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Abstract

This paper presents a simple model for dual-class stock shares, in which common shareholders receive both public and private cash flows (i.e. dividends and any private benefit of holding voting rights) and preferred shareholders only receive public cash flows (i.e. dividends). The dual-class premium is driven not only by the firm's ability to generate cash flows, but also by voting rights. We isolate these two effects in order to identify the role of voting rights on equity-holders' wealth. In particular, we employ a cointegrated VAR model to retrieve the impact of the voting rights value on cash flow rights. We find a negative relation between the value of the voting right and the preferred shareholders' wealth for Brazilian cross-listed firms. In addition, we examine the connection between the voting right value and market and firm specific risks.

JEL classification numbers: G32, G34, G38, G15

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1 Introduction

In many countries firms have the possibility to issue different types of shares with distinct voting and dividends rights. Pajuste (2005) and Villalonga and Amit (2006) document that the fraction of dual-class stocks is over 30% for some European countries and about 12% in the U.S. Shares with different voting rights entail an asymmetry in cash flow and voting rights. To compensate their restricted voting rights, preferred shareholders receive dividends before common stockholders. The differences in cash flow and voting rights are the starting point of a growing literature which discusses minority shareholder protection and financial markets' development. Two main questions derive from this debate. First, how much are investors willing to pay to obtain control? The answer should depend on the amount of private benefits the controlling shareholder may extract from the firm. Second, what are the effects of multi-class issuances on the value of the firm?

There are a number of approaches to estimate the premium for voting rights in the literature. Barclay and Holderness (1989) and Dyck and Zingales (2004) compute the difference in the price paid by the controlling block and the prevailing market price. Alternatively, Zingales (1994), Zingales (1995) and Cox and Roden (2002) examine the price difference of shares with different voting rights. More recently, Kalay et al. (2014) combine a synthetic non-voting share with the put-call option parity to identify the voting premium. In general, the empirical evidence indicates, on average, a positive value for the right to vote. However, its magnitude varies across countries (Dyck and Zingales (2004)) and over time (Kalay et al. (2014)).

The goal of this paper is to measure the impact of the voting right value in the intrinsic value of the firm. We are not particularly interested in estimating the voting premium per se, but in examining how changes in the value of the voting rights may affect the wealth of shareholders. In particular, we ask how changes in the control premium affect the cash flows available to all investors. We propose a simple model in which the prices of common and preferred shares are driven by the fundamental value of the firm. As in Dyck and Zingales (2004), a dual-class premium arises due to differences in public and private cash flows. By public cash flows, we define dividend payments to which both

shareholder classes have a right. Only the common shareholders may have access to a share of private benefits through their voting rights.

We disentangle the effects of public and private cash flows on the fundamental value of the firm to show that increases in the value of voting rights should negatively affect the wealth of equity holders.[1] To test this implication empirically, we identify the voting right and dividend innovations using a structural cointegrated vector autoregressive (VAR) model in order to isolate the impact of a shock in the firm's ability to generate public and private cash flows. Our assessment focuses on stock data for cross-listed Brazilian firms, mainly because preferred shares are widespread in Brazil for historical reasons (see Fernandes and Novaes (2014)).

We find that an increase in the value of the vote negatively affects the amount of public cash flows for Brazilian cross-listed firms. A small voting premium presumably signals little expropriation of minority shareholders and/or a lower value of private benefits. This is in line with Gompers et al. (2003) and Klapper and Love (2004), who associate better corporate governance practices with firm value and operating performance, respectively. These results are also in line with the insights of the literature on agency and entrenchment problems about the desirability of the one-share-one-vote rule (Adams and Ferreira (2008)). Deviations from one-share-one-vote may induce shareholders to act in self-interest, which gives rise to a negative impact on the firm value (Burkart and Lee (2008)).

Our framework also allows us to shed light on what drives the voting right value. Dyck and Zingales (2004) document that some country-specific factors affect the voting premium, whereas Gompers et al. (2003) and Klapper and Love (2004) show that equity holders' rights may vary across firms within the same country. We ask whether the voting right value is indeed firm-specific or whether it reacts to broad market conditions as proxied by the Fama-French factors. We find that, although the Fama-French factors help explain the behavior of share prices, the voting right value is mainly driven by firm-specific risk premia.

[1] This is consistent with the empirical evidence in the corporate governance literature, e.g. see the excellent review by Adams and Ferreira (2008).

The remainder of the paper proceeds as follows: Section 2 introduces a simple common-preferred price model. Section 3 briefly describes the estimation procedure. Section 4 documents the empirical analysis for Brazilian cross-listed firms and Section 5 discusses the importance of firm-specific factors in relation to the voting right value. Section 6 offers some concluding remarks.

2 How do voting rights affect firms' cash flows?

We propose a simple model in which stock transaction prices reflect not only the unobservable fundamental price of the firm, but also the value of voting rights, if any. We then derive the implications of the model with regard to how changes in the value of corporate rights may affect cash flow rights.

Consider a firm with two classes of shares. Common shares have cash flow and voting rights, whereas preferred shares only have cash flow rights. Both share prices depend on the fundamental value of the firm, given by the present value of the expected public cash flows. Public cash flows compasses any news that investors perceive as changes in expected inflows or outflows of cash for the company. It could be closing a new deal or contract as well as changes in economic outlook, for instance. The price of common shares also reveals the present value of any expected private cash flow that the voting rights could generate. Private cash flows reflect any enforcement that complicates or facilitates private benefits extraction. It could reflect tougher corporate governance legislation from the company board or national legislation, for instance.

We define the fundamental price, m_t, as the present value of the expected stream of dividend payments to preferred shareholders:

$$m_t = \mathbb{E}_t \left[\sum_{i=0}^{\infty} D_{p,t+i}/(1+r)^i \right], \tag{1}$$

where $\mathbb{E}_t$ denotes the conditional expectation given that the information set at time t, $D_{p,t+i}$ is the dividend payment to the preferred shareholders at time $t+i$, and r is the appropriate discount rate.

We define the common-preferred premium, d_t, as the difference in cash flows rights between common and preferred shareholders:

$$d_t = \underbrace{\mathbb{E}_t\left[\sum_{i=0}^{\infty} D_{c,t+i}/(1+r)^i\right] + \mathbb{E}_t\left[\sum_{i=0}^{\infty} v_{t+i}/(1+r)^i\right]}_{\text{common share holders' cash flows}} - \underbrace{\mathbb{E}_t\left[\sum_{i=0}^{\infty} D_{p,t+i}/(1+r)^i\right]}_{\text{preferred share holders' cash flows}}, \qquad (2)$$

where $D_{c,t+i}$ denotes dividend payments to common shareholders, v_{t+i} is the voting right at time $t+i$ and $\mathbb{E}_t\left[\sum_{i=0}^{\infty} v_{t+i}/(1+r)^i\right]$ accounts for the expected present value of the private cash flows that voting rights may generate. One could argue that the voting component is only present in large block sales of the stock. However, Zingales (1995) and Doidge (2004) point out that as long as there is competition on the interest for control, the expected present value of private benefits should be included in the common preferred price premium. Therefore, we assume that any common shareholder enjoys private cash flows. Note that the dividend payments $D_{c,t+i}$ and $D_{p,t+i}$ are public cash flows and $D_{c,t+i} \leq D_{p,t+i}$ holds because preferred shareholders receive at least as much dividends than common shareholders. It is important to note that the common-preferred premium, d_t, depends on two components: the difference in dividend payments $\left(\mathbb{E}_t\left[\sum_{i=0}^{\infty} D_{c,t+i}/(1+r)^i\right] - \mathbb{E}_t\left[\sum_{i=0}^{\infty} D_{p,t+i}/(1+r)^i\right]\right)$ and the voting right value $\left(\mathbb{E}_t\left[\sum_{i=0}^{\infty} v_{t+i}/(1+r)^i\right]\right)$.

Our first goal is to provide a framework that allows us to disentangle the effect of the voting right value from the fundamental price of the firm. Because our identification and estimation strategies rely on a time-series framework, it is natural to model fundamental prices as random walks as they yield unpredictable returns. For identification purposes (see details in Section 3), we must also consider the exchange rate. We define the fundamental exchange rate (e_t), the firm's fundamental share price (time-series counterpart of (1)) and the common-preferred premium (time-series counterpart of (2)) as latent prices

expressed in logarithm terms:[2]

$$e_t = e_{t-1} + \eta_t^e \tag{3}$$

$$m_t = m_{t-1} + \eta_t^m + \pi \eta_t^v \tag{4}$$

$$d_t = d_{t-1} + \eta_t^v + \kappa \eta_t^m, \tag{5}$$

where η_t^e, η_t^m and η_t^v are the innovation terms associated with the fundamental exchange rate, fundamental share price and the voting right, respectively. The innovations η_t^e, η_t^m and η_t^v are assumed to be contemporaneously uncorrelated. From (4), the innovation term related to the voting right is allowed to have a direct effect on the firm's fundamental price. The primary question is whether changes in the value of voting rights (that signal changes in private cash flows) affect the cash flows available to all equity holders. To answer this question one needs to make inference on the value of π.

The common-preferred premium in (5) accommodates shocks from two sources: η_t^m and η_t^v. The impact of η_t^m is through the parameter κ, capturing the difference in the public cash flows (first and third term in (2)). Because η_t^m and η_t^v are assumed to be uncorrelated, η_t^v captures everything that relates to private cash flows which are not contained in η_t^m (second term in (2)).

As equations (3) to (5) refer to latent variables, estimation and identification of κ and π require a relation between latent and observed variables. To this end, we make use of common and preferred shares. The prices of common, p_t^c, and preferred shares, p_t^p, can be defined as a function of the latent price,

$$p_t^p = m_t + b_p \eta_t^T \tag{6}$$

$$p_t^c = m_t + d_t + b_c \eta_t^T, \tag{7}$$

where η_t^T is a transitory noise that contaminates transaction prices and due to trading frictions represents any deviation from the intrinsic value of the firm. In other words, $b_p \eta_t^T$ and $b_c \eta_t^T$ can be seen as short-run deviations from the long-run equilibrium.

[2]This resulting time-series model is an extended version of Scherrer (2014).

Denote Y_t the vector containing the logarithm of the exchange rate, preferred and common prices, and preferred prices in a foreign market.[3] Prices in Y_t may share up to three stochastic trends, namely: the fundamental exchange rate, the fundamental share price, and the fundamental common-preferred premium (defined in (3), (4) and (5), respectively). To assess the impact of changes in public and private cash flows on dual-class share prices, we make use of the impulse response function obtained from the structural infinite vector moving average (VMA(∞)) which is function of uncorrelated innovations,

$$\Delta Y_t = \varphi_0 \eta_t + \varphi_1 \eta_{t-1} + \varphi_2 \eta_{t-2} + ... = \sum_{i=0}^{\infty} \varphi_i \eta_{t-i}, \tag{10}$$

where $\eta_t = (\eta_t^e, \eta_t^m, \eta_t^v, \eta_t^T)'$ and φ_i, $i = 1, 2, 3 \ldots$ are 4×4 parameter matrices. From (10), one can obtain the total impact matrix that sums the effects over time: $\Phi = \sum_{i=0}^{\infty} \varphi_i$. Because our interest lies only in the parameters that show the response of prices in the domestic market to an impulse in η_t^v and η_t^m, we must present the sub-matrix of Φ that drives their dynamics.[4] Thus, as a matter of simplicity, from equations (6) and (7) the total impact is:

$$\begin{pmatrix} \Delta e_t \\ \Delta p_t^p \\ \Delta p_t^c \\ \Delta p_t^{p,f} \end{pmatrix} = \Phi \begin{pmatrix} \eta_t^e \\ \eta_t^m \\ \eta_t^v \\ \eta_t^T \end{pmatrix} = \begin{pmatrix} & & \cdots & \\ \vdots & 1 & \pi & \vdots \\ & (\kappa+1) & (\pi+1) & \\ & & \cdots & \end{pmatrix} \begin{pmatrix} \eta_t^e \\ \eta_t^m \\ \eta_t^v \\ \eta_t^T \end{pmatrix}, \tag{11}$$

where Φ is a 4×4 parameter matrix.

Equation (11) shows how transaction prices respond to innovations in the share fun-

[3] For identification purposes, we add two further prices to form a four dimensional system. They are the observed exchange rate (w_t), and preferred share prices at the foreign market ($p_t^{p,f}$). We define them as follows

$$w_t = e_{t-1} + b_w \eta_t^T \tag{8}$$
$$p_t^{p,f} = m_t + e_t + b_{p,f} \eta_t^T. \tag{9}$$

As for common and preferred shares prices, w_t is equal to the fundamental exchange rate plus some transitory effects. The preferred share price at the foreign market, $p_t^{p,f}$, is equal to the preferred share price at the home market adjusted by the exchange rate.

[4] The appendix shows the steps in order to obtain the elements of Φ.

damental price and in the voting rights. The parameter π summarizes the impact of η_t^v on preferred share prices. In the same way, $\pi + 1$ is the total effect on common shares. Hence, the parameter π is the effect on the firm fundamental price from an innovation in the voting right value. Finally, the term $1 + \kappa$ gives the total response on common shares after shocks on the fundamental share price.

The question is what to expect from the parameters π and κ? The parameter π gives the total response of prices to shocks in the voting right value. The voting right value is often seen as a function of the private benefits that investors may get from holding these rights. It can also reflect a possible premium over the preferred share, in mergers and acquisitions (see Zingales (1994), Zingales (1995) and Dyck and Zingales (2004) for explanations of private benefits and merger premium). As such, an increase in the value of voting rights may signal that common shareholders can extract more private benefits (increase in private cash flows) leading to a negative effect on public cash flows, i.e. the increase in private benefits comes at the expense of all equity holders because the share price declines. This economic intuition leads to the first hypothesis that a positive innovation in private cash flows (an increase in the voting right value) generates a negative effect on public cash flows (i.e., $\pi < 0$).

As for the parameter κ, the intuition on its sign is not so obvious. An increase in the firm's expected cash flows could lead to various possibilities of how the dividend payments are shared between common and preferred shareholders. If no assumptions are made regarding changes in payout policy and management decision on the split of dividends between the two share classes, one may argue that, other things being equal, an increase in the cash flows -results in a relative increase in dividends of both share classes. Therefore, positive (negative) shocks on the expected future cash flows would then lead to a proportional increase (decrease) in dividends for both share classes, increasing (decreasing) the absolute difference between these dividend payments (given that $D_{c,t+i} \leq D_{p,t+i}$), and hence decreasing (increasing) the common-preferred premium. Therefore, positive news for the firm's cash flows may deliver a higher dividend payment for both share classes and a possible reduction in the common-preferred premium (i.e., $\kappa < 0$).

We can use the innovations associated with voting rights in (4) and (5) to infer which variables drive the voting right value: domestic, market or firm specific factors? We make use of the Fama-French factors to answer this question. It is well known that the Fama-French factors are able to explain a large portion of the variability of stock returns. Therefore, if the Fama-French factors are also able to significantly explain the variation in the voting right value, then it is possible to conclude that market factors drive the value of voting rights. If this is not the case, then the voting rights value relate to firm specific factors. The idea is that Fama-French factors help explain the behavior of share price returns more than they help elucidate the behavior of the voting right. If this is the case, firm-specific factors play a larger role on the value of the voting rights than market factors.

3 Estimation procedure

We follow Gonzalo and Granger (1995) and Gonzalo and Ng (2001) for the estimation of the cointegrated VAR models. We assume that the price system in (10) admits a cointegrated VAR(p) representation:

$$\Delta Y_t = \xi_1 \Delta Y_{t-1} + \xi_2 \Delta Y_{t-2} + ... + \xi_p \Delta Y_{t-p} + \zeta + \xi_0 Y_{t-1} + \epsilon_t, \tag{12}$$

where Y_t is the vector of observed log prices, $\xi_0 = \alpha\beta'$, α is the error correction term, β is the cointegrating vector and ϵ_t is a zero mean white noise process with a non-diagonal covariance matrix Ω. We estimate the parameters in (12) and then, through dynamic simulation, back out the infinite VMA(∞) coefficients in (13):

$$\Delta Y_t = \epsilon_t + \psi_1 \epsilon_{t-1} + \psi_2 \epsilon_{t-2} + ... = \Psi(L)\epsilon_t, \tag{13}$$

where L is the usual lag operator and ψ_i, $i = 1, 2, 3, \dots$ are 4×4 parameter matrices, which are a function of the parameters in (12). The VMA representation in (13) has price changes as a function of reduced-form (possible correlated) innovations, ϵ_t. Innovations

in each of the market prices can only affect their respective market prices at time t ($\psi_0 = I_4$ in (13)). The target of this investigation is to achieve a VMA expression driven by uncorrelated innovations. Equation (14) is the structural counterpart of (13), where η_t is a 4×1 vector which contains uncorrelated innovations:

$$\Delta Y_t = \varphi_0 \eta_t + \varphi_1 \eta_{t-1} + \varphi_2 \eta_{t-2} + ... = \sum_{i=0}^{\infty} \varphi_i \eta_{t-i}. \tag{14}$$

The sum of the effects at all lags, $\Phi = \varphi_0 + \varphi_1 + \varphi_2 + ...$, is the measure we are most interested in because it delivers the impact on transaction prices as a result of uncorrelated innovations. [5] These uncorrelated innovations correspond to shocks in the fundamental share price and in the voting right value, depicted in (11).

We identify Φ as in Gonzalo and Ng (2001) and first define ε_t as the reduced-form permanent and transitory innovations: $\varepsilon_t = G\epsilon_t$, with $G = [\alpha'_\perp, \alpha'\Omega^{-1}]'$. The covariance matrix of ε_t is given by $\Xi = G\Omega G'$, where $\Omega = E(\epsilon_t \epsilon'_t)$ from (12). Because Ξ is likely a non-diagonal matrix, we implement a further step to find uncorrelated innovations. As in Scherrer (2014), we define a non-symmetric matrix $\widetilde{\Xi} = \Xi\Theta^{-1}$, where Θ is a diagonal matrix constructed with the diagonal elements of Ξ. We then decompose $\widetilde{\Xi}$ using the spectral decomposition ($\widetilde{\Xi} = SS$), recovering $\eta_t = SG\epsilon_t$. The same relation applies to recover Φ, such that $\Phi = \Psi(L)G^{-1}S = \Psi(L)\varphi_0$, with $\varphi_0 = G^{-1}S$. Note that η_t and ϵ_t have the same dimension. Hence, the number of uncorrelated innovations must be equal to the number of markets. As (12) is a cointegrated system, the number of stochastic trends is equal to the number of variables in the system minus the number of cointegrated relations. Because there are at least two stochastic innovations (η_t^m and η_t^v), it would not be possible to identify the system in a cointegrated framework with only two variables. This is the reason we add the stock price in a foreign market (and then the exchange rate) in Section 2 and in the empirical analysis in Section 4.

[5] For a formal definition of uncorrelated permanent and transitory innovations, see Gonzalo and Granger (1995) and Gonzalo and Ng (2001).

4 Effects of voting rights on firm value

Investors observe distinct cash flows from common and preferred shares. Dual class shares are therefore priced differently and the value of the premium between them may be associated to private cash flows. We assess empirically the impact of changes in the voting right value on firm value. How do investors who hold a common share perceive changes to expected future benefits? How do they impact the way they estimate expected cash flows? What is the relation between private and public cash flows? Do changes in private benefits affect the cash flows generated by the firms?

In order to answer these questions, one needs both preferred and common shares that are traded frequently. For that, we use a data set of Brazilian firms. The Brazilian stock exchange is particularly interesting for this study, given that dual class shares are exceptionally popular in the country and as so, they have been subject to more studies in this area.[6] Brazilian firms can have up to 50% of the total number of shares issued as preferred shares.[7] This characteristic makes it possible for the stock exchange market to have significant trading activity in both classes of shares.[8]

The foreign market is represented by American Depositary Receipts (ADRs). [9] Many Brazilian firms also trade in the U.S. through ADRs. We start with all Brazilian firms which currently trade in the U.S. These make up for 25 firms. Out of these, we select the ones that have common and preferred shares traded on the Brazilian stock exchange. These are Ambev (beverage), Bradesco (finance), Santander (finance), Braskem (petrochemical), Electrobras (energy), Copel (energy), CBD (food distribution), Cemig (energy), Gerdau (steel), Itau Unibanco (finance), Oi (telecommunication), Petrobras (oil),

[6]For more information on some particularities of the Brazilian data, Nenova (2001) provides an interesting study, where she analyzes private benefits for Brazilian firms in the 1990s and find a time-varying behavior.

[7]Law number 10.303 of 31 October, 2001 states a limit of 50 preferred shares. Before that, Law 6.404 of 15 December, 1976 stated a ratio of 2/3 of preferred shares. Preferred shares are defined as having none or less voting power than common shares and have some preference on dividend payments. See $http://www.cvm.gov.br/port/atos/leis/lei10303.asp$ and $http://www.planalto.gov.br/ccivil_03/leis/l6404consol.htm$.

[8]Fernandes and Novaes (2014) also see the advantages of Brazilian data in their extensive study which shows that government activism reduces the value of minority shareholders voting rights in Brazilian public firms.

[9]For identification purposes Section 2 includes preferred shares at a foreign market and exchange rate.

Telefonica (telecommunication), Tim (telecommunication) and Vale (mining). We use daily prices for preferred and common shares traded in Brazilian currency and ADRs on preferred shares traded on the NYSE in U.S. dollars as well as the exchange rate. The sample spans from January 2007 to December 2014.

First we test for cointegration. Table 1 reports the results of the trace and the maximum eigenvalue tests. The four variable system shows one cointegrating vector for the majority of the companies. This delivers three common factors. These three common factors are seen as the stochastic trends presented in Section 2, namely, the fundamental exchange rate, the fundamental share price and the common-preferred premium. We then estimate (12) to obtain matrix Φ in (11) (see discussion in Section 3).[10] From Φ, we can infer the model parameters in (4) and (5): π and κ.

Table 2 presents the results of the inference on the model parameters.[11] From (11), π gives the price response to changes in the value of voting rights. This parameter shows the percentage impact on the fundamental price of the firm (which affects both common and preferred shares) as a result of a shock in the voting value. For instance, in the first row, for a 1% innovation on the voting right, there is a -0.96% effect on the fundamental firm price. All π significant estimates are negative except to Vale.[12] The result indicates that a positive/negative change in the price of the vote decreases/increases the public cash flows. This result shows that an increase in private cash flows (the ones only common shareholders receive), seen through a higher voting value, decreases the public cash flows. This happens because of the negative effect on the fundamental value of the firm. A low value of voting rights is a signal of low expropriation and private benefits. Such a situation may arise from better corporate governance and stronger shareholders rights

[10] We estimate the parameters in (12) using full information maximum likelihood framework of Johansen (1991) where the lag length, p, is determined using the BIC criterium and LM test, such that the residuals are white noise processes.

[11] The parameter π is over identified, given that it can be inferred from more than one position (second and third row in the third column) in (11), but they deliver inferences that are statistically equal.

[12] Vale has a positive significant parameter. Note that Vale's preferred shares are defined as 'class A', so that preferred shareholders have the right to vote in General Assembly Deliberations, just as common shareholders. The only difference is that preferred shareholders do not have a say in the composition of the board of directors. Therefore, the voting difference between the two classes is less significant than in the other firms. This implies that shocks on the voting rights do not have a negative impact on public cash flows.

as in Gompers et al. (2003), who find that companies with stronger shareholder rights present higher firm value and higher profits. In the same way Klapper and Love (2004) find that stronger corporate governance is associated with better operating performance (return on assets).

In 2000 BM&FBovespa launched the "Novo Mercado" (New Market), which is characterized by the highest level of corporate governance. It is defined by BM&FBovespa as high standards for transparency and governance. Firms traded on the Novo Mercado adopt practices of corporate governance superior to the ones required by Brazilian law. It is interesting to note that companies that are part of the Novo Mercado can only issue shares with voting rights, not allowing for asymmetry in cash flows and voting rights.

There are two previous findings in the literature which provide insights about our results. Doidge (2004) finds that foreign firms cross-listing in the U.S. have a voting premium of 43% lower than firms that do not cross-list. This means that the effect for firms that do not cross-list could be even higher than the one we unveil here with a higher negative effect on the firm value after an increase in the voting right value. On the other hand, Dyck and Zingales (2004) find Brazil is the country (among 39 countries) with the highest value for corporate control. They relate their results of a higher premium to lower investor protection and higher willingness to extract private benefits. The lower investor protection would explain the significantly negative π estimates.

The estimates for κ are significant and negative for all firms. This implies that a positive shock on the fundamental share price reduces the common-preferred premium in line with the discussion in Section 2.

In summary, there is evidence that an increase in the value of voting rights generates a negative effect on firms' cash flows. We claim that this is because common shareholders can extract more private benefits and, hence, generate a decrease in public cash flows. A second finding relates good (bad) news for firms' cash flows with a decrease (increase) in the common-preferred premium.

5 Voting right and firm specific risk

The fundamental share price, i.e. the expected future dividend payments, is a financial asset and as such the Fama-French factors should be able to explain a portion of its variation. The common-preferred premium, and, more specifically, the component related to the voting right value does not present such a clear intuition. The Fama-French factors, however, can still be used in this context. Understanding how much of the voting right value can be explained by these factors sheds light on whether the voting right is specific to the firm or it has some common component. The main goal of this Section is to compare how much the Fama-French factors can explain share price returns and the value of voting rights. We perform this analysis using U.S. factors, as all firms in this study have ADRs negotiated at NYSE. As a robustness check, we also present the results of Brazilian factors in the appendix.

The Fama-French factors are the excess return on the market portfolio (MktRF), small market capitalization minus big (SMB) and high book-to-market ratio minus low (HML)[13]. We recover daily estimates of ε_t^m, η_t^m, ε_t^v and η_t^v for each firm from the estimates in Section 4 and regress them on the three Fama-French factors.

$$\varepsilon_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t, \tag{15}$$

$$\eta_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t, \tag{16}$$

$$\varepsilon_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t, \tag{17}$$

$$\eta_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t. \tag{18}$$

Note that ε_t^m and ε_t^v are measures still "contaminated" by impacts of other sources than η_t^m and η_t^v, respectively.[14] As such, we expect the regressions (15) and (17) to present a better fit than (16) and (18), as the regressors of the former ones combine information from both η_t^m and η_t^v. We also expect the Fama-French factors to explain a larger portion

[13] The source for the Fama-French factors is $http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/datalibrary.html$.

[14] From the identification strategy in Section 2 we have that $\varepsilon_t^m = \eta_t^m + \pi\eta_t^v$ and $\varepsilon_t^v = \eta_t^v + \kappa\eta_t^m$. Furthermore, recall from Section 3 that $\varepsilon_t = G\epsilon_t$ and $\eta_t = SG\epsilon_t$.

of η_t^m than of η_t^v, considering the discussion in Section 2. Tables 3 and 4 report the results of the estimation of (15) - (18). We report the parameter estimates and R-squared for all companies.

By analysing the R-squared measures, indeed we find that the Fama-French factors are able to explain the variation in (15) better than in (16). The same applies for (17) compared to (18). These results corroborate our economic intuition, because there is more information in ε_t^m and ε_t^v than in their structural counterparts η_t^m and η_t^v. We also find that the R-squared measure drops more from (17) to (18) than from (15) to (16). This follows mainly because η_t^m loads heavily on the market factor, MktRF, inflating the correlation between MktRF and ε_t^v, as η_t^m is contained in ε_t^v. The same is not true for η_t^v that is contained in ε_t^m, but does not contribute as much to the R-squared measure when comparing (15) and (16).

Comparing the R-squared from the (16) and (18) regression, we find that the Fama-French factors are able to explain a much larger proportion of η_t^m than η_t^v. The three Fama-French factors successfully explain the component associated with the price innovations, however when the innovations related to the voting rights are considered as the dependent variable as in (18), the picture is completely different. This hints that firm specific factors play a larger role on determining the value of the vote. We find that the Fama-French factors only explain, on average, 5% of the variability of η_t^v, suggesting that most of the variability in η_t^v is due to firm specific factors.

The result hints two things: First, there is a firm specific component in the voting right value. This might be because firms have the option to pursue more advanced corporate practices than the ones required by law as well as some legal rules of investors' protection may not be binding. Gompers et al. (2003) show that equity holders rights vary across firms and Klapper and Love (2004) find that companies in the same country provide different level of protection to investors.[15] Second, the voting right value could well relate to domestic risk factors, that are not included in the Fama-French regression. LaPorta et al. (1998), for instance, study 49 countries and conclude that the legal rules

[15]They find that there is a wide variation in firm-level governance with firms which present both good and bad governance in countries with weak and strong legal systems.

to protect investors can vary significantly among countries, and LaPorta et al. (2000) discuss the differences among countries in their laws related to investor protection and corporate governance. Tables A.1 and A.2 in the appendix provide results of this same exercise using domestic risk factors as regressors instead. There is a significant increase in the R-squared for the price returns, as expected. However, the increase in R-squared for the voting right returns is not so evident. This result reinforces that the value of voting rights are driven by firm-specific factors rather than market or domestic market factors.

It is also relevant to investigate the sign and significance of the estimated parameters associated with the Fama-French factors. As expected, we find that β_1 is always positive and highly significant for the regressions (15) and (16). When considering estimates of β_1 for the regressions (17) and (18), we find them to be mostly negative and significant. This result indicates that the small share of the voting right value, which the factor MktRF can explain, happens through a negative relation between the return on holding the voting right and the return on the market portfolio. This is also in line with the discussion in Section 2 of a negative value for κ. Hence, a negative value for β_1 in (18) captures the negative effect on the common-preferred premium from shocks on the fundamental price of the stock (reflecting the positive relation with MktRF).

As a further analysis, Table 5 reports the correlation of the innovations in voting rights across firms. We find a significant low correlation between the voting rights innovations across firms. This is in line with common market factors being of reduced importance to explain variation on the value of voting rights. This result reinforces the conclusion that firm specific factors play a substantial role in driving the voting right value.

In general, the results in this Section indicate that indeed Fama-French factors help explain the behavior of the share price returns. By contrast, when voting rights are used as a dependent variable, we find very different results. Insights that there are firm specific factors explaining the behavior of the voting right value are suggested.

6 Conclusions

This paper presents a simple model for dual-class shares that allows public and private cash flows affect the fundamental share price. Our aim is to disentangle the effect from these two sources, so that we can determine how the private benefits of holding the voting rights affect the fundamental share price and, thus, the equity-holders' wealth.

We propose a simple time-series model for prices of common and preferred shares which allows us to identify the innovations associated with the fundamental share price and voting rights. We find that an increase in the value of the vote (seen as private cash flows which only common shareholders receive) negatively affects the firm value for Brazilian cross-listed firms and, therefore, decreases the public cash flows. This is in line with the literature on agency and entrenchment problems about the desirability of the one-share-one-vote rule (Adams and Ferreira (2008)).

Our results also shed light on the discussion regarding what drives the value of voting rights. We use the Fama-French regressions to measure the role of market and firm specific factors. We find that Fama-French factors explain, on average, only 5% of the variations on the voting rights innovations. This indicates that there are some firm specific components (or at a much lower intensity, domestic factors) that explain most of the variations of the voting rights value.

This paper contributes to the literature on empirical finance and corporate governance. We show how changes in the value of the vote affect the equity holders' wealth and, hence, the results provide insights that one-share-one-vote might be desirable in the open discussion of how to improve corporate governance.

Table 1: Max Eigenvalue and Trace Test

Ho	Ha	Gerdau	Vale	Petro	Bradesco	Ambev	Santander	Braskem	Eletrobras
					Max Eigenvalue Test				
0	1	231.2	606.8	479.3	286.3	178.3	47.5	284.7	314.5
1	2	16.7	12.2	8.0	8.8	13.8	17.5	25.7	5.2
2	3	2.6	2.7	2.1	3.2	3.7	3.5	4.4	2.1
3	4	0.0	0.2	0.1	0.9	0.9	0.7	1.0	0.1
Conclusion		1cv	1 cv	1 cv	1 cv	1 cv	1 cv	1 cv - 99	1 cv
Ho	Ha				Trace Test				
0	4	214.5	594.6	471.3	277.5	164.5	29.9	259.1	309.3
1	4	14.1	9.5	5.8	5.6	10.1	14.0	21.3	3.1
2	4	2.6	2.6	2.1	2.3	2.8	2.8	3.3	2.0
3	4	0.0	0.2	0.1	0.9	0.9	0.7	1.0	0.1
Conclusion		1 cv	1 cv	1 cv	1 cv	1 cv	1 cv	1 cv - 99	1 cv

Ho	Ha	Copel	CBD	Cemig	Itau	Oi	Telefonica	Tim
					Max Eigenvalue Test			
0	1	45.8	470.0	210.9	316.9	22.2	274.9	170.2
1	2	9.0	20.3	9.5	16.3	9.5	41.1	28.0
2	3	1.7	5.3	1.2	7.3	2.3	1.9	1.0
3	4	0.1	0.3	0.1	1.1	0.2	0.0	0.3
Conclusion		1 cv	1 cv	1 cv	1 cv	-	-	1 cv
Ho	Ha				Trace Test			
0	4	36.8	449.6	201.5	300.6	12.7	233.8	142.2
1	4	7.3	15.0	8.2	9.1	7.1	39.2	27.0
2	4	1.6	5.0	1.1	6.2	2.1	1.9	0.7
3	4	0.1	0.3	0.1	1.1	0.2	0.0	0.3
Conclusion		1 cv	1 cv	1 cv	1 cv	-	-	-

We present results considering two cointegration rank tests: maximum eigenvalue and trace test. For each firm the first four rows refer to the maximum eigenvalue test, and the last four rows refer to the trace test. The columns bring the results for the different firms in our sample. The null hypotheses (of both maximum eigenvalue and trace tests) are zero, one, two and three cointegrating vectors, respectively. The critical values at 5% significance level for the null hypothesis of 1 cointegrating vector is 24.28 (max eigenvalue) and 17.80 (trace). The last row in both tests brings the conclusion. '1 cv' means that we are able to conclude with 95% confidence that there is only 1 cointegrating vector and, hence, three common stochastic trends in a four variable system. '1 cv -99' means that we cannot reject the null of 1 cointegrating vector at 1% significance level. '-' stands for no conclusion.

Table 2: Model Parameters

	π	κ
Gerdau	$-0.96**$ (0.14)	-0.08 (0.06)
Bradesco	$-0.38**$ (0.15)	$-0.07**$ (0.02)
Ambev	$-0.11**$ (0.11)	$-0.02**$ (0.03)
Braskem	$-0.34**$ (0.07)	$-0.13**$ (0.04)
CBD	$-0.37**$ (0.2)	$-0.65**$ (0.1)
Cemig	$-0.32**$ (0.1)	$-0.06**$ (0.03)
Itau	$-0.7**$ (0.13)	$-0.12**$ (0.03)
Telefonica	$-0.41**$ (0.07)	$-0.17**$ (0.04)
Copel	$-0.17*$ (0.09)	-0.48 (0.23)
Eletrobras	$-0.15*$ (0.1)	$-0.06**$ (0.03)
Oi	-0.15 (0.17)	$-0.07*$ (0.07)
Tim	-0.15 (0.08)	-0.10 (0.05)
Vale	$0.76**$ (0.2)	-0.02 (0.01)
Petrobras	0.46 (0.2)	-0.01 (0.01)
Santander	0.79 (0.28)	0.07 (0.03)

We report estimates of π and κ. ** and * denote that the parameter estimates are statistically significant at 5% and 10% levels, respectively. We obtain confidence intervals and standard errors (inside brackets) using parametric bootstrap algorithm (See Lutkepohl (2007), page 709).

Table 3: Fama-French Factors

	Gerdau	Bradesco	Itau	Ambev	Braskem	Petrobras	Vale	Santander
	$\varepsilon_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	1.21	1.04	1.00	0.62	1.04	1.00	1.09	0.67
	(13.804)	(14.499)	(15.115)	(15.442)	(11.546)	(15.51)	(15.979)	(9.119)
SMB	−0.16	−0.30	−0.13	−0.29	−0.15	−0.27	−0.27	−0.01
	(−1.26)	(−2.487)	(−1.091)	(−4.024)	(−1.072)	(−2.146)	(−2.5)	(−0.105)
HML	−0.04	0.11	0.17	−0.24	−0.15	−0.07	−0.09	0.06
	(−0.283)	(1.024)	(1.578)	(−3.146)	(−1.193)	(−0.488)	(−0.652)	(0.379)
R^2	0.42	0.49	0.43	0.32	0.30	0.29	0.44	0.11
	$\eta_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	1.02	0.92	0.81	0.58	0.79	0.82	0.95	0.43
	(11.161)	(13.079)	(12.47)	(15.098)	(8.803)	(12.56)	(13.47)	(4.457)
SMB	−0.15	−0.23	−0.02	−0.28	−0.09	−0.20	−0.26	0.06
	(−1.096)	(−1.912)	(−0.137)	(−3.836)	(−0.691)	(−1.45)	(−2.198)	(0.382)
HML	0.01	0.14	0.18	−0.23	−0.13	−0.03	−0.05	−0.12
	(0.064)	(1.379)	(1.801)	(−2.927)	(−1.066)	(−0.219)	(−0.404)	(−0.587)
R^2	0.29	0.40	0.33	0.28	0.18	0.19	0.32	0.03
	$\varepsilon_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	−0.05	−0.10	−0.21	−0.09	−0.42	0.06	0.06	0.28
	(−3.701)	(−7.284)	(−6.241)	(−2.786)	(−10.533)	(5.694)	(5.395)	(11.996)
SMB	−0.03	0.08	0.11	0.11	0.10	−0.02	0.02	−0.08
	(−0.908)	(2.427)	(2.36)	(3.245)	(1.103)	(−0.774)	(0.468)	(−1.845)
HML	0.01	−0.01	−0.06	0.03	0.06	0.03	−0.01	0.10
	(0.554)	(−0.332)	(−1.21)	(0.82)	(0.776)	(1.425)	(−0.338)	(1.956)
R^2	0.01	0.05	0.16	0.03	0.10	0.03	0.03	0.16
	$\eta_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	−0.02	−0.06	−0.15	−0.08	−0.34	0.05	0.04	0.24
	(−1.79)	(−5.01)	(−4.338)	(−2.638)	(−9.11)	(4.515)	(3.439)	(8.303)
SMB	−0.04	0.07	0.11	0.11	0.09	−0.02	0.02	−0.09
	(−0.971)	(2.232)	(2.253)	(3.105)	(1.067)	(−0.662)	(0.641)	(−1.745)
HML	0.02	−0.01	−0.05	0.03	0.05	0.03	−0.01	0.12
	(0.648)	(−0.221)	(−1.021)	(0.741)	(0.657)	(1.354)	(−0.299)	(1.835)
R^2	0.00	0.02	0.09	0.03	0.07	0.02	0.01	0.08

We report parameter estimates considering four variants of the Fama-French regressions. We regress ε_t^m, η_t^m, ε_t^v and η_t^v on the Fama-French factors (MktRF, SMB and HML) by OLS. We report t-statistics based on robust standard errors in parentheses. R^2 stands for the R-squared measure.

Table 4: Fama-French Factors (cont.)

	CBD	Cemig	Oi	Telefonica	Eletrobras	Copel	Tim
$\varepsilon_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	0.69	0.63	0.98	0.39	0.69	0.25	0.95
	(12.763)	(11.511)	(11.321)	(9.099)	(11.914)	(10.568)	(9.892)
SMB	−0.08	−0.21	−0.21	−0.17	−0.18	−0.10	−0.08
	(−0.787)	(−2.275)	(−1.092)	(−1.62)	(−1.615)	(−1.844)	(−0.597)
HML	−0.12	−0.13	−0.02	−0.17	−0.02	−0.10	−0.40
	(−1.33)	(−1.394)	(−0.084)	(−2.65)	(−0.168)	(−1.716)	(−2.727)
R^2	0.26	0.17	0.13	0.11	0.13	0.05	0.32
$\eta_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	0.57	0.55	0.65	0.36	0.60	0.33	0.93
	(12.467)	(10.702)	(7.733)	(8.967)	(10.894)	(9.85)	(10.324)
SMB	−0.09	−0.18	−0.23	−0.16	−0.15	−0.17	−0.09
	(−0.886)	(−2.085)	(−1.163)	(−1.679)	(−1.271)	(−2.324)	(−0.646)
HML	−0.10	−0.12	−0.02	−0.16	−0.03	−0.10	−0.36
	(−1.197)	(−1.193)	(−0.096)	(−2.479)	(−0.192)	(−1.414)	(−2.531)
R^2	0.17	0.13	0.06	0.09	0.10	0.08	0.30
$\varepsilon_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	−0.64	−0.07	−0.46	−0.12	0.04	0.73	−0.09
	(−12.26)	(−4.141)	(−4.005)	(−4.162)	(1.818)	(11.351)	(−0.852)
SMB	−0.07	0.04	0.38	0.04	0.08	−0.36	−0.14
	(−0.469)	(1.096)	(1.958)	(0.603)	(1.423)	(−3.49)	(−1.175)
HML	0.09	0.02	−0.17	0.05	−0.11	0.05	0.33
	(1.046)	(0.718)	(−1.481)	(1.244)	(−1.89)	(0.4)	(2.076)
R^2	0.10	0.01	0.09	0.02	0.00	0.20	0.01
$\eta_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$							
MktRF	−0.29	−0.07	−0.20	−0.09	0.04	0.85	0.06
	(−8.872)	(−3.978)	(−1.565)	(−3.137)	(1.885)	(12.27)	(0.645)
SMB	−0.17	0.04	0.43	0.02	0.08	−0.45	−0.18
	(−0.99)	(1.038)	(2.072)	(0.318)	(1.355)	(−3.634)	(−1.403)
HML	0.03	0.02	−0.18	0.03	−0.11	0.01	0.29
	(0.608)	(0.661)	(−1.526)	(0.784)	(−1.841)	(0.052)	(1.801)
R^2	0.02	0.01	0.03	0.01	0.00	0.24	0.02

We report parameter estimates considering four variants of the Fama-French regressions. We regress ε_t^m, η_t^m, ε_t^v and η_t^v on the Fama-French factors (MktRF, SMB and HML) by OLS. We report t-statistics based on robust standard errors in parentheses. R^2 stands for the R-squared measure.

Table 5: Voting Rights Return Correlation

	Gerdau	Vale	Petro	Bradesco	Braskem	Eletrobras	Copel	CDB	Cemig	Itau	Oi	Telefonica
Gerdau	1											
Vale	-0.03	1										
Petro	-0.04	0.18	1									
Bradesco	0.04	0.06	-0.03	1								
Braskem	-0.02	-0.06	-0.07	0.03	1							
Eletrobras	0.02	0.00	-0.02	0.03	0.00	1						
Copel	-0.02	0.01	0.05	-0.05	-0.22	0.06	1					
CDB	-0.01	-0.04	0.01	0.02	0.05	-0.04	-0.14	1				
Cemig	-0.03	0.02	0.00	-0.03	0.04	0.02	-0.13	0.03	1			
Itau	0.06	-0.03	-0.07	0.21	0.12	-0.01	-0.24	0.05	0.05	1		
Oi	-0.02	0.02	-0.02	0.03	0.00	-0.02	-0.03	0.05	0.05	0.05	1	
Telefonica	0.00	-0.01	-0.01	0.01	0.04	0.03	-0.07	0.04	0.05	0.07	0.08	1

We report the empirical correlation matrix computed using the estimates of the firm specific innovations associated with the voting rights η_t^v.

A Appendix

A.1 Model derivation

To obtain the structural VMA model with observed price changes as function of permanent uncorrelated innovations, we must compute the first difference of (6) and (7) and then substitute the uncorrelated innovations from (4) and (5) accordingly.

$$
\begin{aligned}
&p_t^p - p_{t-1}^p = m_t - m_{t-1} + b_p\left(\eta_t^T - \eta_{t-1}^T\right), \\
&p_t^c - p_{t-1}^c = m_t - m_{t-1} + d_t - d_{t-1} + b_c\left(\eta_t^T - \eta_{t-1}^T\right), \\
&\Delta p_t^p = \Delta m_t + b_p\left(\eta_t^T - L\eta_t^T\right), \\
&\Delta p_t^c = \Delta m_t + \Delta d_t + b_c\left(\eta_t^T - L\eta_t^T\right),
\end{aligned} \tag{A.19}
$$

where L is the usual lag operator. Setting $L = 1$, we have that

$$
\begin{aligned}
&\Delta p_t^p = \eta_t^m + \pi\eta_t^v, \\
&\Delta p_t^c = \eta_t^m + \pi\eta_t^v + \eta_t^v + \kappa\eta_t^m = (\pi+1)\eta_t^v + (\kappa+1)\eta_t^m.
\end{aligned} \tag{A.20}
$$

A.2 Brazilian risk factors

We repeat the Fama-French regressions using Brazilian risk factors as regressors[16] instead of the U.S. Fama-French factors. As a robustness check, Tables A.1 and A.2 present the results. Using domestic risk factors significantly improves the explanatory power of returns in comparison to the results obtained with the U.S. risk factors. Domestic components indeed help explain the behavior of the firm price. However, the same is not true for the voting rights value that we do not observe a substantial improvement for every firm. This reinforces the insight that the value of the voting right is indeed firm specific and not market related.

[16] Risk factors are from *http://www.fea.usp.br/nefin/*.

Table A.1: Brazilian Risk Factors

	Gerdau	Bradesco	Itau	Ambev	Braskem	Petrobras	Vale	Santander
				$\varepsilon_t^m = \beta_0 + \beta_1 MktRF + \beta_2 SMB + \beta_3 HML + u_t$				
$MktRF$	1.23	1.14	1.16	0.54	0.92	1.34	1.15	0.69
	(24.274)	(39.322)	(35.319)	(15.276)	(14.795)	(27.995)	(30.126)	(9.145)
SMB	−0.10	−0.03	0.07	−0.13	−0.02	0.20	0.02	0.05
	(−1.495)	(−0.612)	(1.233)	(−2.761)	(−0.218)	(2.799)	(0.553)	(0.602)
HML	0.25	−0.02	−0.04	−0.18	0.52	0.27	0.10	0.03
	(4.013)	(−0.521)	(−0.779)	(−2.835)	(5.8)	(3.291)	(1.563)	(0.312)
R^2	0.62	0.74	0.69	0.38	0.38	0.68	0.67	0.15
				$\eta_t^m = \beta_0 + \beta_1 MktRF + \beta_2 SMB + \beta_3 HML + u_t$				
$MktRF$	1.10	1.07	1.03	0.51	0.71	1.22	1.04	0.52
	(19.616)	(33.256)	(21.978)	(14.752)	(11.052)	(21.252)	(24.812)	(6.134)
SMB	−0.29	−0.14	−0.02	−0.15	−0.12	0.07	−0.12	0.00
	(−4.681)	(−2.841)	(−0.281)	(−3.189)	(−1.182)	(0.749)	(−2.228)	(0.011)
HML	0.28	0.02	0.01	−0.18	0.56	0.34	0.21	0.00
	(4.12)	(0.351)	(0.123)	(−2.763)	(6.03)	(3.638)	(3.045)	(−0.022)
R^2	0.53	0.70	0.61	0.36	0.27	0.58	0.57	0.05
				$\varepsilon_t^v = \beta_0 + \beta_1 MktRF + \beta_2 SMB + \beta_3 HML + u_t$				
$MktRF$	−0.04	−0.09	−0.20	−0.03	−0.27	0.04	0.06	0.20
	(−3.287)	(−6.928)	(−7.707)	(−1.022)	(−6.615)	(3.257)	(5.712)	(7.388)
SMB	0.03	0.02	0.04	0.05	0.20	−0.03	−0.01	−0.04
	(1.675)	(0.97)	(1.6)	(1.865)	(3.894)	(−1.642)	(−0.398)	(−1.336)
HML	−0.07	0.01	0.01	0.00	−0.22	0.01	−0.07	0.06
	(−3.075)	(0.424)	(0.325)	(−0.169)	(−3.358)	(0.348)	(−3.188)	(2.069)
R^2	0.03	0.06	0.19	0.01	0.10	0.02	0.05	0.14
				$\eta_t^v = \beta_0 + \beta_1 MktRF + \beta_2 SMB + \beta_3 HML + u_t$				
$MktRF$	−0.01	−0.05	−0.13	−0.02	−0.19	0.02	0.04	0.14
	(−0.684)	(−3.866)	(−4.469)	(−0.844)	(−4.844)	(1.568)	(3.403)	(5.252)
SMB	0.02	0.02	0.05	0.04	0.21	−0.03	0.00	−0.04
	(0.955)	(0.916)	(1.91)	(1.613)	(4.002)	(−1.657)	(−0.166)	(−1.061)
HML	−0.06	0.01	0.01	−0.01	−0.18	0.00	−0.07	0.07
	(−2.631)	(0.407)	(0.241)	(−0.259)	(−2.707)	(0.084)	(−3.471)	(1.699)
R^2	0.01	0.02	0.09	0.01	0.07	0.01	0.02	0.05

We report parameter estimates considering four variants of the Fama-French regressions (15)- (18) which use domestic risk factors. We regress ε_t^m, η_t^m, ε_t^v and η_t^v on the Brazilian risk factors associated with the Fama-French factors (MktRF, SMB and HML) by OLS. We report t-statistics based on robust standard errors in parentheses. R^2 stands for the R-squared measure.

Table A.2: Brazilian Risk Factors (cont.)

	CBD	Cemig	Oi	Telefonica	Eletrobras	Copel	Tim
	$\varepsilon_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$						
MktRF	0.67	0.59	0.67	0.35	0.69	0.19	0.72
	(18.88)	(12.159)	(8.501)	(7.296)	(13.634)	(8.728)	(13.396)
SMB	−0.10	−0.26	−0.80	−0.16	−0.31	0.09	−0.52
	(−1.306)	(−3.327)	(−5.509)	(−2.65)	(−3.796)	(2.042)	(−4.242)
HML	−0.07	0.38	0.95	0.22	0.65	0.01	0.22
	(−0.975)	(5.44)	(5.454)	(4.08)	(7.016)	(0.128)	(1.763)
R^2	0.37	0.31	0.22	0.20	0.29	0.04	0.44
	$\eta_t^m = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$						
MktRF	0.55	0.51	0.39	0.34	0.61	0.22	0.71
	(15.936)	(10.961)	(4.833)	(7.426)	(11.917)	(7.672)	(13.36)
SMB	−0.19	−0.30	−0.89	−0.13	−0.40	−0.02	−0.53
	(−2.565)	(−3.83)	(−6.411)	(−2.004)	(−4.661)	(−0.441)	(−4.609)
HML	−0.01	0.39	1.08	0.22	0.74	0.12	0.25
	(−0.209)	(5.221)	(6.379)	(3.944)	(7.826)	(1.779)	(2.054)
R^2	0.26	0.27	0.18	0.19	0.27	0.07	0.43
	$\varepsilon_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$						
MktRF	−0.64	−0.04	−0.49	−0.06	0.09	0.70	0.05
	(−17.468)	(−2.381)	(−6.481)	(−2.626)	(3.911)	(10.409)	(1.014)
SMB	0.06	0.13	0.18	0.15	0.08	−0.01	0.12
	(0.849)	(4.302)	(1.517)	(4.146)	(2.072)	(−0.077)	(0.954)
HML	0.12	−0.10	−0.04	−0.07	0.11	0.36	0.16
	(1.415)	(−2.101)	(−0.383)	(−1.652)	(1.775)	(4.604)	(1.133)
R^2	0.14	0.04	0.14	0.04	0.01	0.27	0.00
	$\eta_t^v = \beta_0 + \beta_1 MktRF_t + \beta_2 SMB_t + \beta_3 HML_t + u_t$						
MktRF	−0.30	−0.04	−0.29	−0.03	0.09	0.73	0.19
	(−12.954)	(−2.314)	(−3.837)	(−1.332)	(3.842)	(9.432)	(3.747)
SMB	0.03	0.10	0.23	0.12	0.03	−0.13	0.13
	(0.725)	(3.233)	(2.146)	(3.136)	(0.827)	(−1.803)	(1.007)
HML	0.11	−0.07	−0.09	−0.03	0.16	0.49	0.17
	(1.217)	(−1.542)	(−0.74)	(−0.795)	(2.716)	(5.671)	(1.23)
R^2	0.02	0.03	0.06	0.02	0.02	0.30	0.02

We report parameter estimates considering four variants of the Fama-French regressions (15)- (18) which use domestic risk factors. We regress ε_t^m, η_t^m, ε_t^v and η_t^v on the Brazilian risk factors associated with the Fama-French factors (MktRF, SMB and HML) by OLS. We report t-statistics based on robust standard errors in parentheses. R^2 stands for the R-squared measure.

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