information would reduce the sample substantially as only 15 firms (37%) with stock market capitalization produce goods. In the same way, it is not possible to assess alternative ways in which firms remunerate their shareholders, like stock repurchases, which are widely implemented in developed countries (Grullon & Ikeneberry, 2000) because of data limitations.

2 Colombian Dividend Payment Regulation

In Colombia, dividend payment approval follows three steps described in the Colombian Commercial Code (CCC from now on). First, the board of directors and/or the firms' legal representative (which usually is the manager) expose the project of profits to be distributed in dividends to the shareholders' assembly (Article 446, CCC). Secondly, the shareholders' assembly discusses the project and set the amount to be paid in dividends (Article 420, CCC).

As a way to protect the minority shareholders, it is established a *special majority system*[9] in which it is required the favorable vote of a plural number of shareholders representing minimum 78% of the shares or participative quotes to distribute less than 50% of profits or not distribute profits in dividends.[10] Otherwise, the firms have to decree minimum 50% of profits (Article 155, CCC). Equation 1 summarizes the special majority system.

Stylized facts indicate that it is very frequent for the shareholders' assembly to reach the agreement established in the special majority system; 81.53% of the biggest private Colombian firms[11] between 2006 and 2014 did not distribute profits or distribute less than 50% of profits in dividends. Therefore, Colombia should not be classified as a mandatory

[9] One exception to this rule applies to the firms created upon the "SAS" (Simplified joint-stock) legal form, which could stipulate in its bylaws another majority system to approve the profit distribution in dividends (Article 38, law 1258 of 2008).

[10] See Document 220-074017 from the Colombian Companies Superintendece and Sentence C-707/05 from the Colombian Constitutional Court.

[11] See section 4 for dataset description

dividend rule country as some studies state (La Porta et al., 2000; Saens & Tigero, 2021), because, on average, firms are not distributing the minimum 50% of profits. Finally, the dividends must be paid within the year following the date on which are decreed (Article 156, CCC).

$$Dividends = \begin{cases} >= 50\% \text{ profits}, & \text{By default} \\ 0, & \text{minimum 78\% shares approval.} \\ < 50\% \text{ profits}, & \text{minimum 78\% shares approval.} \end{cases} \quad (1)$$

3 Theoretical Framework

Although numerous dividend theories have been established across several decades of corporate finance research (Al-Najjar & Kilincarslan (2019) and El Attar & Jabbouri (2018) provide an extensive literature review of each theory), the trade impact on dividend policy has not been neither defined nor theoretically modeled. This section describes the theories that can be empirically evaluated with the dataset of this paper (those that do not men-

tion capital gains),[12] [13] and then, it is discussed how exports could impact dividend policy according to each theory.

In the first place, agency cost theory establishes that firms pay dividends as a mechanism to mitigate the agency cost between managers (agent) and shareholders (principal) associated with free cash flow (FCF)[14] subject to manager discretion (Jensen, 1986; Easterbrook, 1984). Dividend payment would avoid manager overinvestment in projects with negative net present value or that do not represent the shareholders' interest. In addition, cash flow volatility could also generate agency cost: *"when cash flows are variable, it is difficult for investors*

[12] In the group of dividend theories that address capital gains topics, *catering* theory states that firms offer the dividend policy that investors want; firms initiate to pay dividends when investors put a higher stock price on firms that pay dividends (Baker & Wurgler, 2004). *Bird in the hand* theory follows the popular saying that one bird in the hand is better than two in the bush, which in this context means that investors prefer dividends than capital gains because dividends are less risky. Therefore, firms that pay more frequent and higher dividends would reduce investors' cash flow uncertainty and would increase firm's value. The usual criticism to this theory is that firm's risk is more determined by its investment projects than by the way it distributes profits.

Tax preference theory emphasizes that differential taxes between dividends and capital gains would spur investors to prefer firms with specific dividend policy due to fiscal benefits (Litzenberger & Ramaswamy, 1979). In the same way, *tax dividend clientele hypothesis* highlights that tax heterogeneity between dividends and capital gains would create dividend clienteles because of investors looking for the highest after-tax return on their portfolios. As in most of countries dividend tax rate is higher than capital gains tax rate (Allen et al., 2000), stocks with higher dividend yields would attract investors with lower marginal tax rate. There is evidence of the validity of this theory for US (Kawano, 2014) and Sweden (Dahlquist et al. 2014).

[13] A third dividend literature group could be defined related with the impact evaluation of changes in dividend taxes regulation on firms' outcomes. For example, Chetty & Saez (2005) found a positive response of dividend payment to 2003 tax dividend cut in US. Also, Jacob (2021) found that firms with limited internal funds increased wages and TFP due to dividend tax cut in Sweden. Although these studies are not directly related with the topic of this paper, they are relevant for future research on Colombian dividend policy given that different dividend tax reforms have been recently approved (law 1819 of 2016, law 1943 of 2018 and law 2277 of 2022).

[14] *"Free cash flow is cash flow in excess of that required to fund all projects that have positive net present value when discounted at the relevant cost of capital"* (Jensen, 1986, p.323).

to accurately attribute deviations in cash flows to the actions of corporate managers or to factors beyond management's control. Thus, the higher the expected variance in cash flows, the greater the potential agency cost, and the greater the reliance on dividend distributions" (Bradley et al., 1998, p.556).[15] Therefore, higher FCF and higher cash flow volatility could create agency cost between manager and shareholders that would incentive firms to pay dividends.

These transmission mechanisms could operate in higher proportion for firms with agency cost characteristics. For instance, Kulchania (2023) uses lower debt as an agency cost proxy variable based on the seminal Jensen (1986)'s paper, which suggests that debt could be a mechanism to alleviate agency cost as the capital market scrutiny could monitor efficiently that managers behave according to the shareholder's aim.

Some papers identify low managerial quality as another characteristic of firms with agency issues. Bhattacharyya (2007) develops a principal-agent theoretical model in which dividend policy is a component of a screening contract offered by the principal to the agent in the presence of hidden information (unknown agent productivity) and moral hazard (unknown agent effort). The equilibrium contract motivates low-quality managers to pay more dividends and invest less (conditioned on cash availability). It is predicted a negative relation between managerial quality and dividend payment.

[15] Cash flow volatility could be also classified as an independent dividend theory, in which its correlation with dividend payment is negative: *"Cash flow volatility theory suggest that more stable firms should be able to pay higher dividends. Shareholders prefer predictability in their dividends and cash flow stability means that firms will not need to cut dividends because of lower profits"* (Goldman & Viswanath, 2015, p.359)

Firms' opacity (information asymmetry between insiders and outsiders) could be an additional agency cost determinant. Morris & Roseman (2014) developed an agency cost multiperiod theoretical model as a function of how opaque is the firm to its shareholders. The theoretical prediction - owners will remove free cash flow through dividends when opaqueness is high - is confirmed by an econometric estimation, which uses some variables related with the quantity of analyst that cover a firm and their forecasts accuracy as low opaque firm proxy variable for US from 1993 to 2010. In conclusion, lower debt, lower managerial quality, and higher firms' opacity could exacerbate the agency cost between managers and shareholders that would boost dividend payment.

The agency cost theoretical framework becomes more complex when the shareholders are differentiated (majority vs minority), since the *agent* could be the manager and/or majority shareholder(s) and the *principal* the minority shareholder(s). In a seminal paper, La Porta et al. (2000) raises two models to describe the dividend policy in this context: the *"outcome model"*, in which dividends are an outcome of an effective system which allows the minority shareholder(s) to force firms to pay dividends, avoiding that managers' and/or majority shareholder(s) divert corporate assets or free cash flow to themselves, and the *"substitute model"*, in which dividends are a substitute for shareholders' legal protection, and firms pay dividends to establish a reputation to expropriate moderately shareholders allowing them to raise funds in the capital market. *Ceteris paribus*, the outcome model would predict a positive relationship between dividend payout and minority shareholders rights, while the substitute model a negative one.

The Colombian studies about minority shareholders rights or other corporate governance items usually cover subsamples of firms listed in the stock market (Benavides & Mongrut, 2010; Gaitan, 2009; Lagos & Vecino, 2011; Pombo & Gutierrez, 2007; Ramirez & Usma, 2010), whereby it is not possible to extrapolate those findings to the firms of this paper (see section 4). However, the *Good Business Practices Report* from the Colombian Companies Superintendence (Superintendencia de Sociedades, 2020), which cover the biggest private Colombian firms, [16] provides valuable inputs: i) the number of shareholders is low: 70% of the biggest private firms have 5 or less shareholders, ii) the manager is appointed by the shareholder's assembly in 61% of the firms, and iii) only 58% of these firms have board of directors.

According to La Porta et al. (2000), the majority shareholder could become a controlling shareholder, who can determine the manager's decisions, in this potential highly concentrated context. Nevertheless, the special majority system generates a counterbalance regarding dividend payment (see section 2). It would be necessary to carry out micro data studies about corporate governance for Colombian firms non-listed in the stock market to deepen this aspect.

In the second place, *signaling theory* states that under asymmetric information between managers and the market, managers use dividends to communicate private information about current and future firms' performance. Managers increase dividend payments if they expect

[16] Colombian Companies Superintendence did not share the micro-data information because of confidentiality reasons.

positive and low volatile earnings (Farre et al., 2014) and avoid cutting or making volatile dividend payments since it could be interpreted by investors as a negative sign about firms' performance. Lintner (1956) developed the pioneering partial dividend adjustment model, which explains a dynamic in which firms smooth dividend payments across time converging to a target dividend payout ratio, rather than adjusting immediately to earnings, in order to signal firms' stability.

Which is the export role on firms' dividend policy? According to the agency cost theory, dividend policy could be modified if exports increase (decrease) FCF, ergo, exacerbate (calm) priorities differences between managers and shareholders, in consequence, firms pay (not pay) dividends to mitigate this agency cost. Assuming FCF = cash flow from operating activities – capital expenditure – debt payment,[17] export net effect on FCF will depend if cash flow from operating activities increases in higher magnitude than capital expenditures and debt payment because of exports variation. Although academic literature has studied export effect on capital expenditures (Campa & Myles (2002) found that under liquidity constrains, Spanish exporters' capital investments are higher than non-exporters because of more stable cash flow associated with negative correlation of destination countries' business cycles), it would be necessary to consider export effect on the other FCF components to determine its

[17] One limitation of the agency cost theory is that there is still no consensus about free cash flow (FCF) definition. Jensen (1986) initially described FCF as: *"Free cash flow is cash flow in excess of that required to fund all projects that have positive net present value when discounted at the relevant cost of capital"* (Jensen, 1986, p.323), but it was not directly measured. In a literature review paper about FCF definitions implemented in the academic literature, Bhandari & Adams (2017) recommend to use FCF = CFO (Cash flow from operating activities) – CAPEX (Capital expenditures) – Debt payment.

aggregate impact.

Also, the empirical evidence about exports effect on cash flow volatility, another agency cost source, is non-conclusive; while some papers found that exporting has a negative effect on cash flow volatility (see Goldman & Viswanath (2015) for India and Campa & Myles (2002) for Spain), there is evidence in the opposite direction for sales volatility (see Vannoorenbergue (2012) for France and Riaño (2011) for Colombia). Appendix 10 indicates that export share is positive correlated with cash flow volatility and conditional cash flow volatility, supporting to some extent the second group of papers. One potential explanation for this pattern is provided by Riaño (2011), who calibrated a dynamic model with Colombian manufacturing firms finding that, an adjustment in total sales associated with foreign markets increases the exporting firms' volatility. Riaño (2011) also finds that despite firm risk aversion, the correlation between domestic and international demand shocks is not an important exporting determinant when idiosyncratic firm productivity is highly persistent.

In addition, exporting could make the managerial practices more structured (Görg & Hanley (2017) provides evidence for Germany), which could have opposing effects on dividend policy. On the one hand, improving managerial quality could reduce the agency cost and the dividend payment according to Bhattacharyya (2007). On other hand, better managers could work in firms with better corporate governance, which protect the minority shareholders rights in a higher proportion and/or implement corporate governance codes, which could rise dividend payment according to the 'outcome model'.[18]

[18]Nonetheless, there is mixed evidence about the sign of the correlation between corporate governance and

On the other hand, *signaling* theory would predict that temporal favorable export demand shocks (generated by, for example, exchange rates or international commodities prices fluctuation) should not increase dividend payment: *"managers perceive that the volatile (unstable) dividend payment streams reflect the volatility in earnings that are not good indicators about their firms' financial performance to the market"* (Al-Najjar & Kilincarslan, 2019, p.207). Consequently, it could exist a 'signaling cost' of stop paying dividends when favorable temporal international market conditions reverse. On the contrary, it is more likely to rise dividend payment in a smoothed way across time (Lintner, 1956) when a structural change in firm's exports occurs (for example, new product exported encouraged by R&D investment), since those earnings could present lower future volatility.

Finally, exports could also impact dividend policy according to the theories that address capital gains topics. Investors' choice between firms that pay dividends or firms with higher capital gains could change because of trade exposure; it would be necessary to carry out studies to determine if exports impact is higher on stock returns[19] or dividend payment. However, neither dividend payment[20] nor capital gains[21] were taxed in Colombia during the analyzed period (2006-2014), which would make *tax preference* (Litzenberger & Ramaswamy, 1979) and *dividend clientele* (Kawano, 2014) irrelevant theories in Colombia, independently

managerial quality (Acharya et al., 2018), ergo, further research about this aspect is needed and suggested.

[19]There is evidence for US that exchange rate movements could increase capital gains: *"stock performance of export-oriented companies tends to move against the dollar"* (Chakraborty et al., 2015, p.1059)

[20]There was not an additional tax to the profits distributed in dividends in Colombia from 1986 to 2016. See Avila-Mahecha (2019).

[21]Article 36-1 from the Colombian tax law indicated that profits from shares sales were exempted from income tax or profit tax. It was modified by article 376 of Law 1819 from 2016.

of firms' income source (international or domestic market).

4 Descriptive Statistics

The database is composed by the merge of two public Colombian datasets for the 2006-2014 period. The first one is customs data, which cover entire international transactions disaggregated at traded value - product (Colombian external tariff subheading 10 digit) – quantity (units and kilograms) – destination or origin country and firm level, reported by the DANE.[22] The second one is financial statements (balance sheet, income statement, and cash flow) of the biggest private Colombian firms (those whose total assets or operating income value exceeds 30,000 Colombian legal minimum wages), which are validated by tax auditors and reported to the Colombian Companies Superintendence.[23] Both databases are public and were download in February 2021. On annual average, big private exporting firms account 43% of total exporting firms (3,434 of 7,920 firms per year) and 61% of total export value (US$28,322 million of US$46,256 million per year).[24]

Initially, all big private Colombian firms (exporters and non-exporters) are included in the descriptive statistics in order to provide a Colombian dividend policy's general frame-

[22]National Colombian Statistics Agency (DANE, by its acronym in Spanish). Imported and exported value were deflated using Colombian Producer Price Index (2014 is the base year).

[23]The variables from this dataset were deflated using an industrial-specific annual Producer Price Index (PPI) reported by the Colombian Central Bank (2014 is the base year).

[24]See Merchán (2024) for comparative descriptive statistics between big private exporting firms relative to big private non-exporting firms and big private exporting firms relative to non-exporting firms.

work. Figure 1a indicates that annual average percentage of firms that decreed dividends is significantly higher for exporting (32%) than for non-exporting firms (24%), however, the tendency for both type of firms is similar: a flat slope with a rise in 2010.[25]

In terms of the amount decreed, [26] [27] figure 1b illustrates that annual average percentage of decreed dividends relative to assets is very similar for exporting (7.5%) than for non-exporting firms (9.1%) -restricting the sample to firms that decreed dividends-. Also, the probability that exporting firms pay those decreed dividends according to times established in law (one year after decreeing them) (76%) is very similar for non-exporting firms (77%) (figure 1c). In general, figures 1a, 1b, 1c lead to conclude that exporting is positively correlated with 'dividend extensive margin' (probability that firms decree dividends) but neither with 'dividend intensive margin' (amount decreed) nor with the probability of paying those dividends according to times established in law.

As the baseline econometric analysis will be performed in three years differences given

[25]The same countercyclical dividend payout pattern experienced during the recent COVID crisis in America (Dang et al., 2020) occurred post 2008 global financial crisis in Colombia, in which the percentage of firms that decreed dividends increased during low economic growth years.

[26]The amount decreed in dividends is not directly reported in the financial statements, but it was calculated as follows: $Amount\_Decreed\_Div_t = Amount\_Paid\_Div_t + Non\_Paid\_Div_t - Non\_Paid\_Div_{t-1}$, where $Amount\_Paid\_Div_t$ is the amount paid in dividends in t and $Non\_Paid\_Div_t$ is the amount of payable dividends in t (liabilities)

[27]It was identified and dynamically corrected some non-sense observations: i) a decrease in the amount of payable dividends (liabilities) between t and t-1 ($Non\_Paid\_Div_t - Non\_Paid\_Div_{t-1} < 0$) with zero amount paid in dividends in t: $Amount\_Paid\_Div_t = 0$, and ii) decrease in the amount of payable dividends between t and t-1 larger in absolute value than the amount paid in dividends: $|Non\_Paid\_Div_t - Non\_Paid\_Div_{t-1}| > Amount\_Paid\_Div_t$. For those observations, it was dynamically replaced $Non\_Paid\_Div_t$, so that the next equation is satisfied: $|Non\_Paid\_Div_t - Non\_Paid\_Div_{t-1}| = Amount\_Paid\_Div_t$

the 2SLS first stage results (see section 6), the next variables are calculated in three years differences. Figure 1d shows that exporting firms are more likely to be 'continuers' (decreed dividends in t and t-3) than non-exporting firms (20% and 13% annual average, respectively). On the contrary, the probability to initiate to decree dividends (decreed dividends in t but not in t-3) is very similar for exporting and non-exporting firms (14% and 13% annual average, respectively) (figure 1e). Also, the probability to stop decreeing dividends (did not decreed dividends in t but decreed them in t-3) is very similar for exporting and non-exporting firms (15% and 13% annual average, respectively) (figure 1f). Consequently, the rate of firms that continuously pay dividends is higher for exporting than for non-exporting firms,[28] but initiation and stopping rates is similar for both type of firms.[29]

Figure 2a shows that aggregate real exchange rate (instrumental variable) diminished (appreciated) between 2006 and 2014, indicating an aggregate Colombian competitiveness loss in the international market, which is highly correlated with oil price surge occurred during those years (Acero, 2017). Nevertheless, this trend did not occur with all principal exports' destination countries; bilateral real exchange rates show an appreciation with US, Ecuador and Netherlands, but depreciation with China and Venezuela (see figure 2b). The opposite tendency with China and Venezuela arose because of the Colombian pesos depreciation with the yuan -contrary to the nominal revaluation trend with the other trading partners'

[28] On the contrary, the rate of firms that continuously did not pay dividends (they did not pay neither in t nor in t-3) is higher for non-exporting (61%) than for exporting firms (51%).

[29] The sum of the continuers rate plus initiation rate plus stopping rate plus non-continuers firms is 1 (100%).

currencies (figure 2c)-, and the unprecedent high inflation rate in Venezuela.

Lastly, table 1 shows the simple average of the main variables included in the econometric analysis disaggregated by four firm types, according if firms exported and/or decreed dividends. Some interesting patterns emerge from the descriptive statistics. First, ranking firm types from the largest to the smallest in terms of total assets and TFP indicates that exporting firms that decreed dividends are the biggest, followed by exporting firms that did not decreed dividends, non-exporting firms that decreed dividends, and non-exporting firms that did not decreed dividends. This implies that firms' size and productivity are statistically correlated in higher proportion with the probability of exporting than with the probability of decreeing dividends.

Secondly, firms that decree dividends have statistically higher profit rate (operating profit/operating income), financial investment rate (financial investment/assets) and lower debt rate (debt/assets) than firms that did not decree dividends, independently if they exported or not. Basically, higher profits incentivize firms to decree dividends (as international evidence suggests), firms are more likely to decree dividends when have met their investment needs, and the negative correlation with debt rate could support the agency cost theory explained in the previous section. Third, exporting firms have lower free cash flow (FCF)[30]

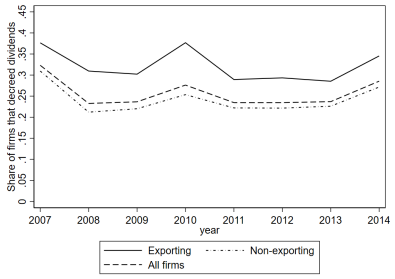
[30]Initially, free cash flow (FCF) was calculated with the recommended definition provided by Bhandari & Adams (2017): FCF = CFO (Cash flow from operating activities) – CAPEX – Debt payment. However, 43% of the observations reported negative values because CFO was negative (firms reported losses or the capital expenditures plus debt payment magnitude was higher than CFO). Consequently, it was used an alternative FCF definition to avoid high negative values percentage, which makes it difficult to compute differentiated calculations: FCF = OI (Operating Income) – CAPEX – Debt payment.

and lower overinvestment rate[31] than non-exporting firms (independently if they decreed dividends or not), suggesting that overinvesting less and reducing FCF could be two self-selection into exporting determinants.

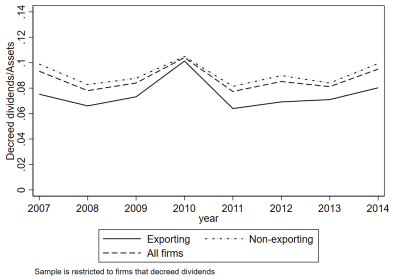
Finally, table 6, 7, and 8 show the descriptive statistics for the same variables in two-, three-, and four-year differences specification disaggregated by the same four firm types. Also, the next section describes the econometric methodology, which restricts the sample to the big private Colombian exporting firms because the instrumental variable can be calculated just for exporting firms.

[31] Overinvestment calculation follows Richardson (2006) methodology (see appendix 11).

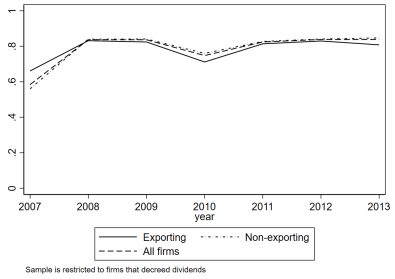
Figure 1: Colombian dividend policy: share of firms that decreed dividends, share of amount decreed, and decreeing dividends rates (continuation, initiation and stopping)



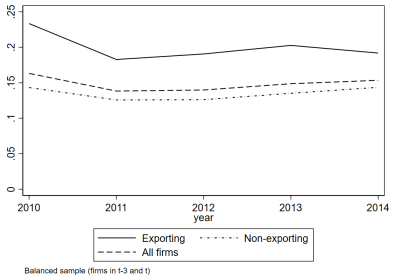
(a) Share of big private Colombian firms that decreed dividends, 2007 – 2014



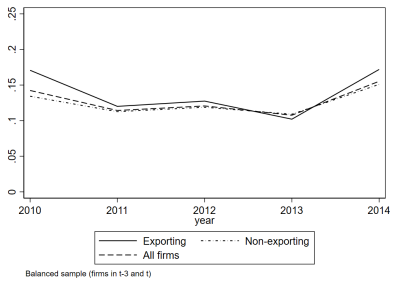
(b) Share decreed dividends relative to assets, 2007-2014



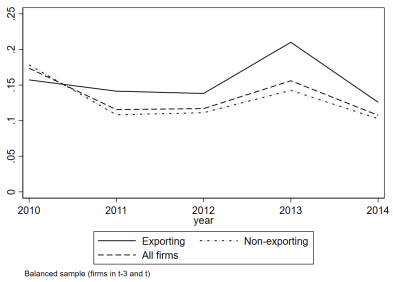
(c) Share of big private Colombian firms that decreed dividends and paid them 2007 – 2013



(d) Share of continuers firms (decreed according to times established in law*,dividends in t and t-3), 2010-2014



(e) Share of firms that initiated to decree dividends (decreed dividends in t but not in t-3), 2010-2014



(f) Share of firms that stopped to decree dividends (decreed dividends in t-3 but not in t), 2010-2014

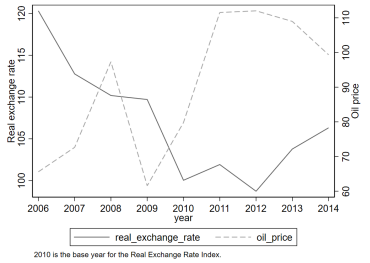
Source: Own calculations based on Colombian Companies Superintendence (biggest private Colombian firms' financial statements) and National Colombian Statistics Agency (customs data). *Decreed dividends should be paid within the next year they are decreed (Article 156, Colombian Code of Commerce).

Table 1: Descriptive statistics – variables in levels (simple average by firm type)

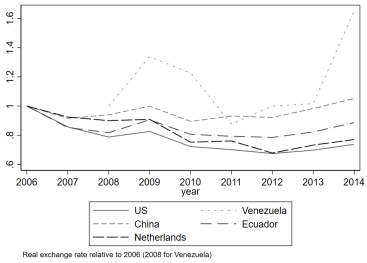
Variable	Firm type					
	Non-exporting, non-decreed dividends	Non-exporting, decreed dividends	Exporting, non-decreed dividends	Exporting, decreed dividends	P-value coefficient (diff across groups)[1]	Number of observations
Log real export value (COP)			19.783	19.929	0.000	21,301
Log firm specific real exchange rate[2]			5.513	5.456	0.977	21,301
Export value/operating income			0.200	0.128	0.000	21,301
HHI exports			0.713	0.665	0.000	21,301
International managerial quality[3]			0.000	0.001	0.850	15,732
Log real import value (COP)	19.706	20.078	20.916	21.668	0.000	47,016
Log firm specific real exchange rate (imports)[4]	5.685	5.847	6.044	6.344	0.000	47,016
Imported value/sales cost	0.315	0.291	0.307	0.324	0.000	47,016
Log real decreed dividends (COP)		19.089		20.196	0.000	27,866
Decreed dividends/equity		0.251		0.185	0.001	27,866
Decreed dividends/assets		0.091		0.075	0.000	27,866
Share of big private firms that decreed dividends in t and paid them in t		0.642		0.555	0.000	27,866
Share of big private firms that decreed dividends in t and paid them between t and t+1		0.146		0.230	0.000	23,329
Share of big private firms that decreed dividends in t and did not pay them between t and t+1		0.212		0.217	0.020	23,329
Log real total assets (COP)	21.889	22.312	23.010	23.559	0.000	112,224
ROA (Profit before taxes/assets)	0.052	0.110	0.044	0.103	0.000	112,224
Profit rate	0.041	0.082	0.045	0.090	0.000	110,788
Total investment/assets	0.021	0.029	0.016	0.028	0.000	112,224
Debt/assets	0.217	0.183	0.257	0.190	0.000	112,224
Cash flow/ assets	0.071	0.084	0.053	0.062	0.000	112,224
TFP[5]	1.815	1.856	1.879	1.924	0.000	112,224
Free Cash Flow[6] / Assets	1.643	1.668	1.246	1.271	0.000	112,224
Overinvestment[7]/assets	0.006	0.006	-0.001	-0.003	0.012	112,224

Note: Simple average by year. [1] A regression of each dependent variable on dummy variable(s) for each firm type group(s) plus state, year, and industry fixed effects was estimated. Then, it was jointly tested that the coefficient(s) of the dummy variable(s) was(were) different than 0 through a F-test. [2] $\triangle Log\_real\_export\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fk,t=0}) + 1]$, where RER_{kt} is the real exchange rate between Colombia and destination country k, and $share\_exp_{fk,t=0}$ is the share of export value to destination country k in total exports of firm f in its first sample year. [3] International managerial quality variable is obtained from Merchán (2024). [4] $\triangle Log\_real\_import\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_imp_{fj,t=0}) + 1]$, where RER_{jt} is the real exchange rate between Colombia and origin country j, and $share\_imp_{jt}$ is the import value share from origin country j in total imports of firm f in its first sample year. [5] TFP calculation based on Levinsohn & Petrin (2003) methodology and *prodest* Stata command (Mollisi & Rovigatti, 2018) (table 9). [6] FCF (Free Cash Flow) = Operating Income - CAPEX (Capital expenditures) – Debt payment. [7] Overinvestment calculation follows Richardson (2006) methodology (see appendix 11).

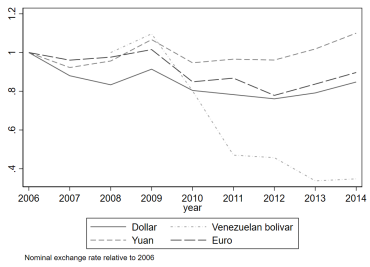
Figure 2: Real and nominal exchange rates, free cash flow, and decreeing dividends rate disaggregated by international managerial quality



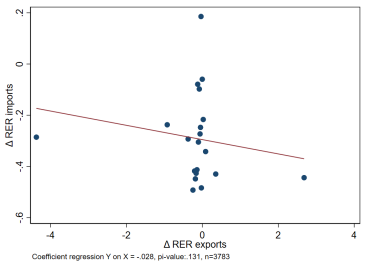
(a) Real exchange rate index and oil price



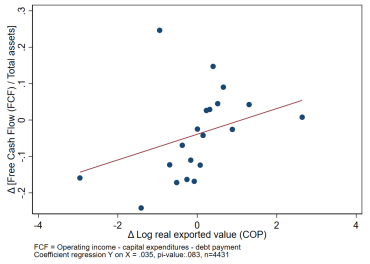
(b) Bilateral real exchange rate, 2006-2014, principal trading partners (2006=1)



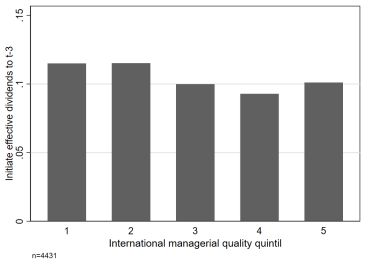
(c) Bilateral nominal exchange rate, 2006-2014, principal trading partners (2006=1)



(d) Binned scatter plot between firms specific real exchange rate from exports and imports (3 years differences)



(e) Binned scatter plot, export value and FCF (3 years differences)



(f) Share of firms that initiated to decree (effectively paid*) dividends relative to t-3 by international managerial quality quintiles

Source: Own calculations based on i) Colombian Companies Superintendence (biggest private Colombian firms' financial statements), ii) National Colombian Statistics Agency (customs data), iii) IMF (prices and bilateral nominal exchanges rates), iv) Colombian Central Bank (methodology to calculate real exchange rate, Banco de la Republica (2021)), v) FRED - Federal Reserve Bank of St. Louis (oil price), and vi) international managerial quality obtained from Merchán (2024). *Decreed dividends should be paid within the next year they are decreed (Article 156, Colombian Code of Commerce).

5 Methodology

The calculation of exports effect on dividend policy through OLS could produce biased estimators since firms' exports could be correlated with unobservable dividend policy determinants like: *"corporate strategy, anticipated competitive pressures, expected revenue growth, etc"* (Roberts & Whited, 2013, p.509). In fact, the omitted variable bias is particularly severe in the corporate finance literature: *"a number of factors relevant for corporate behavior are unobservable to econometricians."* (Roberts & Whited, 2013, p.498) [32]. The OLS estimates' bias direction (upward or downward) would depend on the product of the correlation between export value and omitted variable with the sign of the omitted variable's impact on dividend policy. For instance, anticipated competitive pressures could be positive correlated with export value (firms could boost exports in order to face competition) and impact negatively dividend policy (competition could rise future uncertainty discouraging firms to pay dividends), which would produce a downward bias in the OLS export value's coefficient.

For this reason, a 2SLS methodology is implemented following Jiang et al. (2010)'s methodology, which studied how export demand shocks impacted Chinese exporters performance during the Asian financial crisis in 1997 using a shock index (firm specific real exchange rate variation) as instrumental variable.[33] They ran a 2SLS differentiated econo-

[32]Roberts & Whited (2013) provides a deep analysis of endogeneity issue in empirical corporate finance literature.

[33]In a similar approach, Bastos et al. (2018) calculated real exchange rate changes interacted with exports destination country dummies at the initial year to study the effect of exports destination on input prices.

metric specification including province-industry fixed effects and a vector of firms' pre-shock characteristics in order to control for initial differences. Also, they add a vector of the interaction of firms' pre-shock characteristics with the shock index in the first stage: *"because the impact of the exchange rate shocks on changes in firms' exports may vary across firms with differing initial characteristics"* (Jiang et al., 2010, p. 825).

Equation 2 shows the first stage estimation in which f denotes firm, i industry (ISIC 3 digit), s state, and t year. The dependent variable $\triangle Log\_exp_{ft}$ is the change of log real export value measured in real Colombian Pesos (COP). The instrumental variable is $\triangle Log\_RER_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fk,t=0}) + 1]$, where RER_{ft} is the real exchange rate between Colombia and destination country k, and $share\_exp_{fk,t=0}$ is the export value share to destination country k in total exports of firm f in its first sample year. RER_{kt} is calculated following Banco de la Republica (2021) - Colombian Central Bank methodological guide to calculate real exchange rate-, in which $RER_{kt} = (S/S^*) * (P^*/P)$, where P^* is the external price level, P is the Colombian price level, S is the nominal exchange rate between Colombia and US, and S^* is the nominal exchange rate between country k and US.[34] One is added (+1) to the firm specific real exchange in order to include zeros for the observations in which firms exported to destination countries where they did not export the initial year (t=0). RER_{kt} growth implies real exchange depreciation, indicating that Colombian goods become relatively cheaper in the international market.

[34]Consumer prices index and nominal exchanges rates were obtained from International Monetary Fund, International Financial Statistics.

Theoretically, relevance condition is fulfilled because firms that export to countries where a real exchange rate depreciation with Colombia occurred are more likely to increase their exports than similar exporting firms that export to other countries, since their products become internationally cheaper encouraging external demand. For instance, two similar exporting firms in observable characteristics faced different exogenous export demand shocks if one firm exported to US (exogenous fall in external demand) and the other firm exported to China (exogenous rise in external demand) (see figure 2b)[35]. As expected, first stage statistics confirm that firm specific real exchange rate impacts positively and significatively the export value (see section 6).

In addition, two elements allow to infer that exclusion restriction is plausibly satisfied. First, real exchange rate variation occurred between 2006 and 2014 was unpredictable and highly correlated with international oil price increase (Acero, 2017), reducing the probability that unobservable dividend policy determinants variables are correlated with the instrumental variable. Also, Venezuela inflation rate and Colombian pesos devaluation with the yuan provide other exogenous real exchange rate variation sources. Second, export shares of firm specific real exchange rates are fixed at initial year, guaranteeing that the instrumental variable variation is not generated by endogenous manager decisions.

X includes a set of firm-level dividend policy determinants: log total assets, profit rate (operating profit/operating income), debt (financial debt/assets), financial investments/assets,

[35]Nevertheless, both firms are likely to absorb nominal exchange variation because most of the Colombian firms are not financially covered by currency risk; the percentage of the 5000 biggest Colombian firms that contracted exports exchange rate forwards increased from 3% in 2006 to 6.5% in 2014 (Alfonso, 2018).

cash flow (cash flow/assets) and TFP.[36] These variables were selected based on the most common explanatory variables included in five empirical published papers about dividend policy (Chay & Suh, 2009; DeAngelo et al., 2006; Gugler & Yurtoglu, 2003; Kulchania, 2023; Michaely & Moin, 2022).[37] As the focus of this paper is international trade, X also covers export value/operating income ratio, import value/sales cost ratio and the international managerial quality calculated in Merchán (2024).[38]

For ease of coefficients interpretation, X are normalized per year to have mean 0 and standard deviation 1. δ_i are industry fixed effects, δ_s state fixed effects, and δ_t year fixed effects. Robust standard errors are clustered at firm level. $\triangle_l$ describes the differences operator between t and t-l. Finally, equation 3 shows the second stage regression:

$$\triangle_l ln(Exp)_{fist} = \beta_0 + \beta_1 \triangle_l ln(RER)_{fist} + \Phi \triangle_l ln(RER)_{fist} * X_{fist-l} + \Gamma X_{fist-l} + \delta_i + \delta_s + \delta_t + \triangle_l \epsilon_{fist} \quad (2)$$

[36] TFP calculation based on Levinsohn & Petrin (2003) methodology and prodest Stata command (Mollisi & Rovigatti, 2018). See appendix table 9

[37] Firm size (total assets or total assets growth) is included as explanatory variable in 4 of them, profitability in 3, Tobin's q in 3, debt in 2 and liquidity (cash flow over assets) in 1. As there is no public information of firms' market value to calculate Tobin's q, financial investment ratio relative to assets variable is added. TFP is also included due to a recent paper by Kulchania (2023), who fills the gap to study TFP impact on dividend policy, finding that firms with higher productivity are more likely to initiate, maintain, and increase dividend payouts.

[38] International managerial quality is calculated as *"the average of a regression residuals group conformed by detailed export unit value residuals for differentiated goods (multiplied by -1 for those products that compete internationally by price) and detailed export quantity residuals for homogeneous goods"* (Merchán, 2024, p.3201)

$$\triangle_l Y_{fist} = \beta_0 + \beta_1 \triangle_l ln(\hat{Exp})_{fist} + \Gamma X_{fist-l} + \delta_i + \delta_s + \delta_t + \triangle_l \upsilon_{fist} \quad (3)$$

where the main dependent variable $\triangle_l Y_{fist}$ is a dummy indicating if firms initiated to decree effectively paid dividends (the firm decreed dividends in t – effectively paid according to times established in law – but not in t-l). Equation 3 is estimated through a simple linear probability model because, to the best of the author's knowledge, none methodology fixes simultaneously: i) the 'incidental parameter problem' of fixed effects in non-linear models (Greene, 2002; Stammann, 2021) generated by the fixed effects included in equation 3, ii) the disadvantages of each binary choice models with endogenous variables (Dong et al., 2012) due to export value endogeneity, and iii) the interpretation of interactions terms in non-linear models (Drichoutis, 2011) in the heterogeneous effect specifications explained later.

Y_{fist} also covers variables that allow to verify the potential transmission mechanisms from exports on dividend policy described by the agency cost theory (see section 3). In the first place, Y_{fist} includes free cash flow (FCF) relative to assets. Ideally, this transmission mechanism should be proved modeling exports effect on FCF and then, in a second step, the FCF effect on dividends (EXP $\rightarrow \hat{FCF} \rightarrow$DIV). Nevertheless, this methodological approach would not allow to correct export value endogeneity. In the second place, Y_{fist} covers overinvestment rate relative to assets (see appendix 11 for its calculation details) in order to verify if dividend payment avoid overinvestment. Finally, appendix 10 analyzes export value impact on cash flow volatility with different methodological approaches.

One potential issue of this econometric analysis is that real exchange rate effect on div-

idend policy via exports could be reversed via imports (Jiang et al., 2010), which is more likely to occur in particular firms like the ones with parent companies abroad.[39] Nonetheless, stylized facts indicate that, on average, big private Colombian exporting firms tend to export to different countries where they import from (coefficient of firm specific real exchange rate from imports[40] on firm specific real exchange rate from exports is just -2.8% and non-statistically significative, see figure 2d), and equation 2 and 3 already includes import value/sales cost ratio as explanatory variable in order to control for this potential "reverse" effect. As another robustness check, equation 4 adds import value as endogenous variable to the baseline specification and firm specific real exchange rate from imports as an additional instrumental variable:[41]

$$\triangle_l Y_{fist} = \beta_0 + \beta_1 \triangle_l ln(Exp)_{fist} + \beta_2 \triangle_l ln(Imp)_{fist} + \Gamma X_{fist-l} + \delta_i + \delta_s + \delta_t + \triangle_l \epsilon_{fist} \quad (4)$$

In addition, heterogeneous export effects on dividend policy disaggregated by international managerial quality quintiles are calculated as shown in equation 5 in order to: test the Bhattacharyya (2007) theoretical predictions and the different agency cost sub- hypothesis:

[39] *For example, Chinese firms may import intermediate inputs from parent companies overseas, assemble these inputs into finished products, and then send them back to their parent companies in the same locations. For such firms, exchange rate appreciation in a firm's overseas export locations also makes intermediate inputs more expensive. The firm's exports should rise, while the prices of intermediate inputs (in Chinese yuan) should also rise."* (Jiang et al. 2010, p.837)

[40] $\triangle Log\_real\_import\_exchange\_rate_{ft} = ln[(\sum_k RER_{kt} * share\_imp_{fj,t=0}) + 1]$, where RER_{jt} is the real exchange rate between Colombia and origin country j, and $share\_imp_{jt}$ is the share of import value from origin country j in total imports of firm f in its first sample year

[41] The estimation sample is smaller given that it is not possible to calculate real exchange rate from imports for the big private exporting firms that did not import.

'outcome' and 'substitute' models (see section 3):

$$\triangle_l Y_{fist} = \beta_0 + \beta_1 \triangle_l ln(Exp)_{fist} + \sum_{q=2}^{5} \beta_q * \{D(1 = \ if\ q = Q_{fist-l}) * \triangle_l ln(Exp)_{fist}\} + \Gamma X_{fist-l} + \delta_i + \delta_s + \delta_t + \triangle_l \epsilon_{fist} \quad (5)$$

where X are the set of explanatory variables defined previously for equation 2 and 3, and $D(1 = \ if\ q = Q_{fist-l})$ is a dummy variable which takes the value of 1 if firms' international managerial quality (IMQ) belongs to quintile q in year *t-l*. Export shock effect on dividend policy for the first international managerial quality quintile firms is measured by $\hat{\beta}_1$, and the effect on the second, third, fourth and fifth quintile is given by $\hat{\beta}_1 + \hat{\beta}_2$, $\hat{\beta}_1 + \hat{\beta}_3$, $\hat{\beta}_1 + \hat{\beta}_4$, and $\hat{\beta}_1 + \hat{\beta}_5$, respectively. It was added four new instruments: $\{D(1 = \ if\ q = Q_{fist-l}) * \triangle_l ln(RER)_{fist} \,|\, q \in [2,5]\}$ in order to improve the first stage estimation accuracy of the four new endogenous variables: $\{D(1 = \ if\ q = Q_{fist-l}) * \triangle_l ln(Exp)_{fist} \,|\, q \in [2,5]\}$.

As a way to test the outcome and the substitute model, it was estimated an additional heterogeneous effect specification including a dummy variable SAS_{fis}, which indicates if firm f is currently legally registered as SAS (Simplified joint stock). As the dividend payment rules for SAS firms could protect the minority shareholders in lower proportion (the special majority system to distribute less than 50% of profits in dividends or not distribute dividends is not mandatory, see section 2), a null export value effect on dividend policy for SAS firms

(and positive for non-SAS firms) could provide evidence in favor of the 'outcome model'. The methodological limitation is that available data contains only the current firms' legal status, ergo, SAS dummy is time invariant. As a way to deal with this imprecision, the estimation sample will be balanced (firms that exported all years from 2006 to 2014) in order to include comparable firms which were created under another legal form and had the possibility to transform to SAS from 2008.[42]

$$\triangle_l Y_{fist} = \beta_0 + \beta_1 \triangle_l ln(Exp)_{fist} + \beta_2 SAS_{fis} * \triangle_l ln(Exp)_{fist} + \beta_3 SAS_{fis} + \Gamma X_{fist-l} + \delta_i + \delta_s + \delta_t + \triangle_l \epsilon_{fist} \tag{6}$$

in which $\hat{\beta}_1$ is the export effect on dividend policy for firms which were legally constituted as another legal form and did not transform to SAS, and $\hat{\beta}_1 + \hat{\beta}_2$ would indicate the export effect on dividend policy for firms that were legally constituted as another legal form and transformed to SAS at some point in time. It is added a new endogenous variable $SAS_{fis} * \triangle_l ln(Exp)_{fist}$ and a new instrumental variable $SAS_{fist} * \triangle_l ln(RER)_{fist}$ to the 2SLS estimation.

In terms of the export effect on amount decreed in dividends, it is implemented the methodological procedure 19.2 described in Wooldridge (2010) -which is a combination of Heckman (1979) two-step procedure and 2SLS-, in order to verify the potential selectivity

[42]It was a widely implemented practice: around 54% of the firms transformed to SAS legal form at some point in time.

bias of the big private exporting firms that initiated to decree effectively paid dividends. This problem would generate incorrect standard errors in the IV coefficients that should be corrected through bootstrapping. Equation 7 shows the selection equation (probit) from which the inverse mill ratio (probability density function/ standard normal cumulative distribution) is calculated and, then, it is included as one explanatory variable in the 2SLS estimation restricting the sample to those firm-year observations in which firms initiated to decree effectively paid dividends (equation 8):

$$Initiate\_Eff\_Div_{fist}(1 = Yes, 0 = No) = \vartheta(\triangle_l H_{fist}, X_{fist-l}) \tag{7}$$

$$\triangle_l P_{fist} = \beta_0 + \beta_1 \triangle_l ln(Exp)_{fist} + \beta_2\ IMR_{fist} + \Gamma X_{fist-l} + \delta_f + \delta_s + \delta_t + \triangle_l \epsilon_{fist} \tag{8}$$

where P is the amount decreed in dividends relative to assets, X the set of explanatory variables defined before, and H includes the instrumental variable $\triangle ln(RER)_{fist}$ and minimum one variable that should explain selection (why firms initiated to decree effectively paid dividends) but not the outcome (amount decreed in dividends relative to assets).[43] These variables contribute to get precise estimates and avoid issues specifications (Sartori, 2003). Two recent dividend policy papers used the next selection variables to identify dividend payers firms: i) a dummy if the return on assets was above the first sample quartile in the previous period (Driver et al., 2020)[44], and ii) industry dividend payers percentage (Bazil et al.,

[43] Year fixed effects are included. Industry and state fixed effects are excluded because some fixed effects have very low number of observations (2 and 4, respectively) which could exacerbate the incidental parameter problem. See table 15.

[44] *"Commencing dividends entails an assumption that they will be continued... initiation of dividends thus*

2022)[45]. As the main dependent variable of this paper is defined in relation to a previous period, the selection equation is calculated with the two selection variables mentioned before but differentiated in a similar way: i) a dummy variable if the return on assets was above the first sample quartile in t but not in t-l $\triangle_l QuartileROA_{fist} > 1$, and ii) change in the industry dividend payers percentage between t and t-l ($\triangle_l percentage\_industry\_dividend\_payers_{fist}$). $\hat{\beta}_2$ statistical significance in equation 8 would determine if sample selection exists and if it is necessary to correct standard errors in the IV estimation.

6 Results

Table 2 shows the first stage results (equation 2) estimated in two (l=2), three (l=3) and four (l=4) years differences. Firm specific real exchange rate has a positive and statistically significant effect on export value in all specifications, indicating that real exchange rate devaluation (products exported by the firm become relatively cheaper in the international market) boosts export value, as suggested by the economic theory.

There is a trade-off between instruments' coherency and strength as to whether the correct specification should include $\triangle_l ln(RER)_{fist} * X_{fist-l}$ or not. On the one hand, no rejection of Hansen's J tests of over identifying restrictions in column 2 (l=2), column 4 (l=3) and

depends on some threshold criterion being exceeded... This [variable in the selection equation] is justified by the anticipated damage from having to cease dividend payments in the future, so that a threshold effect is expected." (Driver et al., 2020, p.568)

[45] *"Proportion of dividend payers in an industry tends to have positive impact on the decision to pay dividends"* (Bazil et al., 2022, p. 304).

column 6 (l=4) suggest that interactions $\triangle_l ln(RER)_{fist} * X_{fist-l}$ are coherent instruments that identify the same parameters (Parente & Santos, 2011). On the other hand, first stage is stronger without those interactions, according to larger F test and effective F statistics. Consequently, second stage results are calculated with both first stage econometric specifications as robustness check.

In terms of the instrument's strength, all specifications except column 6 (l=4) present F test joint significance larger than the 'rule of thumb' of 10 and effective F statistics - which are robust to heteroscedasticity, autocorrelation, and clustering (Montiel & Pflueger, 2013) - larger than 20% weak instrument threshold (τ). Therefore, the instrumental variable is stronger in the two- and three-years differences specification. Three years differences is preferred as the baseline since strength F tests in the specification without interactions $\triangle_l ln(RER)_{fist} * X_{fist-l}$ (column 3) and Hansen's J test pi-value in the specification with interactions (column 4) are larger than the same tests in the two-year differences specifications (column 1 and 2, respectively), indicating stronger and more coherent instruments.

Table 3 illustrates the second stage results (equation 3) in the baseline specification (l=3). The findings seem to validate the agency cost theory; firms initiated to decree effectively paid dividends in response to exogenous exports shocks (column 1 and 2), which could be a way to mitigate the agency cost generated by FCF because of exports variation (column 3 and 4) (figure 2e). As appendix 10 shows that export share is positively correlated with cash flow volatility and conditional cash flow volatility[46], the econometric results suggest that

[46]Probably, it is required a longer sample to prove a causal effect from exports on cash flow volatility.

export value impacts dividend policy through the two agency cost transmission mechanisms explained in the theoretical section: FCF and cash flow volatility. Interestingly, dividend payment could be insufficient to avoid over investment (export value coefficient is not significant in column 6 but it is significant in column 5).

These findings are robust when it is assumed that import value is endogenous, confirming that real exchange rate variation effect on dividend policy via exports is not reversed via imports (table 10) (equation 4). Additionally, the positive export shocks effect on the probability to initiate to decree effectively paid dividends is not robust in the two-year differences specification (table 11) but in the four-year differences (table 12), suggesting that minimum three years must pass for the international market conditions fluctuation becomes relevant into the shareholders' assembly decision about dividend policy.

Table 4 indicates that positive impact of exports on the probability to initiate to decree effectively paid dividends is driven by the highest international managerial quality quintiles firms[47] (equation 5).[48] Also, the positive exports impact on the probability to initiate to decree effectively paid dividends is driven by firms which did not change their legal form to SAS (equation 6), which are more likely to protect the minority shareholders because of the mandatory special majority system (see section 2). These results support the 'outcome' model and suggest that firms with better international managerial quality have better minority

[47] On average, highest managerial quintile firms do not start to decree effectively paid dividends in a larger proportion (figure 2f), they are just more prone to do it facing exogeneous export shocks.

[48] In contradiction to Bhattacharyya (2007), whose theoretical model do not differentiate majority and minority shareholders.

shareholders rights and corporate governance.[49]

In general, econometric results support that big private Colombian exporting firms started to decree effectively paid dividends as a mechanism to mitigate the agency cost generated by exogenous export shocks in an effective system that protect minority shareholders (outcome model). This pattern follows Floyd et al. (2015)'s findings for US, in which agency cost of free cash flow explains the industrial dividend payouts. [50] On the contrary, the findings contradict signaling theory because firms adapt their dividend policy to temporary profit variation caused by international market conditions fluctuation.

A back-of-the-envelope calculation presents two limitations. First, 2SLS's coefficients are consistent but not unbiased, and secondly, econometric specification was calculated with linear probability model because of the reasons mentioned before. Since these limitations cannot be resolved, 0.0357 coefficient (column 2 in table 3) implies that 1 standard deviation change in log real export value (1.15) accounts for around 26%[51] of the firms which started to decree effectively paid dividends (10.3% from the estimation sample). As a point of reference, the same calculation with OLS coefficient (0.0136) would indicate that 1 standard deviation change in log real export value (1.15) accounts for around 10% of firms which started to decree effectively paid dividends.

Finally, table 13 shows the selection equation's results described in equation 7. As ex-

[49]Detailed micro data is necessary to state conclusively.

[50]They found that agency cost theory explains industrial payouts but signaling theory the financial sector payouts.

[51]$0.26 = 0.0357*\ln(1+1.15)/0.103$

pected, the instrumental variable (firms specific real exchange rate: $\triangle_l Log\_RER_{ft}$) and the selection variables ($\triangle_l Quartile\_ROA > 1_{fist}$, $\triangle_l perc\_indpayers_{fist}$) coefficients are positive and statistically significant on the probability that firms initiated to decree effectively paid dividends. Then, null statistically significance of the inverse mills' ratio coefficient in the IV estimation (table 5) (equation 8) indicates that there is no selection bias according to the selection equation described before (equation 7); exporting firms that initiated to decree effectively paid dividends could be a random sample from the big private exporting firms. Also, null statistically significance of export value coefficient indicates that export value does not impact the amount decreed in dividends. These results show that exogenous exports shocks increase the frequency in which firms initiated to decree effectively paid dividends, but not the amount that firms usually decree. Furthermore, the econometric results are aligned with the patterns described in the descriptive statistics: exporting impact 'dividend extensive margin' (probability to initiate to decree effectively paid dividends) but not 'dividend intensive margin' (amount decreed).

Table 2: First stage – firm specific real exchange rate effect on export value

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	△ Log real export value COP					
Difference (l)	Second difference		Third difference		Fourth difference	
△ Log firm-specific real exchange rate (share destination country t=0)	0.222***	0.203***	0.226***	0.237***	0.231***	0.255***
	(0.0266)	(0.0251)	(0.0263)	(0.0308)	(0.0309)	(0.0429)
Observations	5,545	5,545	4,431	4,431	3,322	3,322
$X_{t-l} * \triangle RER$	No	Yes	No	Yes	No	Yes
X_{t-l}	Yes	Yes	Yes	Yes	Yes	Yes
Effective F statistic	69.81	12.29	74.33	10.59	55.74	7.12
Critical value τ = *5%*	37.42	25.67	37.42	26.46	37.42	26.50
Critical value τ = *10%*	23.11	14.72	23.11	15.25	23.11	15.38
Critical value τ = *20%*	15.06	8.90	15.06	9.27	15.06	9.41
F-joint significance of the instrument(s)	69.81	11.04	74.33	10.35	55.74	7.26
Under identification test p-value	0.00	0.00	0.00	0.00	0.00	0.00
Pi-value Hansen J-statistic		0.12		0.19		0.76

Notes: Effective F statistic reports Montiel & Pflueger (2013) weak instrument test, which is robust to heteroscedasticity, autocorrelation, and clustering, with its critical values. Hansen J statistic tests under the null hypothesis that the instruments are coherent (Parente & Santos, 2011) in an overidentified model (# instruments > # endogenous variables). The null hypothesis of the under-identification test is that the model is not identified (the matrix is not full column rank). X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and *prodest* Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality (Merchán, 2024), and import value/sales cost. X variables are normalized to have mean 0 and standard deviation 1 (per year).

Table 3: Export effect on firms' dividend policy

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*Initiate effective dividends* (the firm decreed dividends in t - effectively paid [1]- and did not decree them in t-3)		$\triangle_3$ [Free Cash flow [2]/ assets]		$\triangle_3$ [Over-investment [3]/ assets]	
Method	IV	IV	IV	IV	IV	IV
$\triangle_3$ Log real export value COP	0.0465***	0.0357**	0.120*	0.119*	0.00928**	0.00692
	(0.0167)	(0.0144)	(0.0717)	(0.0619)	(0.00471)	(0.00421)
Observations	4,431	4,431	4,431	4,431	4,431	4,431
Fixed effects	State, year, industry					
X_{t-3}	Yes	Yes	Yes	Yes	Yes	Yes
First stage	Column 3, table 2	Column 4, table 2	Column 3, table 2	Column 4, table 2	Column 3, table 2	Column 4, table 2
Method	OLS		OLS		OLS	
$\triangle_3$ Log real export value COP	0.0136***		0.0455**		0.000744	
	(0.00397)		(0.0216)		(0.00132)	
Observations	4,431		4,431		4,431	
Fixed effects	State, year, industry					
X_{t-3}	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. Balanced sample comprises big private Colombian exporting firms that exported all years from 2006 to 2014. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and prodest Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income , international managerial quality (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1.
[1] Effectively paid according to times established in law: one year after decreeing them (Article 156 – Colombian Code of Commerce).
[2] FCF = Operating Income – Capital expenditures (CAPEX) – Debt payment.
[3] Overinvestment calculation follows Richardson (2006) methodology, see appendix 11.

Table 4: Heterogeneous export effect on firms' dividend policy – IV estimation

	Coefficient	(1) *Initiate effective dividends* (the firm decreed dividends in t -effectively paid[1]- and did not decree them in t-3)	(2) $\triangle_3$ [Free Cash flow[2]/ assets]	(3) $\triangle_3$ [Over investment[3]/ assets]
Heterogeneous effect by international managerial quality quintiles - equation 5				
Q1	b1=	0.0160	0.118**	0.00485
	Pi-value b1=0	0.5301	0.0122	0.5451
Q2	b1+b2=	0.0452	0.0486	0.0047
	Pi-value b1+b2=0	0.3418	0.5723	0.7356
Q3	b1+b3=	0.0625**	-0.0646	0.0166
	Pi-value b1+b3=0	0.0314	0.2859	0.1226
Q4	b1+b4=	0.0126	0.0739	-0.0039
	Pi-value b1+b4=0	0.6061	0.4014	0.8002
Q5	b1+b5=	0.0570*	0.3371	0.0089
	Pi-value b1+b5=0	0.0892	0.1584	0.1826
Heterogeneous effect by legal firm type - equation 6				
No SAS	b1=	0.0348**	0.1129**	0.0071
	Pi-value b1=0	0.0433	0.0384	0.2708
SAS	b1+b2=	0.0367	0.1513	0.0063
	Pi-value b1+b2=0	0.1372	0.1711	0.2781

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. Balanced sample comprises all big private Colombian firms that exported all years from 2006 to 2014. SAS: Simplified joint-stock company.
[1] Effectively paid relative to times established in law: one year after decreeing them (Article 156 – Colombian Code of Commerce).
[2] FCF = Operating Income – Capital expenditures (CAPEX) – Debt payment.
[3] Overinvestment calculation follows Richardson (2006) methodology, see appendix 11. Equation 5 and 6 describe the IV econometric specification.

Table 5: Export effect on firms' dividend policy (amount decreed) – heckman and 2SLS estimation

	(1)	(2)	(3)	(4)
Dependent variable		$\triangle_3$ [Decreed dividends/Assets]		
Method	IV	IV	IV	IV
$\triangle_3$ Log real export value COP	0.00534	0.00872	0.00340	0.00806
	(0.0131)	(0.0109)	(0.0131)	(0.0108)
Inverse Mills Ratio			-0.00943	-0.00433
			(0.0277)	(0.0274)
Censored observations	449	449	449	449
X_{t-3}	Yes	Yes	Yes	Yes
Fixed effects		State, year, industry		
	First stage			
Pi-value Hansen J statistic	.	0.39	.	0.39
Under identification test pi-value	0.00	0.01	0.00	0.00
F joint significance of the instrument(s)	23.05	11.42	28.42	11.59
Effective F statistic (first stage)	23.05	5.52	28.42	4.91
Critical value $\tau = 20\%$	15.06	10.16	15.06	10.00
Critical value $\tau = 10\%$	23.11	16.58	23.11	16.36
$X_{t-3} * \triangle_3 RER$	No	Yes	No	Yes
X_{t-3}	Yes	Yes	Yes	Yes
First stage	Column 1 - Table 14	Column 2 - Table 14	Column 3 - Table 14	Column 4 - Table 14
Method		OLS		OLS
$\triangle_3$ Log real export value COP		-0.00855**		-0.00901**
		(0.00426)		(0.00416)
Inverse Mills Ratio				-0.0230
				(0.0281)
Censored observations		449		449
X_{t-3}		Yes		Yes
Fixed effects		State, year, industry		

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. The estimation follows procedure 19.2 described in Wooldridge (2010): Heckman (1979) two-step procedure with 2SLS. Balanced sample comprises all big private Colombian firms that exported from 2006 to 2014 and initiated to decree effectively paid dividends. Inverse Mills Ratio is calculated based on selection equation (table 13). X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and prodest Stata command (Mollisi and Rovigatti, 2018) - see appendix table 9-), export value/operating income, international managerial quality variable (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1.

7 Conclusion

The international trade role on dividend policy is surprisingly insufficient explored in the academic literature. This paper argues that exports could be one of the missing pieces to put together the *"dividend puzzle"*. Exogenous export demand shocks arose between from 2006 and 2014 in Colombia provide a proper natural experiment to evaluate exporting firms' dividend policy adjustment and assess the principal dividend theories' testable predictions. For this purpose, a 2SLS empirical approach is implemented in which firm specific real exchange rates (weighted by destination countries' export shares at initial year) is used as export value instrumental variable, following Jiang et al. (2010) methodology. The exogeneity condition is plausibly satisfied since the real exchange rate fluctuation occurred was mainly driven by international oil price variation and unprecedent inflation rate in trading partners. Fulfillment of relevance condition is empirically supported.

The main results indicate that exogenous export shocks impact positively and statistically significative the probability that firms initiate to decree effectively paid dividends, the free cash flow, and the cash flow volatility. This finding contradicts signaling theory because firms modify their dividend policy because of temporal international income variation. On the contrary, agency cost theory is supported; dividend payment mitigate the priorities differences between manager(s) and shareholder(s) generated by exports shocks via higher free cash flow and cash flow volatility. Although positive export shocks impact on the probability to decree

dividends is statistically significative and its magnitude is relevant (the back-of-the-envelope calculation indicates that exports account for a significative 26% of the firms that initiated to decree effectively paid dividends), they do not affect the amount that firms usually decree in dividends.

From a policy perspective, econometric results support the 'outcome model' within the agency cost theory: firms which did not transform to SAS (Simplified Joint- stock) legal form – which are more likely to have better minority shareholders protection – and firms with better international managerial quality - which could have better corporate governance - are more likely to start to decree effectively paid dividends in response to exogenous export shocks. Also, econometric results indicate that dividend payment could be insufficient to avoid firms' over investment. As a final remark, it is expected that this paper become a point of reference that incentives to generate more research about international trade impact on dividend policy.

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9 Appendix A: Tables

Table 6: Descriptive statistics – two year differences

Variable	Firm type: Non-exporting, non-decreed dividends	Non-exporting, decreed dividends	Exporting, non-decreed dividends	Exporting, decreed dividends	P-value coefficient (diff across groups)1	Number of observations
$\triangle_2$ Log real export value (COP)			-0.017	0.068	0.009	12,987
$\triangle_2$ Log firm specific real exchange rate[2]			-0.290	-0.221	0.169	12,987
$\triangle_2$ Export value/operating income			0.003	0.005	0.081	12,987
$\triangle_2$ HHI exports			0.000	-0.005	0.318	12,987
$\triangle_2$ International managerial quality[3]			-0.006	0.017	0.105	10,336
$\triangle_2$ Log real import value (COP)	0.006	0.037	0.028	0.068	0.557	30,311
$\triangle_2$ Log firm specific real exchange rate (imports)[4]	-0.291	-0.279	-0.222	-0.151	0.000	30,311
$\triangle_2$ Import value/sales cost	-0.002	0.003	0.000	0.004	0.525	30,311
$\triangle_2$ Log real decreed dividends (COP)		0.111		0.144	0.007	11,708
$\triangle_2$ Decreed dividends/equity		0.024		0.025	0.111	11,708
$\triangle_2$ Decreed dividends/assets		0.007		0.005	0.294	11,708
$\triangle_2$ Share of firms that continued to decree dividends relative to t-2		0.547		0.623	0.000	20,707
$\triangle_2$ Share of firms that started to decree dividends relative to t-2		0.453		0.377	0.000	20,707
$\triangle_2$ Share of firms that started to decree dividends (effectively paid) relative to t-2		0.359		0.289	0.000	16,432
$\triangle_2$ Share of firms that started to decree dividends (non effectively paid) relative to t-2		0.092		0.083	0.117	16,432
$\triangle_2$ Share of firms that stop to decree dividends	0.157		0.204		0.000	56,902
$\triangle_2$ Log real total assets (COP)	0.118	0.128	0.113	0.115	0.724	77,621
$\triangle_2$ ROA (Profit before taxes/assets)	-0.011	-0.008	-0.014	-0.013	0.032	77,621
$\triangle_2$ Profit rate	-0.004	-0.003	-0.008	-0.008	0.107	76,378
$\triangle_2$ Total investment/assets	0.000	0.000	0.000	0.000	0.514	77,621
$\triangle_2$ Debt/assets	-0.001	0.014	0.012	0.018	0.000	77,621
$\triangle_2$ Cash flow/ assets	-0.001	-0.002	0.000	0.000	0.669	77,621
$\triangle_2$ TFP[5]	0.003	0.009	0.003	0.006	0.001	77,621
$\triangle_2$ [Free Cash Flow[6]/assets]	-0.215	-0.099	-0.100	-0.072	0.000	77,621
$\triangle_2$ [Overinvestment[7]/assets]	0.004	0.005	0.001	0.005	0.083	77,621

Notes: Simple average by year. [1] A regression of each dependent variable on dummy variable(s) for each firm type group(s) plus state, year, and industry fixed effects was estimated. Then, it was jointly tested that the coefficient(s) of the dummy variable(s) was(were) different than 0 through a F-test. [2] $\triangle Log\_real\_export\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fk,t=0}) + 1]$, where RER_{kt} is the real exchange rate between Colombia and destination country k, and $share\_exp_{fk,t=0}$ is the share of export value to destination country k in total exports of firm f in its first sample year. [3] International managerial quality variable is obtained from Merchán (2024). [4] $\triangle Log\_real\_import\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fj,t=0}) + 1]$, where RER_{jt} is the real exchange rate between Colombia and origin country j, and $share\_imp_{jt}$ is the import value share from origin country j in total imports of firm f in its first sample year. [5] TFP calculation based on Levinsohn & Petrin (2003) methodology and *prodest* Stata command (Mollisi & Rovigatti, 2018) (table 9). [6] FCF (Free Cash Flow) = Operating Income - CAPEX (Capital expenditures) – Debt payment. [7] Overinvestment calculation follows Richardson (2006) methodology (see appendix 11).

Table 7: Descriptive statistics – three year differences

Variable	Firm type					
	Non-exporting, non-decreed dividends	Non-exporting, decreed dividends	Exporting, non-decreed dividends	Exporting, decreed dividends	P-value coefficient (diff across groups)1	Number of observations
$\triangle_3$ Log real export value (COP)			-0.029	0.104	0.001	10,161
$\triangle_3$ Log firm specific real exchange rate [2]			-0.447	-0.335	0.045	10,161
$\triangle_3$ Export value/operating income			0.001	0.006	0.003	10,161
$\triangle_3$ HHI exports			-0.001	-0.005	0.602	10,161
$\triangle_3$ International managerial quality [3]			-0.012	0.020	0.100	8,015
$\triangle_3$ Log real import value (COP)	0.033	0.093	0.103	0.159	0.006	23,411
$\triangle_3$ Log firm specific real exchange rate (imports) [4]	-0.444	-0.361	-0.325	-0.223	0.000	23,411
$\triangle_3$ Import value/sales cost	0.003	0.013	0.009	0.015	0.043	23,411
$\triangle_3$ Log real decreed dividends (COP)		0.176		0.193	0.125	8,840
$\triangle_3$ Decreed dividends/equity		0.029		0.009	0.579	8,840
$\triangle_3$ Decreed dividends/assets		0.008		0.001	0.789	8,840
Share of firms that continued to decree dividends relative to t-3		0.520		0.595	0.000	16,444
Share of firms that started to decree dividends relative to t-3		0.480		0.405	0.000	16,444
Share of firms that started to decree dividends (effectively paid) relative to t-3		0.377		0.300	0.000	12,587
Share of firms that started to decree dividends (non effectively paid) relative to t-3		0.095		0.089	0.292	12,587
Share of firms that stop to decree dividends	0.174		0.234		0.000	43,039
$\triangle_3$ Log real total assets (COP)	0.179	0.208	0.178	0.183	0.026	59,497
$\triangle_3$ ROA (Profit before taxes/assets)	-0.014	-0.006	-0.017	-0.010	0.000	59,497
$\triangle_3$ Profit rate	-0.006	0.000	-0.010	-0.006	0.012	58,555
$\triangle_3$ Total investment/assets	0.000	0.001	0.000	0.000	0.716	59,497
$\triangle_3$ Debt/assets	0.005	0.016	0.020	0.021	0.000	59,497
$\triangle_3$ Cash flow/ assets	-0.002	-0.001	-0.001	0.002	0.099	59,497
$\triangle_3$ TFP[5]	0.007	0.016	0.009	0.016	0.000	59,497
$\triangle_3$ [Free Cash Flow[6] / assets]	-0.271	-0.132	-0.142	-0.045	0.000	59,497
$\triangle_3$ [Overinvestment/assets]	0.004	0.005	0.003	0.005	0.507	59,497

Notes: Simple average by year. [1]A regression of each dependent variable on dummy variable(s) for each firm type group(s) plus state, year, and industry fixed effects was estimated. Then, it was jointly tested that the coefficient(s) of the dummy variable(s) was(were) different than 0 through a F-test. [2] $\triangle Log\_real\_export\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fk,t=0}) + 1]$, where RER_{kt} is the real exchange rate between Colombia and destination country k, and $share\_exp_{fk,t=0}$ is the share of export value to destination country k in total exports of firm f in its first sample year. [3] International managerial quality variable is obtained from Merchán (2024). [4] $\triangle Log\_real\_import\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fj,t=0}) + 1]$, where RER_{jt} is the real exchange rate between Colombia and origin country j, and $share\_imp_{jt}$ is the import value share from origin country j in total imports of firm f in its first sample year. [5] TFP calculation based on Levinsohn & Petrin (2003) methodology and *prodest* Stata command (Mollisi & Rovigatti, 2018) (table 9). [6] FCF (Free Cash Flow) = Operating Income - CAPEX (Capital expenditures) – Debt payment. [7] Overinvestment calculation follows Richardson (2006) methodology (see appendix 11).

Table 8: Descriptive statistics – four year differences

Variable	Firm type: Non-exporting, non-decreed dividends	Non-exporting, decreed dividends	Exporting, non-decreed dividends	Exporting, decreed dividends	P-value coefficient (diff across groups)1	Number of observations
$\triangle_4$ Log real export value (COP)			-0.023	0.164	0.000	7,698
$\triangle_4$ Log firm specific real exchange rate[2]			-0.534	-0.433	0.162	7,698
$\triangle_4$ Export value/operating income			0.003	0.007	0.045	7,698
$\triangle_4$ HHI exports			-0.008	-0.005	0.380	7,698
$\triangle_4$ International managerial quality[3]			-0.015	0.009	0.430	6,037
$\triangle_4$ Log real import value (COP)	0.088	0.176	0.199	0.245	0.000	17,716
$\triangle_4$ Log firm specific real exchange rate (imports)[4]	-0.561	-0.443	-0.414	-0.307	0.000	17,716
$\triangle_4$ Import value/sales cost	0.015	0.025	0.022	0.028	0.031	17,716
$\triangle_4$ Log real decreed dividends (COP)		0.184		0.157	0.823	6,539
$\triangle_4$ Decreed dividends/equity		0.011		-0.004	0.519	6,539
$\triangle_4$ Decreed dividends/assets		0.002		-0.003	0.666	6,539
Share of firms that continued to decree dividends relative to t-4		0.511		0.605	0.000	12,205
Share of firms that started to decree dividends relative to t-4		0.489		0.395	0.000	12,205
Share of firms that started to decree dividends (effectively paid) relative to t-4		0.409		0.325	0.000	8,445
Share of firms that started to decree dividends (non effectively paid) relative to t-4		0.085		0.079	0.338	8,445
Share of firms that stop to decree dividends	0.191		0.256		0.000	32,449
$\triangle_4$ Log real total assets (COP)	0.247	0.284	0.242	0.248	0.008	44,667
$\triangle_4$ ROA (Profit before taxes/assets)	-0.017	-0.005	-0.019	-0.009	0.000	44,667
$\triangle_4$ Profit rate	-0.005	0.003	-0.010	-0.004	0.000	43,947
$\triangle_4$ Total investment/assets	0.000	0.000	0.000	-0.001	0.344	44,667
$\triangle_4$ Debt/assets	0.005	0.016	0.022	0.021	0.014	44,667
$\triangle_4$ Cash flow/ assets	-0.003	-0.001	-0.003	0.002	0.098	44,667
$\triangle_4$ TFP[5]	0.012	0.023	0.016	0.025	0.000	44,667
$\triangle_4$ Free Cash Flow[6] / Assets	-0.288	-0.155	-0.144	-0.057	0.000	44,667
$\triangle_4$ Overinvestment[7]/assets	0.006	0.006	0.002	0.006	0.107	44,667

Notes: Simple average by year. [1]A regression of each dependent variable on dummy variable(s) for each firm type group(s) plus state, year, and industry fixed effects was estimated. Then, it was jointly tested that the coefficient(s) of the dummy variable(s) was(were) different than 0 through a F-test. [2] $\triangle Log\_real\_export\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fk,t=0}) + 1]$, where RER_{kt} is the real exchange rate between Colombia and destination country k, and $share\_exp_{fk,t=0}$ is the share of export value to destination country k in total exports of firm f in its first sample year. [3] International managerial quality variable is obtained from Merchán (2024). [4] $\triangle Log\_real\_import\_exchange\_rate_{ft} = ln[\sum_k (RER_{kt} * share\_exp_{fj,t=0}) + 1]$, where RER_{jt} is the real exchange rate between Colombia and origin country j, and $share\_imp_{jt}$ is the import value share from origin country j in total imports of firm f in its first sample year. [5] TFP calculation based on Levinsohn & Petrin (2003) methodology and *prodest* Stata command (Mollisi & Rovigatti, 2018) (table 9). [6] FCF (Free Cash Flow) = Operating Income - CAPEX (Capital expenditures) – Debt payment. [7] Overinvestment calculation follows Richardson (2006) methodology (see appendix 11).

Table 9: TFP estimation

Variables	(1) Log real operating income
Log real operating expenses	0.344***
	(0.00398)
Log real property, plant and equipment	0.0363***
	(0.00576)
Log real sales cost	0.556***
	(0.00941)
Observations	159,872
Number of groups	29,656

Notes: *** p<0.01, ** p<0.05, * p<0.1. TFP calculation based on Levinsohn & Petrin (2003) methodology and prodest Stata command (Mollisi & Rovigatti, 2018). *Free variable* is operating expenses, *state variable* is property plant and equipment, and *proxy variable* is sales cost. Sample includes the biggest private Colombian firms (exporting and non-exporting).

Table 10: Export and import effect on firms' dividend policy – three year differences

	(1) $\triangle_3$ Log export value	(2) $\triangle_3$ Log import value	(3) Initiate effective dividends [1] relative to t-3	(4) $\triangle_3$ [Free Cash flow [2]/assets]	(5) $\triangle_3$ [Overinvestment [3]/assets]
Method	First stage	First stage	IV	IV	IV
$\triangle_3$ Log export value			0.301*	0.0759*	0.00527
			(0.0157)	(0.0433)	(0.00432)
$\triangle_3$ Log import value			0.0403	0.0265	0.00492
			(0.0257)	(0.102)	(0.0105)
$\triangle_3$ Log firm specific real exchange rate	0.226***	-0.0111			
	(0.0350)	(0.0246)			
$\triangle_3$ Log firm specific real exchange rate imports	0.0576*	0.217***			
	(0.0305)	(0.0414)			
Observations	3,783	3,783	3,783	3,783	3,783
X_{t-3}*$\triangle RER$	Yes	Yes	-	-	-
X_{t-3}*$\triangle RER\_imports$	Yes	Yes	-	-	-
X_{t-3}	Yes	Yes	Yes	Yes	Yes
Fixed effects			State, year, industry		
Under identification test pi-value			0.05	0.05	0.05
F test: joint significance of instruments (column 1)			7.12	7.12	7.12
F test: joint significance of instruments (column 2)			3.39	3.39	3.39
Method			OLS	OLS	OLS
$\triangle_3$ Log export value COP			0.0133***	0.0198	-0.000182
			(0.00405)	(0.0169)	(0.00137)
$\triangle_3$ Log import value COP			0.00795	-0.0158	0.00867***
			(0.00555)	(0.0321)	(0.00168)
Observations			3,783	3,783	3,783
Fixed effects			State, year, industry		
X_{t-3}			Yes	Yes	Yes

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. Balanced sample comprises all big private Colombian firms that exported from 2006 to 2014. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and prodest Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality variable (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1.
[1] Effectively paid relative to times established in law: one year after decreeing them (Article 156 – Colombian Code of Commerce).
[2] FCF (Free Cash Flow) = Operating Income - CAPEX (Capital expenditures) – Debt payment.
[3] Overinvestment calculation follows Richardson (2006) methodology, see appendix 11.

Table 11: Export effect on firms' dividend policy - two year differences

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*Initiate effective dividends* (the firm decreed dividends in t - effectively paid [1]- and did not decree them in t-2)		$\triangle_2$ [Free Cash flow [2] / assets]		$\triangle_2$ [Over-investment [3] / assets]	
Method	IV	IV	IV	IV	IV	IV
$\triangle_2$ Log export value	0.0163	0.0102	0.0814	0.00149	0.00794*	0.00688
	(0.0166)	(0.0130)	(0.0560)	(0.0360)	(0.00468)	(0.00496)
Observations	5,545	5,545	5,545	5,545	5,545	5,545
Fixed effects	State, year, industry					
X_{t-2}	Yes	Yes	Yes	Yes	Yes	Yes
First stage	Column 1, table 2	Column 2, table 2	Column 1, table 2	Column 2, table 2	Column 1, table 2	Column 2, table 2
Method	OLS		OLS		OLS	
$\triangle_2$ Log export value	0.00732*		0.0360*		0.00130	
	(0.00383)		(0.0199)		(0.00127)	
Observations	5,545		5,545		5,545	
Fixed effects	State, year, industry					
X_{t-2}	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. Balanced sample comprises all big private Colombian firms that exported from 2006 to 2014. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and *prodest* Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1.
[1] Effectively paid relative to times established in law: one year after decreeing them (Article 156 –Colombian Code of Commerce).
[2] FCF = Operating Income – Capital expenditures (CAPEX) – Debt payment.
[3] Overinvestment calculation follows Richardson (2006) methodology, see appendix 11.

Table 12: Export effect on firms' dividend policy - four year differences

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Initiate effective dividends (the firm decreed dividends in t - effectively paid [1]- and did not decree them in t-4)		$\triangle_4$ [Free Cash flow [2]/ assets]		$\triangle_4$ [Over-investment [3]/ assets]	
Method	IV	IV	IV	IV	IV	IV
$\triangle_4$ Log real export value	0.0472***	0.0406***	-0.0293	0.0371	0.00737	0.00717
	(0.0177)	(0.0153)	(0.106)	(0.0916)	(0.00550)	(0.00503)
Observations	3,322	3,322	3,322	3,322	3,322	3,322
Fixed effects			State, year, industry			
X_{t-4}	Yes	Yes	Yes	Yes	Yes	Yes
First stage	Column 5, table 2	Column 6, table 2	Column 5, table 2	Column 6, table 2	Column 5, table 2	Column 6, table 2
Method		OLS		OLS		OLS
$\triangle_2$ Log real export value		0.0164***		0.0584**		0.000844
		(0.00438)		(0.0242)		(0.00157)
Observations		3,322		3,322		3,322
Fixed effects			State, year, industry			
X_{t-2}	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at firm level. *** p<0.01, ** p<0.05, * p<0.1. Balanced sample comprises all big private Colombian firms that exported from 2006 to 2014. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and *prodest* Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1.

[1] Effectively paid relative to times established in law: one year after decreeing them (Article 156 –Colombian Code of Commerce).

[2] FCF = Operating Income – Capital expenditures (CAPEX) – Debt payment.

[3] Overinvestment calculation follows Richardson (2006) methodology, see appendix 11.

Table 13: Selection equation (probit) – heckman estimation

Variables	(1) The firm initiated to decree effectively paid dividends in t relative to t-3 (1=Yes, 0=No)
$\triangle_3$ Quartile ROA>1	0.0274*
	(0.0156)
$\triangle_3$ Percentage firms that decreed dividends in the industry	0.286***
	(0.0451)
$\triangle_3$ Log firm-specific real exchange rate	0.0112***
	(0.00333)
X_{t-3}	Yes
Dummy years	Yes
Observations	4,431

Notes: Probit - marginal effects reported. Sample is restricted to big private exporting firms that exported all years from 2006 to 2014. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and prodest Stata command (Mollisi and Rovigatti, 2018) -see appendix 9-), export value/operating income , international managerial quality variable (Merchán, 2024), and import value/sales cost.

Table 14: IV first stage (sample: censored observations)

	(1)	(2)	(3)	(4)
Dependent variable		$\triangle_3$ Log real export value		
Difference (l)		Third difference		
$\triangle_3$ Log firm-specific real exchange rate	0.229***	0.288***	0.236***	0.299***
	(0.0477)	(0.0744)	(0.0442)	(0.0761)
Inverse Mills Ratio, t			0.144	0.204
			(0.359)	(0.367)
Censored observations	449	449	449	449
Fixed effects		State, year, industry		
X_{t-3} $\triangle_3$ RER	No	Yes	No	Yes
X_{t-3}	Yes	Yes	Yes	Yes
Effective F statistic	23.05	5.52	28.42	4.91
Critical value $\tau = 5\%$	37.42	28.51	37.42	28.20
Critical value $\tau = 10\%$	23.11	16.58	23.11	16.36
Critical value $\tau = 20\%$	15.06	10.16	15.06	10.00
F joint significance of the instrument	23.05	11.42	28.42	11.59
Under identification test p-value	0.00	0.01	0.00	0.00
Pi-value Hansen J statistic	.	0.39	.	0.39

Notes: Effective F statistic reports Montiel & Pflueger (2013) weak instrument test, which is robust to heteroscedasticity, autocorrelation, and clustering, with its critical values. Hansen J statistic tests under the null hypothesis that the instruments are coherent (Parente & Santos, 2011) in an overidentified model (instruments $>$ endogenous variables). The null hypothesis of the under-identification test is that the model is not identified (the matrix is not full column rank). X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn and Petrin (2003) methodology and prodest Stata command (Mollisi and Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality variable (Merchán, 2024), and import value/sales cost. X variables are normalized to have mean 0 and standard deviation 1.

Table 15: Number of observations per fixed effects

	Number of fixed effects	Number of observations per fixed effects				
		Mean	Median	Standard deviation	Min	Max
Year	4	1133.25	1135	9.9	1120	1143
State	15	302.20	62	582.9	4	2192
Industry	47	96.45	24	139.8	2	698

10 Appendix B: Exports and cash flow volatility

Ideally, export effect on cash flow volatility should be estimated including different non-overlapping cash flow's standard deviation observations per firm (e.g, 1985-1989, 1990-1994, 1995-1999, 2000-2004, etc..). As the data of this paper covers only 9 years (2006-2014), one feasible option is to calculate rolling window standard deviation. Thus, column 1 of table 16 shows estimation of equation 3 including 4-years rolling window standard deviation of cash flow/assets as dependent variable (equivalent to l=3 in equation 3)[52]. The results indicate that there is no statistically significative export effect on cash flow volatility neither in the 2SLS (panel A) nor in the OLS estimation (panel B). Results are robust when the dependent variable is calculated 3-years rolling window (equivalent to l=2) and 5-years rolling window (equivalent to l=4). The null export value effect holds for other volatility measures (rolling window standard deviation of FCF/assets in column 2 and rolling window standard deviation of log operating income in column 3). Probably a sample that covers a longer period of time to calculate different non-overlapping cash flow's standard deviation observations per firm is required to get a more accurate volatility measure as dependent variable in the 2SLS estimation.

Then, two feasible non-2SLS methodological approaches are implemented. First, it is estimated a regression which includes one observation per firm, in which cash flow's standard deviation is the dependent variable and the simple average of the explanatory variables X by

[52]The results are robust excluding cash flow/assets from the explanatory variables X.

firm plus industry fixed effects are the independent variables. The disadvantage is that it is not possible to solve exports endogeneity. The sample covers all big private exporting firms with 5 or more observations during the 2006-2014 period. The main explanatory variable is export value/operating income, instead of log real export value, following Vannoorenberghe (2012) who uses export value/operating income share as the main export exposure measure. Column 1 - panel C - table 16 suggest a positive correlation between export share and cash flow volatility. In the same way, column 2 and 3 illustrate a positive correlation between export share and other volatility measures (FCF/assets' standard deviation and operational income's standard deviation). Although export share is positive correlated with firm volatility, causality cannot be proven in this estimation.

Second, it is replicated -as far as possible- Vannoorenberghe (2012)'s estimation, which calculates a two-step methodology in which variance of disaggregated sales growth residuals per firm is computed in the first stage, and then, included as dependent variable in the second stage. As the sample of this paper does not contain information disaggregated at firm-year-product for the domestic market segment, Vannoorenberghe (2012)'s methodology is replicated but at firm-year level. In the first place, column 1 and 2 of table 17 show the operating income growth residuals estimation (replication of table 2 - column 2 and 4 in Vannoorenberghe (2012)). Then, column 1 in table 18 indicates that export share has a positive impact on conditional operating income volatility -including Vannoorenberghe (2012)'s explanatory variables-. Results are robust to one and two- years differences. Analogously to the previous estimation, the sample is restricted to exporting firms with 5 or more observations

in the 2006-2014 period. Finally, it is replicated this methodology to calculate conditional free cash flow volatility (columns 3 and 4 in table 17) and conditional cash flow volatility (columns 5 and 6 in table 17). The results show that export share has also a positive impact on conditional cash flow volatility (column 3 in table 18).

Table 16: Export share effect on firms' volatility

Dependent variable	(1) SD [Cash flow/assets] in a 4-year rolling window	(2) SD [FCF/assets] in a 4-year rolling window	(3) SD [Operating income] in a 4-year rolling window
Panel A: IV - rolling window			
Method	IV	IV	IV
$\triangle_3$ Log real export value COP	-0.000582	-0.0429	-0.0159
	(0.00142)	(0.0312)	(0.0109)
Observations	4,431	4,431	4,431
Fixed effects	State, year, industry		
X_{t-3}	Yes	Yes	Yes
Panel B: OLS - rolling window			
Method	OLS	OLS	OLS
OLS			
$\triangle_3$ Log real export value COP	-0.000516	-0.000770	0.00741*
	(0.000410)	(0.00982)	(0.00398)
Observations	4,431	4,431	4,431
Fixed effects	State, year, industry		
X_{t-3}	Yes	Yes	Yes
Panel C: OLS - cross section			
Dependent variable	SD [Cash flow/assets]	SD [FCF/assets]	SD [Operating income]
Mean export share (export value/operating income)	0.00994***	0.559***	0.130***
	(0.00230)	(0.151)	(0.0255)
$V*_{avg}$	Yes	Yes	Yes
Observations	2,356	2,356	2,356
R-squared	0.638	0.161	0.135
Fixed effects		Industry	

Notes: SD: standard deviation. Robust standard errors clustered at firm level in panel A-B. Robust standard errors clustered at industry level in panel C. *** p<0.01, ** p<0.05, * p<0.1. X controls variables are: log total assets, profit rate, debt/assets, financial investments/assets, cash flow/assets, TFP (calculation based on Levinsohn & Petrin (2003) methodology and prodest Stata command (Mollisi & Rovigatti, 2018) -see appendix table 9-), export value/operating income, international managerial quality variable (Merchán, 2024), and import value/sales cost. X are normalized to have mean 0 and standard deviation 1. *V is equal to vector X excluding export value/operating income.

Table 17: Residual operating income, free cash flow, and cash flow growth rate calculation

Variables	$\triangle_3$ Log real total operating income		$\triangle_3$ FCF/assets		$\triangle_3$ CF/assets	
$\triangle_3$ Log real property, plant and equipment		0.0865***		-0.150***		-0.011***
		(0.0155)		(0.0481)		(0.00262)
Constant	0.0898***	0.0912***	-0.107***	-0.086***	0.00034	0.00174***
	(0.00656)	(0.00161)	(0.0186)	(0.00499)	(0.000815)	(0.000272)
Observations	10,099	9,481	10,099	9,481	10,099	9,481
R-squared	0.135	0.592	0.030	0.400	0.044	0.375
Firm fixed effects	No	Yes	No	Yes	No	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at firm level in parentheses. FCF = Operating Income – Capital expenditures (CAPEX) – Debt payment. CF: Cash flow. *** p<0.01, ** p<0.05, * p<0.1.

Table 18: Export share effect on conditional operating income, free cash flow and cash flow variance

Variables	(1) Variance residuals column 2 table 17 [$\triangle_3$ Log real total operating income USD]	(2) Variance residuals column 4 table 17 [$\triangle_3$ FCF/assets]	(3) Variance residuals - column 6 table 17 [$\triangle_3$ CF/assets]
Mean export share (export value/operating income)	0.324***	8.736	0.00234*
	(0.0778)	(8.386)	(0.00132)
Mean log real operating income	0.00454	10.67**	0.00177***
	(0.0373)	(5.349)	(0.000682)
Mean log real property, plant and equipment	0.00628	-1.675	-0.001***
	(0.0174)	(1.117)	(0.000263)
Mean log real operating expenses	-0.0503*	-9.363**	-0.001***
	(0.0268)	(1.117)	(4.619)
Mean debt (Debt/assets)	0.102	30.25**	-0.028***
	(0.138)	(13.69)	(0.00367)
Constant	0.635***	-14.68	0.0120***
	(0.136)	(10.04)	(0.00378)
Observations	2,382	2,382	2,382
R-squared	0.076	0.046	0.093
Industry fixed effects	Yes	Yes	Yes

Notes: Robust standard errors in parentheses clustered at industry level *** p<0.01, ** p<0.05, * p<0.1.

11 Appendix C: Overinvestment calculation

Richardson (2006) calculates overinvestment as the residual of a regression of investment expenditure on the lags of several variables (growth opportunities, leverage, cash, age, size, stock returns, expenditure investment), plus year (t) and industry (s) fixed effects with Compustat database for United States. As the dataset of this paper does not include information that allows to measure growth opportunities, age, and stock returns variable, the feasible regression is the following:

$$I(new)_{fist} = \beta_0 + \beta_1 Debt_{fist-1} + \beta_2 Cash_{fist-1} + \beta_3 Operating\_expenses_{fist-1} + \beta_4 I(new)_{fist-1} + \delta_s + \delta_t + \epsilon_{fist} \quad (9)$$

where $I(new)_{fist}$ is investment expenditure, $Debt_{fist-1}$ is the lag of liabilities/assets share, $Cash_{fist-1}$ is the lag of cash/total assets ratio, $Operating\_expenses_{fist-1}$ is the firm size proxy variable, δ_s are industry fixed effects, and δ_t are year fixed effects. Results are shown in table 19.

Table 19: Overinvestment calculation

Variables	(1) Net expenditure investment (total)/assets	(2) Net expenditure investment (fixed assets)/assets
Net expenditure investment (total) (t-1)	-0.000105	
	(9.96e-05)	
Net expenditure investment (fixed assets) (t-1)		-6.55e-05
		(5.37e-05)
Log real operating expenses (USD) (t-1)	0.00597	0.00164***
	(0.00420)	(0.000625)
Cash flow/assets (t-1)	0.115***	0.0396**
	(0.0331)	(0.0160)
Liabilities/Assets (t-1)	-0.00109	-0.000680
	(0.00102)	(0.000547)
Observations	175,418	175,418
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
R squared	0.001	0.002

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.