HOW ARE BIG 4 AUDITS VALUED AROUND THE WORLD? THE NON-LINEAR RELATIONSHIP BETWEEN THE VALUE OF AUDIT QUALITY AND THE INVESTOR PROTECTION QUALITY

Abstract

Although audit quality is expected to be positively valued by the users of financial information, that value can vary with the level of investor protection. However, previous literature on this issue is controversial: while some papers defend that audit quality and investor protection are complementary (that is to say, audit quality is valued higher in those countries with a strong investor protection), other papers defend that both are substitutes (and, thereby, audit quality is valued higher in those countries with weaker investor protection). In this paper, we reconcile these two competing views by showing the existence of a non-linear relation between the value of audit quality –proxied by the interest rate premium of Big 4 auditors' clients– and the quality of creditor protection. Our results show that Big 4 auditors' clients pay, on average, a lower cost of debt, thereby confirming the positive value of audit quality over the world. The relation between that interest rate premium and the creditor protection quality is U-shaped, that is, the maximum premium is observed for the countries with intermediate levels of creditor quality.

Keywords: Big 4 audits; cost of debt capital; creditor protection; legal environment

1. INTRODUCTION

Previous research on the value of auditor selection has shown that managers and external claimholders of listed U.S. firms perceive Big 4 auditors as high-quality auditors. This expected higher quality justifies the greater fees paid to Big 4 auditors (Firth, 1985; Francis, 1984), or the capital market's rewards to those U.S. firms audited by a Big 4 auditor, such as a lower cost of equity or debt capital (Fernando, Abdel-Meguid, & Elder, 2010; Karjalainen, 2011; Khurana & Raman, 2004; Mansi, Maxwell, & Miller, 2004; Pittman & Fortin, 2004), or a higher valuation of their accounting information (Kanagaretnam, Krishnan, & Lobo, 2009; Krishnan, 2003; Teoh & Wong, 1993).

The evidence on the auditor brand name is, however, much sparser in other environments with weaker investor protection than the public U.S. firms, such as other countries and/or non-listed companies, and it offers divergent results. On the one hand, some papers show that the Big 4 premium fees or the stock market rewards for Big 4 auditors' clients disappear in environments with a weaker investor protection–such as code-law countries or private companies (Chaney, Jeter, & Shivakumar, 2004; Fortin & Pittman, 2007; Khurana & Raman, 2004; Kim, Simunic, Stein, & Yi, 2011). These papers consider that audit quality and investor protection act as complementary mechanisms: thus, the audit quality value would increase with the quality of investor protection because, as the investor protection becomes stronger, the demand of audit quality, the insurance value of auditors and the quality differentiation between Big 4 and non-Big 4 auditors are greater.

On the other hand, other papers have found that the selection of a Big 4 auditor not only is valuable in those environments with weak investor protection, but it can be valued higher than in the environments with strong investor protection (Cano-Rodríguez & Sánchez-Alegría, 2011; Choi, Kim, Liu, & Simunic, 2008; Choi & Wong, 2007; Karjalainen, 2011). Thus, as the investor protection becomes weaker, the agency problems faced by the investors tend to be greater, and the availability of alternative governance mechanisms that could serve as substitute of the role of auditing is lower. These greater agency problems and the absence of alternative

mechanisms could justify the greater value of audit quality in the weak investor protection countries.

In this paper, we reconcile these two opposing views by analyzing how the value of audit quality changes with the different levels of investor protection. The main novelty of our paper is that we consider the possibility that the value of the auditor brand name does not change linearly with the level of the investor protection, but it can vary in a non-linear fashion.

To test this hypothesis, we analyze empirically the value of the auditor selection for the users of the financial information of the firm using a multinational sample. More specifically, we analyze, on a sample of listed firms from 38 different countries, if the firms that select a Big 4 auditor are rewarded with a cost of debt premium by their creditors, as well as the variation of such cost of debt premium with the quality of the legal creditor protection. Our results show that, when the creditor protection is not controlled, the selection of a Big 4 auditor contributes to reduce the cost of debt for our whole sample. When we consider a linear relation between creditor protection and the value of auditor brand name, our results are partially consistent with those works that exhibit a greater value of the auditor brand name in the countries with weaker creditor protection, indicating that the value of audit quality diminishes as the creditor protection becomes stronger. Finally, we test and observe a U-shaped relationship between the value of the auditor brand name and the cost of debt premium. This U-shaped relationship shows that audit quality and creditor protection are mainly complementary in those countries with weak credit enforcement, and they are mainly substitutes in those countries with strong credit enforcement. Therefore, the cost of debt premium reaches its maximum in those countries with an intermediate level of creditor protection quality.

This work contributes to the research on audit quality in various ways. First, although some previous papers have analyzed the value of auditor brand name for creditors in samples from a single country (Cano-Rodríguez & Sánchez-Alegría, 2011; Fortin & Pittman, 2007; Karjalainen, 2011; Mansi et al., 2004; Pittman & Fortin, 2004), to our knowledge, this is the first paper that studies this value in a multinational setting and analyzes how this value varies across countries. Second, our paper demonstrates that the value of the auditor brand name reputation changes in a non-linear fashion with the creditor protection, being more valuable in those countries with a medium level of credit enforcement and less valuable in those countries with a too weak or a too strong creditor protection. Third, our paper relates the value of audit quality with the level of the creditor protection rather than the level of stockholder protection, on which the previous papers that have studied the relation between investor protection and the value of audit quality has been mainly focused (Choi et al., 2008; Choi & Wong, 2007; Francis & Wang, 2008).

The rest of the paper is structured as follows: in the following section, we present the theoretical background describing the two competing views on the relation between investor protection and the value of audit quality, and discuss how these competing views can produce a non-linear relation between investor protection; next, we describe our empirical methods and model; in the fourth section, our results and robustness tests are presented; section five, concludes.

2. THEORETICAL BACKGROUND

In this section, we first discuss the expected influence of the selection of a Big 4 auditor on the formation of the cost of debt. Next, we analyse the two linear relations between the value of auditor selection and the level of investor protection that have been observed in the extant

literature. Finally, we discuss how the interaction of the opposing forces described in the previous section can produce a non-linear relation between the value of the auditor selection and the level of investor protection.

2.1. The influence of the auditor selection on the cost of debt.

The demand for external auditing has been justified from three different viewpoints (Wallace, 1987, 2004b). The first one, known as the monitoring hypothesis, is based on the agency theory (Jensen & Meckling, 1976). This hypothesis considers external auditing as a mechanism to monitor managers' behaviour, reducing the agency conflicts among managers, stockholders and other stakeholders. The second viewpoint (information hypothesis) states that auditing contributes to enhance the quality and reliability of financial reports, thereby reducing the information asymmetry between managers and stakeholders (Seow, 2001). The third viewpoint (insurance hypothesis) views external auditing as an insurance against the losses produced by an audit misstatement, because auditors are also liable for these misstatements (Fortin & Pittman, 2007; Wallace, 2004a).

Despite that the former hypotheses justify the value of external auditing, this value is not likely to be homogeneous among all the auditors, but it will vary depending on the quality level of the audit work. In this sense, audit quality has been traditionally divided into two dimensions (DeAngelo, 1981): auditor's independence and auditor's competence. The first dimension alludes to the will of the auditor to disclose a misstatement whenever it is found, while the second one consists on the capability of the auditor to find such misstatements.

A common measure of auditing behavior used in the research literature on auditing is the size of the audit firm, because both auditors' competence and independence are expected to be positively related to the size of the audit firm. Larger audit firms are expected to be more competent because they can spend more resources on staff training, developing industry expertise (Craswell et al. 1995), or on information technologies (Krishnan 2003). Additionally, they are also expected to be more independent because: (1) they are less likely to be influenced by the pressures of a single client; (2) they have a greater reputational capital to defend, and (3) they face greater litigation risk because of their "deeper pockets" and higher insurance coverage (Francis, 2004; Kim, Chung, & Firth, 2003).

Consequently, from a creditors' perspective, the hiring of a Big 4 auditor would be more beneficial than the hiring of a non-Big 4 auditor because: (1) Big 4 auditors are more likely to restrict managers' opportunistic behaviour; (2) they are more likely to discover and report the errors and misstatements in the financial statements, thereby increasing the information value of those statements; and (3) they provide higher insurance coverage in the case of audit misstatements. Accordingly, creditors are motivated to reward those companies that hire a Big 4 auditor with a lower cost of financing debt. This would be our first hypothesis:

> *Hypothesis 1. The firms that are audited by a Big 4 auditor bear a lower cost of debt than those firms audited by a non-Big 4 auditor.*

The former hypothesis has been previously tested and supported by papers that have used a sample of public (Mansi et al., 2004) or newly public (Pittman & Fortin, 2004) U.S. firms. On other samples, however, the results are divergent: Some papers have found no support for the existence of a cost of debt premium for Big 4 auditor's clients in private firms and different countries (Fortin & Pittman, 2007; Kim et al., 2011), while other papers do find such a premium (Karjalainen, 2011) or conclude that that premium depends on the public or private property of the firm (Cano-Rodríguez & Sánchez-Alegría, 2011).

2.2. The linear relation between the value of auditor brand name and the quality of investor protection

In the former section, we have argued that the selection of a high-quality auditor can reduce the cost of debt financing. This reduction, however, is likely to be dependent on the usefulness of audit quality for the creditors of the firm. Therefore, and according to the three roles of auditing, we can expect this reduction to be greater: (1) where the agency problems are more important; (2) where there is a stronger demand for accounting quality; and, (3) where the level of litigation risk is high. Additionally, we can also expect that a greater differentiation in quality between Big 4 and non-Big 4 auditors or the absence of alternative mechanisms that could substitute the role of audit quality would lead to a greater valuation of Big 4 auditors' brand.

Regarding this issue, Choi et al (2008) identify two competing views about the interaction between auditor selection and investor protection. According to the first view, the demand (and, therefore, the value) of audit quality is greater in strong investor environments. The second view, however, states that audit quality and investor protection are substitutes, that is, a strong investor protection reduces the incremental value of audit quality. Next we discuss these two viewpoints.

According to the first viewpoint, investor protection and audit quality are complementary mechanisms. That is, audit quality is valued higher in those environments with stronger investor protection. There are various theoretical reasons that support this viewpoint. The first one is that a strong investor protection level can increase the quality differentiation between Big 4 and non-Big 4 auditors. Thus, given that investor protection increases the likelihood of discovering and punishing audit misstatements and, thereby, the litigation risk for auditors, and that Big 4 auditors are more likely to be sued because of their "deeper pockets" and insurance coverage, we can conclude that Big 4 auditors have stronger incentives to provide higher-quality audits in those environments with stronger investor protection (Francis & Wang, 2008). Moreover, this greater litigation risk not only motivates Big auditors to provide higher quality audits, but it makes creditors to prefer Big 4 auditors to non-Big 4 auditors when suing for audit misstatements, because of Big 4 auditors' "deeper pockets" and higher insurance coverage (Kim et al., 2003). Consequently, the higher the litigation risk of the country, the higher the insurance value of Big 4 auditors for the creditors of the firm.

In environments with weak investor protection, where the likelihood of discovering an audit misstatement is low or the punishments for such misstatements are less important, Big 4 auditors' motivation for maintaining their independence would be weaker. Some papers obtain empirical results that are consistent with this idea: although the quality difference between Big 4 and non-Big 4 auditors is clear in environments with a strong investor protection (Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Francis & Wang, 2008; Francis, Maydew, & Sparks, 1999), it becomes subtler or even disappears in environments with weaker investor protection such as code-law countries (Francis & Wang, 2008) or private firms (Jeong & Rho, 2004; Vander Bauwhede & Willekens, 2004).

A second reason is the smaller importance of the financial statements for the creditors' decision-making in those environments with a weak investor protection. Previous literature has also shown that firms provide accounting information of poorer quality when the investor protection is weaker (Ball & Shivakumar, 2005; Burgstahler, Hail, & Leuz, 2006; Leuz, Nanda, & Wysocki, 2003). This lower quality diminishes the usefulness of the publicly disclosed

accounting information for reducing the information asymmetry between managers and claimholders. As a consequence, the external claimholders (creditors among them) will require alternative sources of information, particularly demanding an insider access to the financial information of the firm (Ball & Shivakumar, 2005). If the creditors get this access to the private information, they would not need to rely on the information conveyed in the publicly disclosed financial statements of the firm for their decision making, and, consequently, the demand for audit quality would be lower.

Various works have obtained empirical evidence that is consistent with this first viewpoint. Thus, the lower market share of Big 4 auditors in those environments with weaker investor protection -such as in common-law countries (Francis, Khurana, & Pereira, 2003) or among private companies (Cano-Rodríguez & Sánchez-Alegría, 2011)- demonstrates the lower demand for audit quality in these environments. Additionally, Khurana and Raman (2004) find that the selection of a Big 4 auditor reduces the cost of capital in the US, but not in other countries with lower litigation risk. In the same sense, El Ghoul et al. (2010) show that the reductions in the cost of equity capital produced by the selection of a Big 4 auditor are more pronounced in countries with a strong legal regime. Mansi et al. (Mansi et al., 2004) and Pittman and Fortin (2004) also find that the appointment of a Big 4 auditor contributes to reduce the cost of debt capital for public companies, but not for non-listed firms (Fortin & Pittman, 2007). Further, various authors have provided evidence of a Big 4 fee premium on samples of listed companies (Firth, 1985; Francis, 1984; McMeeking, Pope, & Peasnell, 2003) but not on samples of private companies (Chaney et al., 2004).

The second viewpoint, on the other hand, considers that audit quality can serve as a substitute for investor protection in those environments where the investor protection is weaker and, therefore, the value of audit quality increases as the investor protection weakens.

There are also various theoretical arguments that support this viewpoint. First, the agency costs of debt contracts are expected to be more important in those environments with weaker legal creditor protection. These greater agency problems can motivate managers to hire high-quality auditors in order to avoid the payment of a higher cost of debt demanded by creditors to compensate for these agency problems (Choi & Wong, 2007). In countries with stronger creditor protection, however, the agency problems between the creditors and the managers or the stockholders can be alternatively mitigated by the legal protection mechanisms in place. Therefore, it can be expected that the governance role played by the selection of a Big 4 auditor will be stronger in the countries with weak creditor protection and, hence, creditors will be motivated to apply greater discounts in the cost of debt to the firms audited by a Big 4 auditor where the investor protection is weak.

A second theoretical reason that supports the substitution between audit quality and investor protection is based on the information role of auditing. As we have indicated before, firms in environments with weak investor protection typically report accounting information of poorer quality. We have argued above that this poor quality can motivate creditors to require insider access to financial information (thereby reducing the value of audit quality as we have previously stated), but this access is not likely to be obtained in every situation. In this case, the creditors will have to rely on the published financial statements for their decision making. Given that the poor quality of the financial information produces a higher information asymmetry between creditors and managers of the firm, the firms can be motivated to hire a

Big 4 auditor to provide their creditors with a credible signal that reduces such information asymmetry (Datar, Feltham, & Hughes, 1991).

Some papers have obtained empirical results that are consistent with this viewpoint. Thus, Choi et al.(2008) show that the Big 4 fee premium is smaller in countries with strong investor protection than in countries with weak investor protection; Choi et al. (2007) find that the likelihood of hiring a Big 4 auditor by firms that are issuing debt or capital is higher in weak legal environments; Hope et al. (2011) show that the reduction in the financing constraints produced by external audit is more pronounced in countries with weaker creditor rights; Fernando et al. (2010) show that the effect of the selection of a Big 4 auditor on the cost of capital is higher for smaller companies, what is justified by their poorer information environment; Cano-Rodríguez and Sánchez-Alegría (2011) find that the influence of Big 4 auditors on the cost of debt is more pronounced among the private than among the public Spanish firms.

In summary, some theoretical arguments and empirical results support that the value of Big 4 auditors' brand name is higher as the investor protection becomes stronger, while other arguments and results point that the value of the appointment of a Big 4 can be higher the weaker the investor protection. Since both results are possible, we enounce the two alternatives as our second hypothesis:

> *Hypothesis 2 (alternative). The reduction in the cost of debt financing produced by the selection of a Big 4 auditor is greater (lower) in environments with strong creditor protection than in environments with weak creditor protection.*

Thus, our hypothesis 2 would be consistent with the idea that audit quality and investor protection are complementary mechanisms, while the alternative would be consistent with the idea that audit quality and investor protection are substitutes.

2.3. The non-linear relation between the value of the auditor brand name and the quality of investor protection

In the previous section, we have exposed the arguments of the extant literature that justify that the value of audit quality varies with the quality of investor protection. On the one hand, some arguments support the complementarity between audit quality and investor protection, what would produce a positive relation between the quality of investor protection and the value of audit quality is positive. On the other hand, other arguments point to the possibility that audit quality and investor protection are substitutes and, therefore, the value of audit quality would be lower when the creditor protection strengthens. In this case, the relation between the quality of investor protection and the value of audit quality would be negative.

We can expect that the variation of the value of audit quality with respect to the quality of the investor protection will depend on which one of the two groups of reasons prevails. Thus, if the reasons that justify a positive relation prevail in any case, the relation between the value of audit quality and the quality of the investor protection would be linear and positive. On the other hand, if the reasons that justify the negative relation prevail in any case, the relation would be linear and negative.

This is the approach followed by the previous works have study the relation between the value of audit quality and the investor protection and it grants the test of our hypothesis 2.

In this paper, however, we consider other possibility, which is that the interaction between the reasons that support the complementarity and the reasons that support the substitutability can produce a trade-off, defining a U-shaped (or an inverse U-shaped) relation between the value of audit quality and the creditor protection quality. In this possibility, we contemplate two possible scenarios. In the first scenario, we consider that the reasons that support the complementarity prevail among the countries with a strong protection, but the reasons that justify a negative relation prevail among the countries with a weak protection. Therefore, in this scenario we would find that the Big 4 auditors' clients domiciled in a country with a strong creditor protection would benefit from a lower cost of debt than those clients of non-Big 4 auditors. This reduction in the cost of debt, however, would diminish as we reduce the quality of the creditor protection, till we reach a minimum point. If we continue reducing the quality of the creditor protection, the reasons that justify a negative relation gains importance, increasing the difference in the cost of debt between Big 4 and non-Big 4 auditors' clients.

Therefore, in this scenario we would observe that the cost of debt premium is higher for those countries with the weakest and the strongest levels of creditor protection. That cost of debt premium would be lower if we move towards those countries with a medium level of creditor protection quality. In conclusion, in this scenario we would observe a quadratic and concave relation between the cost of debt and the joint influence of the type of auditor and the creditor protection variables.

In the second scenario, the reasons that justify a negative relation would prevail among the countries with stronger protection, while the reasons that justify a positive relation would prevail among the countries with weaker protection. In this scenario, we can expect a higher cost of debt premium for those countries with a medium level of creditor protection quality. As we increase the creditor protection quality, the value of that premium would be lower because the reasons that justify a negative relation (for example, the existence of alternative governance mechanisms) tend to prevail over the reasons that justify a positive relation. In the same sense, if we reduce the creditor protection quality, the value of the premium would also be lower, because the reasons that justify the positive relation (for instance, the lower demand for audit quality) become prevalent. In consequence, in this scenario we would observe a quadratic and convex relation between the cost of debt and the joint influence of the type of auditor and the creditor protection variables.

In conclusion, we consider the possibility that the relation between the quality of the creditor protection and the value of audit quality is not linear, but quadratic. We contemplate, however, two possible scenarios. Since both scenarios are plausible, we enounce two alternatives as our third hypothesis:

> *Hypothesis 3 (alternative). The reduction in the cost of debt financing produced by the selection of a Big 4 auditor varies in a quadratic and concave (convex) fashion with the quality of the creditor protection.*

METHODS

2.4. Research model and variables

To test our hypotheses, we estimate three linear models that relate the cost of debt with the selection of a Big 4 auditor and the creditor protection of the country. These model are presented in equations [1], [2] and [3]:

$Costofdebt_{it} = a_0 + a_1 \cdot Big_{it} + \sum_j a_j \cdot Control_j + \varepsilon_{1,it}$	[1]
$Costofdebt_{it} = b_0 + b_1 \cdot Big_{it} + b_2 \cdot Creditor_i + b_3 \cdot Big_{it} \cdot Creditor_i + \sum_j b_j \cdot Control_j + \varepsilon_{2,it}$	[2]
$Costofdebt_{it} = c_0 + c_1 \cdot Big_{it} + c_2 \cdot Creditor_i + c_3 \cdot Big_{it} \cdot Creditor_i + c_4 \cdot Creditor_i^{\,2} + c_5 \cdot Big_{it} \cdot Creditor_i^{\,2} + \sum_j c_j \cdot Control_j + \varepsilon_{3,it}$	[3]

The dependent variable of the three models is *Costofdebt*$_{it}$. This variables is computed as the interest expense of the firm *i* in the year *t*, divided by the sum of the average long term and the average short term at the moments *t-1* and *t*.

The first independent variable used to test our hypothesis is the type of auditor (*Big*$_{it}$). This variable is a dummy variable that takes the value of 1 if the firm is audited by a Big 4 firm and 0 otherwise. According to our first hypothesis, we expect Big 4 auditor's clients to be rewarded by a lower cost of debt, so we expect the coefficient a_1 to be significantly negative.

The second explanatory variable is the quality of the preservation of creditor's rights in each country (*Creditor*$_i$). We have employed various proxies for creditor protection: our first proxy is the *creditor rights index* (Djankov, Hart, McLiesh, & Shleifer, 2008; Djankov, McLiesh, & Shleifer, 2007). This measure computes the number of creditors' rights that are defined in the laws and regulations of the country, from a set of four different rights. Consequently, this measures ranges from a minimum value of 0 (weakest creditor protection) to a maximum value of 4 (strongest creditor protection).

Although the former variable measures to what extent the laws and regulations of a given country recognize the rights of the creditors, the simple recognition of rights does not guarantee its enforcement (Boubakri & Ghouma, 2010; Esty & Meggison, 2003). Consequently, we also employ four additional proxies for creditor protection that are related to the quality of debt law's enforcement (Djankov et al., 2008): (1) the *estimated cost of the insolvency proceeding*, estimated as the sum of all kinds of costs borne by all parties as a percentage of the value of the insolvency state; (2) the *estimated time until the insolvency is resolved*; and (3) the *efficiency of debt enforcement*, measured as the present value of the terminal value of the firm after bankruptcy costs; and (4) the *recovery rate*, computed as the percentage of the claim that the creditor would recover after the insolvency is resolved. These measures, as well as the creditor rights index, have been widely used in the previous literature as proxies for the quality of creditor protection in a country's debt regulation (for instance, Boubakri & Ghouma,

2010; Houston, Lin, Lin, & Ma, 2010). Given that the *estimated cost of the insolvency proceeding* and the *estimated time until the insolvency is resolved* are inversely related to the quality of creditor protection (a higher cost or a longer time would imply a weaker creditor protection), we have multiplied the values of this variables by minus one. Finally, to facilitate the interpretation of the results, we have measured this variable as the difference with respect to the median. Thus, the countries with a value for the $Creditor_i$ variable near to zero are countries with a level of creditor protection near to the median; large negative (positive) values indicate weak (strong) creditor protection.

Model [2] is used to assess the sign of the linear relation between the value of audit quality and the creditor protection. Thus, to test the second hypothesis, we introduce the interaction of the variables Big_{it} and $Creditor_i$ in our model [2]. If the value of audit quality increases with the quality of the creditor protection, as expected in hypothesis 2, the sign of b_3 would be negative. A positive sign for b_3, however, would indicate that the value of audit quality is higher in those countries with weaker creditor protection, thereby supporting the alternative hypothesis 2.

Finally, to study the possible quadratic relation between the value of audit quality and the creditor protection, we introduce the interaction between the type of auditor and the square of the creditor protection variable. A negative sign for its coefficient c_5 would indicate that the cost of debt premium of Big 4 auditors' clients is higher for the countries with stronger and weaker creditor protection. This result would be consistent with the first scenario described above and would give support to hypothesis 3. A positive sign for c_5, however, would be consistent with the second scenario and would support the alternative hypothesis 3: the premium reaches its maximum at the medium levels of creditor protection, and it becomes lower as we increase or decrease the creditor protection quality.

To complete our model, we have included several control variables. The first control is the size of the firm ($Size_{it}$), computed as the natural logarithm of total sales. Consistently with previous research (Blackwell, Nolan, & Winters, 1998; Pittman & Fortin, 2004), we expect that larger firms will bear a lower cost of debt than smaller firms, so the expected value for the coefficient b_3 is negative. As a second control, we have included the leverage of the firm ($Leverage_{it}$), calculated as debt over total assets. Given that a higher leverage ratio increases the default risk and the agency problems of the firm, we expect its coefficient (b_4) to be positively related to the cost of debt. The next control is the rate of growth ($growth_{it}$), computed as the increases in sales between the years *t-1* and *t* divided by the sales of year *t-1*. The influence of this variable can be both positive or negative (Kim et al., 2011): on the one hand, a high rate of growth can be indicative of high risk because of the high fluctuation in sales. In this case, the growth rate would be positively associated to the cost of debt. On the other hand, though, firms with a high growth rate can be perceived as less likely to default and, hence, a high growth rate would reduce the cost of debt of the firm. Consequently, we make no explicit assumption about the sign of this variable. $Collateral_{it}$ is computed as the net value of plant, property and equipment over total assets. This variable controls for the possibility of using these assets as collateral for the firm debts, thereby reducing the cost of that debt. Consequently, we expect its coefficient to be negative. $Current_{it}$ is calculated as current assets over current liabilities. This ratio is included to control for the possible liquidity problems of the firm. We expect a negative relation between this ratio and the cost of debt. The variable ROA_{it} is introduced to control for firm performance, and it is calculated as income before

extraordinary items over lagged total assets. Given that profitability is inversely related to the default risk, we expect this variable to be negatively related to the dependent variable. The next control is $Disc.Accruals_{it}$. This variable is computed as the absolute value of the difference between total accruals and expected accruals. Expected accruals are estimated, as in Francis and Wang (2008), as the product of the current year sales and firm's own prior year ratio of current accruals to sales, plus the product of the current year value of gross property, plant and equipment and the prior year ratio of depreciation expense to gross value of property plant and equipment. We have introduced this variable in the model to control for accounting quality: a higher value of the variable would indicate a lower value of accounting quality and, therefore, we expect this variable to be positively related to the cost of debt. Finally, we control industry and country fixed effects by introducing dummies for each sector and country.

2.5. Data and sample

The financial data are obtained from the Compustat Global database. We select all the non-financial companies with fully consolidated financial statements for the period between 1990 and 2004. Our sample period ends in 2004 because previous research has warned about the inaccuracy of Compustat Global database information on the auditor identity for the years from 2005 (Choi, Choi, Kim, & Byungcherl, 2011)[1].

Initially, we selected the observations from the 49 countries surveyed in La Porta et al. (1998). We dropped the observations from Japan, South Korea, India and Pakistan because Big 4 companies use to operate in them through local affiliates, making difficult to differentiate between Big 4 and non-Big 4 auditors (Francis & Wang, 2008, p. 162).

We exclude those observations that correspond to fiscal periods shorter than twelve months, those that are not audited or that do not indicate the type of auditor, and those with missing value for the variables of the models. We also dropped the countries with less than 100 observations to assure that countries with fewer observations do not drive the results. Additionally, to avoid the influence of outliers, we dropped those observations with values above (below) the percentile 99^{th} (1^{st}) of each continuous explanatory variable.

To compute the dependent variable, we calculate the cost of debt of each observation as the ratio between the interest expense and the sum of the average of short-term and long-term debt at the beginning and at the end of the year. This variable, however, can be a noisy estimate of the cost of debt because of the effect of the extreme observations produced by very small denominators (Pittman & Fortin, 2004). To eliminate this noise, we drop the observations above (below) the percentile 95^{th} (5^{th}) of this variable.

The resulting sample is composed by 69,037 observations that correspond to 12,015 companies from 33 different countries. The Table 1 reports the distribution of the observations by country and type of auditor, as well as the value of the creditor protection proxies for each country.

INSERT TABLE 1 ABOUT HERE

3. RESULTS

3.1. Descriptive statistics

[1] This inaccuracy generally implies the miscoding of Big 4 auditors to non-Big 4, thereby reducing the market share of Big 4 auditors from 2005.

The Table 2 reports the descriptive statistics for the variables $Costofdebt_{it}$, $Size_{it}$, $Leverage_{it}$, $Growth_{it}$, $Collateral_{it}$, $Current_{it}$, ROA_{it}, and $Disc.Accruals_{it}$ for the total sample and the subgroups of Big 4 and non-Big 4 clients. The table also reports a median comparison test to assess the differences in the dependent and the control variables between the two subgroups.
Table 2 shows that Big 4 auditors' clients are larger, less leveraged, with a higher growth rate, higher values of current and collateral ratios and higher profitability. Additionally, they also exhibit a lower ratio of discretionary accruals over total assets.
Regarding the cost of debt, the table shows that the mean and the median of this ratio are lower for Big 4 than for Non-Big 4 auditors' clients. However, the median comparison test is not significant.

INSERT TABLE 2 ABOUT HERE

3.2. Model estimates

The table 3 reports the estimates for the three models. The estimation method employed is the pooled regression with errors clustered by company and period. These errors are robust to heteroskedasticity and within-firm serial correlation (Petersen, 2009).

INSERT TABLE 3 ABOUT HERE

The first column analyzes the influence of the auditor selection on the cost of debt for the overall sample, without taking into account the mediating effect of creditor protection. The coefficient obtained for the variable Big_{it} is negative and significant as expected, showing that Big 4 auditors' clients pay, on average, an interest cost which is 9 basis points lower than non-Big 4 auditors' clients. This result is consistent with previous research that has demonstrated the existence of a cost of debt premium for those firms that hire a Big 4 auditor, thereby supporting our first hypothesis.
The sign of the coefficients for the control variables are also as expected. Thus, we obtain that size, collateral, current and profitability contribute to reduce the cost of debt, while a high leverage increase the cost of debt. We also obtain a positive coefficient for the growth variable, indicating that a high variability in sales contributes to increase the cost of debt. Finally, the sign of the discretionary accruals variable is positive, as expected, but it is not significant.
The columns 2 to 6 of the table 3 report the estimates of the model [2] for each of the five creditor protection proxies. In this model, we assume that the value of audit quality varies with the quality of the creditor protection in a linear fashion. The sign of this linear relationship is captured by the sign of the coefficient of the interaction between the type of auditor and the creditor protection proxy. Although the sign of this coefficient is positive for the five proxies, it is significant only for the *Insolvency cost* and the *Recovery rate* proxies (the latter only at the 10 per cent level). Therefore, for these two measures of creditor protection, the results show that the cost of debt premium becomes smaller as the quality of creditor protection enhances; for the other measure, however, there is no evidence of changes in the value of audit quality among the different levels of creditor protection quality. These results, then, support only partially the alternative hypothesis 2.
Regarding the sign of the remaining coefficients, the sign of the coefficient of the variable Big_{it} is significantly negative (albeit it is significant at the 10 per cent for the *Insolvency cost* proxy)

supporting the existence of a cost of debt premium for Big 4 auditors' clients in the countries with a medium level of creditor protection quality.

The coefficient for the creditor protection proxy is positive for the *Creditor rights index* (although it is not significant) and the *Insolvency cost* (significant at the 1% level). This results are against expected, for we expect a stronger c reditor protection to reduce the cost of debt. This expectation is fulfilled, though, when the other creditor protection proxies are used, since the coefficient of the $Creditor_i$ variable for those proxies is significantly negative.

Regarding the control variables, the results are very similar among the five creditor protection proxies and almost identical to those obtained in the model [1].

The last five columns of the table 3 report the estimates of the model [3]. In this model we introduce the interaction between the type of auditor and the square value of the creditor protection proxy to study the existence of a non-linear relationship between the value of audit quality and the quality of credit enforcement. The sign of the coefficient for this variable is significantly positive for the *Creditor rights index*, the *Time to insolvency resolution*, the *Enforcement Efficiency* (at the 10 per cent level) and the *Recovery rates* proxies, and it is negative, but not significant, for the *Insolvency cost* proxy. The significant coefficients for this variable demonstrate that the value of audit quality varies in a non-linear fashion with the quality of credit enforcement. Moreover the positive sign of the coefficient indicates a convex relationship: the maximum of the cost of debt premium is obtained in the countries with a medium level of creditor protection, and that premium gets reduced as the creditor protection becomes stronger or weaker. In conclusion, the results (with the exception of the *Insolvency cost* proxy) support the alternative third hypothesis.

Regarding the other variables of the model, the coefficient of the variable Big_{it} is significantly negative (with the exception of the *Insolvency Cost* proxy, for which it is negative but non-significant). The coefficient for the $Creditor_i$ variable is significantly negative for the *Time to insolvency resolution*, the *Enforcement Efficiency* and the *Recovery rate* proxies. For the *Creditor rights index* and the *Insolvency cost*, however, is non-significant.

The interaction between the type of auditor and the $Creditor_i$ variable is also non-significant for the two first proxies and the *Recovery rate*, but significantly positive for the other two proxies. This positive value indicates that the maximum premium is reached in countries with a level of creditor enforcement below the median.

The sign of the coefficient for the square values of the $Creditor_i$ variable, however, depends on the chosen proxy: it is significantly positive for the *Enforcement efficiency* and the *Recovery rate* proxies, and significantly negative for the *Insolvency cost* and the *Time to resolutions* proxies. For the *Creditor rights index,* however, is negative but non-significant.

Figure 1 illustrates the expected cost of debt premium for each country, depending on the chosen proxy for creditor protection. This cost of debt premium is computed as the coefficient for the variable Big_{it}, plus the coefficient for the interaction Big_{it} *x* $Creditor_i$ multiplied by the value of the creditor protection proxy, plus the coefficient for the interaction Big_{it} *x* $Creditor_i^2$ multiplied by the square of the creditor protection proxy. With the exception of the *Insolvency cost* proxy, the figure shows the convex relation between the cost of debt premium and the quality of credit enforcement. Thus, the absence of a significant cost of debt premium in the countries with weaker creditor protection can be justified by the low demand of audit quality, the low litigation risk and the absence of a quality gap between Big 4 and non-Big 4 auditors; on the other extreme, the countries with stronger creditor protection do not exhibit a

significant cost of debt premium either. This can be justified by the availability of alternative corporate governance mechanisms that can serve as a substitute for external auditing. Finally, the figure shows that it is in the countries with a medium level of creditor protection where the Big 4 auditors' clients benefit from a significant cost of debt premium.

Regarding the control variables, their coefficients and signs are very similar to those reported for model [1].

3.3. Robustness tests

Elimination of U.S. observations

Both the extreme level of litigation risk of the United States (Francis & Wang, 2008) and the high number of observations from this country in our sample (more than one-third of the observations) could bias the estimates of the model. To avoid this possible bias, we have estimated our models after removing the data from the United States. The results (not tabulated) do not differ qualitatively from those reported including the data from the United States.

Endogeneity of the type of auditor

Previous literature (for instance, Chaney et al., 2004; Kim et al., 2003) has pointed that the auditor choice can be an endogenous variable. Thus, it could be possible that the firms that bear a lower cost of debt can be the firms that more usually select a Big 4 auditor. Consequently, our estimations may be affected by a self-selection bias. However, in our models, the potential endogeneity problem would not be caused only by the variable Big_{it}, but by the interaction with the creditor protection variable and its square value as well.

To control this potential bias, we have followed a two-step method based on the estimation procedure described by Wooldridge (2002 pp. 623-625). In the first step, we estimate a probit model where the dependent variable is the type of auditor and the independent variables are the exogenous variables of model [3] and three additional instruments: the lagged value of the variable Big_{it}, the gross domestic product *per capita* of each country (obtained from the International Monetary Fund statistics) and a dummy variable that indicates the legal system of the country, differentiating between code-law and common-law according to La Porta *et al.* classification (1998). Using this model, we obtain the fitted probabilities of selecting a Big 4 auditor. In the second step, we estimate our original model [3] by instrumental variables (IV), considering the type of auditor, the interaction between the type of auditor and the creditor protection proxy, and the interaction between the type of auditor and the squared creditor protection proxy as endogenous variables; and using the fitted probabilities, the product of the fitted probabilities by the creditor protection proxy, and the product of the fitted probabilities by the squared creditor protection proxy as instruments. Wooldridge (2002) shows that this

method produces consistent estimates of the parameters and it is more efficient than the standard instrumental variables method. The results of this second step are reported on table 4.

On broad terms, the results after controlling for the potential endogeneity of the type of auditor are not qualitatively different from those presented on table 3. The most remarkable difference is the coefficient of the interaction between the type of auditor and the squared creditor protection variable for the *Insolvency cost* proxy, which becomes significantly negative. This value is contradictory with the value for the other four creditor protection proxies, which is significantly positive. These positive values support the existence of the convex relation between the value of audit quality and creditor protection, as with the pooled estimates reported on table 3.

4. CONCLUSIONS

Although audit research has widely documented that U.S. firms audited by a Big 4 auditor are rewarded by the capital markets, the evidence on these rewards in the rest of the world is sparse. Moreover, the empirical results that have analysed the value of the auditor brand reputation in other settings different from the listed U.S. companies have found mixed results: while some papers show that the value of audit quality increases in environments with strong investor protection, other papers show the contrary result.

In this paper, we offer an explanation to the former divergent results: the existence of a non-linear relation between the value of audit quality and the investor protection quality. We empirically test this explanation by analysing the difference in the cost of debt paid by Big 4 and non-Big 4 auditors' clients, and how that difference varies with the quality of credit enforcement. Using a sample from 33 different countries, our results confirm the existence of a non-linear and convex relation between the interest premium of Big 4 auditors' clients and the creditor protection quality. Moreover, the convex shape of this relation indicates that the selection of a Big 4 auditor is more valued in those countries with a medium level of creditor protection quality. Thus, on the one hand, as the creditor protection weakens, the demand for audit quality, the litigation risk and the quality differentiation between Big 4 and non-Big 4 auditors tend to be lower, thereby reducing the value of the interest rate. On the other hand, as the creditor protection strengthens, the appearance of other governance mechanisms that can serve as substitutes of external auditing also contribute to reduce the relative importance of audit quality and, therefore, the interest premium also becomes lower.

The obtained evidence is, however, under various limitations. For example, we have focused our analysis on the relation between the auditor brand name and the cost of debt, but previous literature has also shown that the reward for selecting a Big 4 auditor can take other forms, such as the reduction of the cost of equity or a higher valuation of the accounting information of the company. Thus, although our results support the existence of the convex relation between the value of audit quality and creditor protection, it is possible that the different agency costs or information needs of stockholders can produce a different result if we measure the value of the auditor brand for them.

Additionally, we have used the selection of a Big 4 auditor as a proxy for audit quality. Albeit this measure has been widely used in previous literature, it would be interesting if our results could be replicated using alternative proxies for audit quality.

Table 1. Distribution of the observations by country and type of auditor

Country	Observations	Big 4 auditors' share	*Creditor rights index*	*Estimated insolvency costs* (%)	*Estimated insolvency time*	*Enforcement Efficiency* (%)	*Recovery rate(%)*
AUS	2,278	0.650	3	8.0	0.58	87.8	84.86
AUT	505	0.442	3	18.0	0.92	78.0	77.27
BEL	525	0.642	2	3.5	0.92	90.8	90.78
BRA	326	0.709	1	12.0	3.67	13.4	8.21
CAN	3,391	0.923	1	3.5	0.75	93.2	93.24
CHE	1,263	0.791	1	3.5	3.00	60.4	60.38
CHL	468	0.774	2	14.5	5.08	40.9	21.68
DEU	3,286	0.476	3	8.0	0.92	57.0	55.65
DNK	825	0.864	3	9.0	2.50	76.7	74.08
ESP	872	0.907	2	14.5	1.00	82.0	58.96
FIN	661	0.719	1	3.5	0.92	92.4	92.42
FRA	3,277	0.447	0	9.0	1.89	54.1	46.61
GBR	7,444	0.785	4	6.0	0.50	92.3	90.65
GRC	383	0.350	1	9.0	1.92	53.8	38.76
HKG	713	0.809	4	9.0	0.63	88.3	86.32
IDN	914	0.478	2	18.0	5.50	25.1	25.14
IRL	333	0.841	1	9.0	0.42	89.9	89.94
ISR	258	0.306	3	23.0	1.50	66.2	51.37
ITA	838	0.930	2	22.0	1.17	45.3	37.40
MEX	351	0.672	0	18.0	1.83	72.6	51.31
MYS	3,233	0.639	3	14.5	2.25	48.4	33.73
NLD	1,036	0.918	3	1.0	1.42	94.9	94.24
NOR	659	0.888	2	1.0	0.92	91.8	91.84
NZL	350	0.786	4	3.5	0.67	90.7	80.07
PER	140	0.443	0	7.0	3.08	41.8	30.67
PHL	271	0.225	1	38.0	5.67	17.5	17.53
PRT	271	0.391	1	9.0	2.00	82.3	60.56
SGP	1,928	0.850	3	1.0	0.58	96.1	95.08
SWE	1,296	0.745	1	9.0	1.00	86.0	81.27
THA	1,412	0.366	2	36.0	2.67	54.9	44.58
TWN	1,486	0.798	2	3.5	0.83	93.8	70.50
USA	27,501	0.938	1	7.0	2.00	85.8	85.79
ZAF	543	0.715	3	18.0	1.92	39.8	39.35
Total	69,037						
Median		0.719	2.000	9.000	1.420	78.000	60.563

Table 2. Descriptive statistics

		$Costofdebt_{it}$	$Size_{it}$	$Leverage_{it}$	$Growth_{it}$	$Collateral_{it}$	$Current_{it}$	ROA_{it}	$Disc.Accruals_{it}$
Whole sample	Mean	0.0595	6.1315	0.5743	0.1198	0.3603	1.7843	0.0322	0.1320
	St.Dev.	0.0274	1.8680	0.2060	0.2773	0.2234	1.0366	0.0936	0.1019
	P25	0.0397	4.8484	0.4361	-0.0168	0.1798	1.1020	0.0054	0.0589
	P50	0.0562	6.1219	0.5746	0.0735	0.3233	1.5256	0.0402	0.1101
	P75	0.0758	7.4184	0.6995	0.1954	0.5142	2.1711	0.0784	0.1781
Non-Big 4 auditors' clients	Mean	0.0602	5.3731	0.5806	0.1146	0.3445	1.7144	0.0248	0.1369
	St.Dev.	0.0294	1.9991	0.2112	0.2844	0.2197	1.0485	0.0955	0.1102
	P25	0.0385	3.9792	0.4353	-0.0264	0.1675	1.0420	0.0000	0.0553
	P50	0.0561	5.2022	0.5812	0.0708	0.3109	1.4398	0.0334	0.1116
	P75	0.0775	6.7026	0.7168	0.1978	0.4910	2.0499	0.0716	0.1875
Big 4 auditors' clients	Mean	0.0593	6.3300	0.5727	0.1211	0.3644	1.8026	0.0341	0.1308
	St.Dev.	0.0268	1.7795	0.2046	0.2753	0.2241	1.0326	0.0930	0.0996
	P25	0.0400	5.1065	0.4363	-0.0146	0.1828	1.1189	0.0072	0.0598
	P50	0.0562	6.2994	0.5729	0.0743	0.3265	1.5468	0.0420	0.1098
	P75	0.0754	7.5412	0.6952	0.1948	0.5209	2.1976	0.0800	0.1756
Pearson Chi^2		0.0731	1832.30	12.27	4.45	31.18	136.56	202.75	3.15

This table reports the descriptive statistics (specifically, the mean, standard deviation and percentiles 25, 50 and 75) for the variables $Costofdebt_{it}$, $Size_{it}$, $Leverage_{it}$, $Growth_{it}$, $Collateral_{it}$, $Current_{it}$, ROA_{it}, and $Disc.Accruals_{it}$. These statistics are reported for the total sample and the subsamples of Big 4 auditors' clients and non-Big 4 auditors' clients. *Pearson* Chi^2 reports the result of the non-parametric test on the equality of the medians, computed with a continuity correction.

Table 3. Pooled regression estimates of models [1], [2] and [3]

	Model [1]		Model [2]									
			$Creditor_i$= Creditor rights index		*$Creditor_i$=– Insolvency Cost*		*$Creditor_i$= –Time to insolvency resolution*		*$Creditor_i$= Enforcement efficiency*		*$Creditor_i$= Recovery rate*	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Big_{it} $(x10^2)$	-0.0884	0.024	-0.0930	0.016	-0.0773	0.055	-0.0803	0.045	-0.0729	0.085	-0.1099	0.005
$Creditor_i$ $(x10^2)$			0.2026	0.178	0.0323	0.004	-0.4823	0.000	-0.0574	0.000	-0.0551	0.000
Big_{it} x $Creditor_i$ $(x10^4)$			0.0411	0.271	0.0187	0.000	0.0454	0.220	0.0030	0.119	0.0029	0.096
$Creditor_i^2$ $(x10^4)$												
Big_{it} x $Creditor_i^2$ $(x10^4)$												
$Size_{it}$	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000
$Leverage_{it}$	0.0178	0.000	0.0178	0.000	0.0178	0.000	0.0178	0.000	0.0178	0.000	0.0178	0.000
$Growth_{it}$	0.0055	0.000	0.0055	0.000	0.0055	0.000	0.0055	0.000	0.0055	0.000	0.0055	0.000
$Collateral_{it}$	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000
$Current_{it}$	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000
ROA_{it}	-0.0230	0.000	-0.0230	0.000	-0.0229	0.000	-0.0230	0.000	-0.0230	0.000	-0.0230	0.000
$Disc.Accruals_{it}$	0.0025	0.100	0.0025	0.102	0.0025	0.099	0.0025	0.101	0.0025	0.099	0.0025	0.100
Intercept	0.0535	0.000	0.0513	0.000	0.0628	0.000	0.0561	0.000	0.0751	0.000	0.0854	0.000
F	271.94		266.77		247.64		266.47		266.63		266.78	
R^2	0.1606		0.1606		0.1654		0.1606		0.1603		0.1606	

Table 3. Estimates of models [1], [2] and [3] (Continued)

	Model [3]									
	$Creditor_i$= Creditor rights index		*$Creditor_i$=–Insolvency Cost*		*$Creditor_i$= –Time to insolvency resolution*		*$Creditor_i$= Enforcement efficiency*		*$Creditor_i$= Recovery rate*	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Big_{it} $(x10^2)$	-0.1971	0.001	-0.0458	0.367	-0.1389	0.001	-0.1351	0.016	-0.2141	0.000
$Creditor_i$ $(x10^2)$	0.1958	0.197	-0.0212	0.214	-1.5773	0.000	-0.0042	0.763	-0.0134	0.055
Big_{it} x $Creditor_i$ $(x10^4)$	3.0990	0.397	0.4900	0.667	0.1916	0.001	0.0077	0.008	0.0013	0.504
$Creditor_i^2$ $(x10^4)$	-4.3340	0.688	-0.1890	0.024	-47.5650	0.000	0.0939	0.000	0.2040	0.000
Big_{it} x $Creditor_i^2$ $(x10^4)$	6.4620	0.015	-0.0785	0.215	6.8620	0.001	0.0196	0.062	0.0173	0.043
$Size_{it}$	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000
$Leverage_{it}$	0.0178	0.000	0.0178	0.000	0.0178	0.000	0.0178	0.000	0.0178	0.000
$Growth_{it}$	0.0055	0.000	0.0055	0.000	0.0055	0.000	0.0055	0.000	0.0055	0.000
$Collateral_{it}$	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000	-0.0054	0.000
$Current_{it}$	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000	-0.0013	0.000
ROA_{it}	-0.0229	0.000	-0.0230	0.000	-0.0230	0.000	-0.0230	0.000	-0.0230	0.000
$Disc.Accruals_{it}$	0.0025	0.103	0.0025	0.098	0.0025	0.102	0.0025	0.098	0.0025	0.100
Intercept	0.0521	0.000	0.0535	0.000	0.0999	0.000	0.0660	0.000	0.0495	0.000
F	261.79		261.58		261.96		262.23		262.47	
R^2	0.1608		0.1609		0.1609		0.1607		0.1607	

This table reports the estimates of the model [1] and the estimates of the models [2] and [3] for the different proxies of the creditor protection ($Creditor_i$). The estimation method is the pooled regression with errors clustered by company and period (Petersen, 2009). The table shows the estimated values of the coefficients and the p-value for each explanatory variable. Industry and country dummies have not been reported for simplicity.

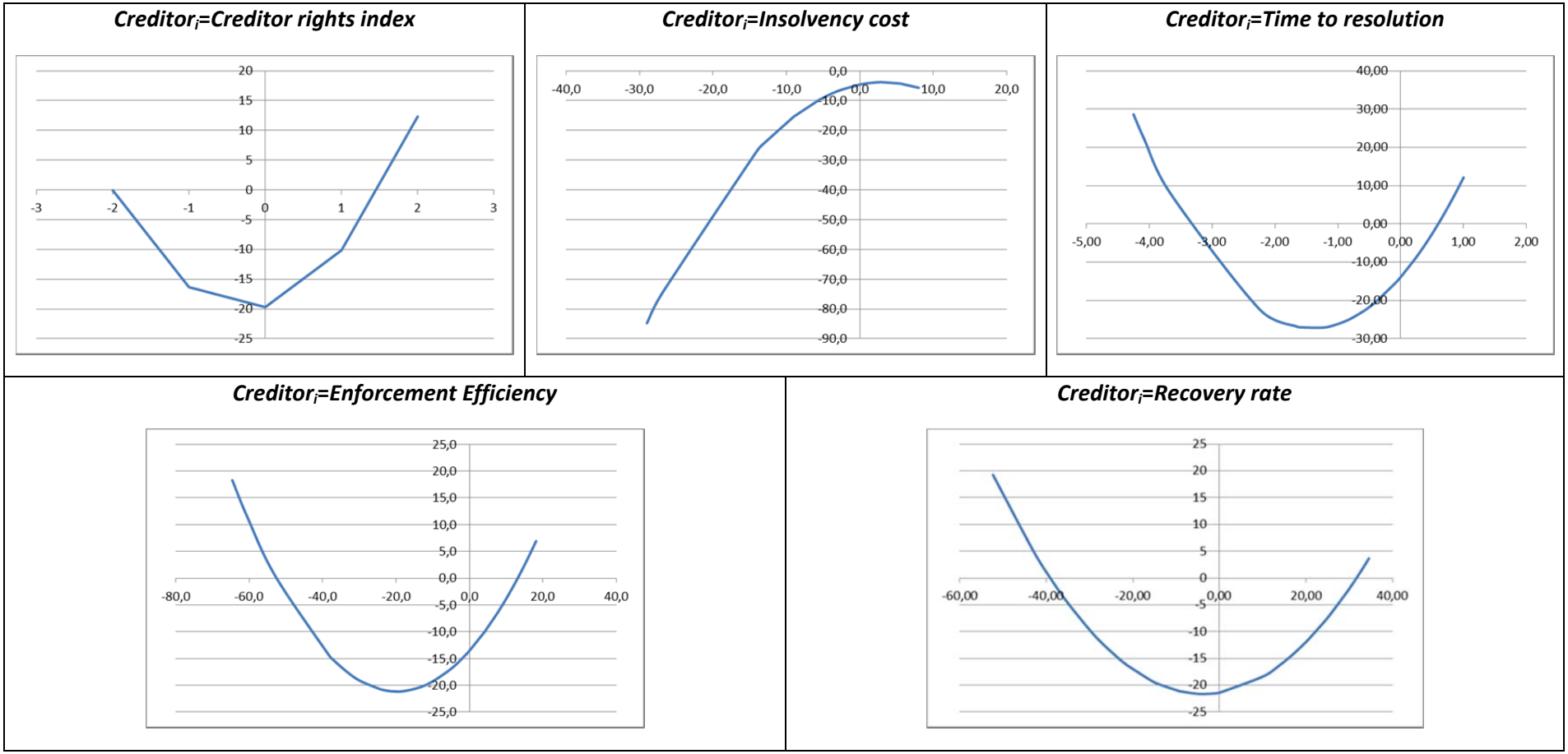
Table 4. Estimates of model [3] controlling for endogeneity of the type of auditor

	Model [3]									
	$Creditor_i$= Creditor rights index		*$Creditor_i$=–Insolvency Cost*		*$Creditor_i$= –Time to insolvency resolution*		*$Creditor_i$= Enforcement efficiency*		*$Creditor_i$= Recovery rate*	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Big_{it}	-0.0017	0.006	-0.0012	0.291	-0.0017	0.000	-0.0017	0.009	-0.0015	0.051
$Creditor_i$	-0.0129	0.000	-0.0022	0.000	-0.0141	0.000	-0.0590	0.000	-0.0675	0.000
Big_{it} x $Creditor_i$	-0.0001	0.780	-0.0004	0.043	0.0014	0.003	0.0022	0.274	-0.0014	0.502
$Creditor_i^2$	0.0001	0.935	-0.00004	0.000	0.0245	0.000	-0.1040	0.000	0.4510	0.000
Big_{it} x $Creditor_i^2$	0.0008	0.003	-0.00002	0.000	0.0011	0.000	0.0317	0.009	0.0194	0.066
$Size_{it}$	-0.0029	0.000	-0.0030	0.000	-0.0029	0.000	-0.0029	0.000	-0.0029	0.000
$Leverage_{it}$	0.0194	0.000	0.0194	0.000	0.0194	0.000	0.0194	0.000	0.0194	0.000
$Growth_{it}$	0.0082	0.000	0.0081	0.000	0.0082	0.000	0.0081	0.000	0.0081	0.000
$Collateral_{it}$	-0.0052	0.000	-0.0052	0.000	-0.0052	0.000	-0.0052	0.000	-0.0052	0.000
$Current_{it}$	-0.0010	0.000	-0.0010	0.000	-0.0010	0.000	-0.0010	0.000	-0.0010	0.000
ROA_{it}	-0.0273	0.000	-0.0274	0.000	-0.0274	0.000	-0.0274	0.000	-0.0274	0.000
$Disc.Accruals_{it}$	0.0032	0.003	0.0033	0.003	0.0032	0.003	0.0033	0.003	0.0033	0.003
Intercept	-0.1924	0.000	-0.0613	0.000	-0.4311	0.000	0.0013	0.885	0.0084	0.515
F	212.46		210.34		212.69		262.23		212.32	
R^2	0.1689		0.1691		0.1685		0.1607		0.1688	

This table reports the estimation of model [3] for the different proxies of creditor protection ($Creditor_i$). To control for the potential endogeneity of the type of auditor, we have followed Wooldridge's (2002) two-step estimation method. In the first step, we have estimated a probit model where the probability of selecting a Big 4 auditor is estimated using the explanatory variables of model [3] and three additional instruments (the lagged value of variable Big_{it}, the Gross Domestic Product *per capita* and the legal system of the country). Then, in the second step, we estimate model [3] by instrumental variables,

considering Big_{it}, Big_{it} *x* $Creditor_{it}$ and Big_{it} *x* $Creditor_i^2$ as endogenous variables, and using the fitted probabilities of the probit model and the product of those fitted probabilities by the values of $Creditor_{it}$ and $Creditor_i^2$ as instruments.

FIGURE 1. Estimation of the Big 4 auditors' clients debt premium for each country



This figure shows the evolution of the cost of debt premium of Big 4 auditors' clients for the values of creditor protection. The value of the cost of debt premium is computed as $c_1 + c_3 \cdot Creditor_i + c_5 \cdot Creditor_i^2$, being c_1, c_3 and c_5 the estimated coefficients of model [3] and $Creditor_i$ the value of the correspondent creditor

protection variable for each country. The Y-axis is measured in basis points; the X-axis is measured as the difference of the $Creditor_i$ variable for each country and the median of that creditor protection proxy.

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