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ABSTRACT

We investigate the relation between business group affiliation and tax avoidance for publicly traded firms in a global setting. Overall, we find that publicly traded business group firms exhibit greater tax avoidance than stand-alone firms. This evidence is consistent with prior findings on Japan and Korea and suggests that the business group form allows ultimate owners to shift income between entities to lower their tax payments. However, we find that the effect is restricted to firms in countries with developed economies and with code law traditions. In emerging market, code law countries we do not observe a significant difference in tax avoidance, and in countries with common law systems we find that business group firms exhibit lower tax avoidance than stand-alone firms. Thus, our evidence suggests that the extent of a country's economic development and legal origin combine to affect the ability of business groups to facilitate tax avoidance for public companies.

1. Introduction

A considerable literature has developed to understand the determinants of a firm's tax avoidance.[1] One important factor that has drawn attention is the ownership structure of the firm. In this study, we contribute to this literature by examining whether the business group ownership structure allows publicly traded affiliated firms to avoid more taxes than stand-alone firms and whether the impact of ownership structure on tax avoidance differs based on two fundamental country characteristics; namely the country's level of economic development and legal origin. To address these questions we examine the relative tax avoidance of publicly traded firms affiliated with a business group versus stand-alone firms using an international sample from 38 countries. We first test whether the business group affiliation is associated with tax avoidance in general. We then investigate whether the relative tax avoidance of business group firms differs depending on the country's economic development and legal origin.

A business group is one of the most common and heavily researched ownership structures around the world. It typically consists of a set of legally independent firms controlled by an ultimate shareholder. Under a typical pyramidal ownership structure the ultimate owner has direct or indirect ownership over a set of firms that allows the owner to control and coordinate the business decisions for each affiliated firm. The ultimate owner could be an individual, corporation, or a founding family (Almeida et al. 2011; Masulis, Pham, and Zein 2015).

The business group ownership structure is notable for the separation of ownership from control and is often used to create an internal capital market that facilitates the transfer of capital between group-affiliated firms to overcome imperfect capital markets, especially in emerging market countries (e.g. Khanna and Rivkin 2001; Chang, Chung, and Mahmood 2006; Buchuk et al. 2014; Almeida, Kim, and Kim 2015). Gramlich, Limpaphayom, and Rhee (2004), and Jung, Kim, and Kim (2009) document evidence from Japan and Korea, respectively, that the business group organizational structure facilitates tax avoidance by allowing ultimate owners to shift income between affiliated taxable entities.

However, it is not clear whether their findings on business group forms in those specific countries would apply to business groups more generally and whether specific country characteristics influence the ability of the group structure to facilitate tax avoidance, particularly for publicly traded firms. The reason is that the business group structure creates non-tax costs that are likely to discourage the tax avoidance activities by business group firms. First, public firms in business groups are subject to costs imposed by minority shareholders who are concerned about the possibility that the controlling owners will use their decision and control rights to expropriate wealth.[2] (Chen et al. (2010)) find that U.S. public firms controlled by founding families exhibit a lower degree of tax avoidance and attribute their finding to the costs of minority shareholder protection, i.e. the implicit costs associated with price discount by outside minority shareholders for their own protection. Business groups are likely to face similar concerns from minority shareholders and use high tax payments (low tax avoidance) as a bonding mechanism to reduce such costs. Second, a well-recognized characteristic of a business group is that it separates ownership from control. McGuire, Wang, and Wilson (2014) examine the effect of dual-class ownership (a high control-ownership wedge) on tax avoidance and find that U.S. public firms with dual-class ownership structure exhibit a lower degree of tax avoidance and attribute their finding to a type of agency cost unique to dual class firms. Their finding suggests that dual class shares increased managerial entrenchment that led to suboptimal tax planning. Therefore, while there is evidence from Japan and Korea that business group affiliation facilitates tax avoidance, the findings on U.S. firms that have a high control-ownership wedge suggest that business group firms are subject to greater non-tax costs that could inhibit their ability to shift taxable income. This leads to our first empirical question of whether publicly traded business group firms, on average, exhibit greater or less tax avoidance across a broad range of countries.

Our second question investigates whether the impact of the business group structure on tax avoidance varies based upon two broad country characteristics that have been used to classify countries in the prior literature. The first characteristic we examine is the extent of the development of the country's capital markets. Prior research suggests that the non-tax costs of tax avoidance are likely to be greater in an emerging market than in a country with well-developed financial markets and institutions. In an emerging market, the risk of expropriation by controlling shareholders is high. Prior research argues that minority shareholders protect themselves from the risk of expropriation by discounting firms' share price and that business groups in emerging markets use their reputation as a bonding mechanism to reduce the price discount by minority shareholders (Khanna and Rivkin 2001; Khanna and Palepu 2000; Khanna and Yafeh 2005; Gopalan, Nanda, and Seru 2007). Therefore, Chen et al.'s (2010) argument that owners use high tax payments as a bonding mechanism to reduce the potential minority shareholder discount should be more important in emerging markets. In addition, the potential agency cost resulting from the separation of cash flow and voting rights, which is common in dual-class share firms (McGuire, Wang, and Wilson 2014), is also likely to be higher in emerging markets that are characterized by less developed labor markets and less efficient information systems that make it more costly to monitor and incentivize managers of business group firms (e.g. Domowitz, Glen, and Madhavan 1998; Khanna and Palepu 1999; Morck, Yeung, and Yu 2000; Douma, George, and Kabir 2006).

The second home country characteristic we consider is the country's legal origin. La Porta et al. (1998) describe how a country's legal tradition (civil law versus common law) affects the ownership and organizational structure of corporations. Specifically, they show that common law provides greater legal protection to outside minority investors by enforcing contracts to constrain controlling insiders from extracting private control benefits (La Porta et al. 1998, 2002: Claessens et al. 2002; Dyke and Zingales 2004; Leuz, Nanda, and Wysocki 2003).[3] Stated another way, common law provides minority shareholders with a higher degree of legal protection that makes it easier for them to obtain relief. This can have one of two effects. On the one hand, the higher threat of legal action could play a similar role of the minority price discount, leading managers to bond themselves by avoiding less taxes or paying higher taxes in order to forestall potential legal action in common law countries. On the other hand, the threat of legal action could reduce the threat of expropriation, and thus, the need for bonding. To this extent, the greater minority shareholder protection in common law countries would lower the non-tax costs, thereby leading to business group firms avoiding more taxes in common law countries than stand-alone firms.

Ball, Kothari, and Robin (2000) also note that code law countries tend to follow the stakeholder governance model rather than the shareholder governance model of common law countries. Under the stakeholder model, management is monitored directly by representatives of various stakeholder groups. In this context, stakeholder groups, such as labor unions, would monitor management to ensure that the firm generates tax savings, which could then be divided among the stakeholder groups.[4] If the governance systems generated by code law systems lead to a greater degree of monitoring, then the agency problem identified by McGuire, Wang, and Wilson (2014) would be less of an issue in code law countries. The lower friction would enable business group firms to exhibit a greater degree of tax avoidance than stand-alone firms in code law countries. On the other hand, Bushman, Piotroski, and Smith (2004) find evidence that governance transparency is greater in common law countries and argue that this allows diffused shareholders to better monitor management. In this case, the agency cost friction documented by McGuire, Wang, and Wilson (2014) would be lower in common law countries and business groups would be able to avoid more taxes in common law countries. Overall, it is ultimately an empirical question whether the level of capital market development or the legal origin increase or decrease levels of group members' tax avoidance.

To test the relation between business group affiliation and tax avoidance, we construct an international sample of 3,829 group-affiliated non-U.S. firms over the period of 2000–2013 from 38 countries. Following Atwood et al. (2012), we measure the extent of a firm's tax avoidance as the difference between the country's statutory corporate tax rate and the firm's cash effective tax rate. We use an index constructed by Morgan Stanley Capital International (MSCI) to classify a country as an emerging market or a developed market and identify the country's legal origin from La Porta et al. (1998).

For the full sample, we find that group-affiliated firms display a greater degree of tax avoidance (a lower effective tax rate) than stand-alone firms. This finding is robust to an alternative two-stage instrumental variable approach. We also use a 'changes' design in which we examine the tax avoidance of firms after they have been added to a business group and continue to find evidence that affiliation with a business group is associated with a greater degree of tax avoidance. Thus, our results support the findings documented for business groups in Korea and Japan by Jung, Kim, and Kim (2009) and Gramlich, Limpaphayom, and Rhee (2004), respectively, and suggest that business groups are able to allocate resources and shift income to reduce the tax liability for member firms.

When we separate the sample based on economic development and legal origin, we find that the relation between business group affiliation and tax avoidance is not consistent across countries. Specifically, we find that the significantly positive relation between business group association and tax avoidance is present only in countries with developed economies and code law legal traditions. We find an insignificant relation in emerging market countries with code law legal traditions, which suggests that the higher threat of a minority discount offsets the increased ability of business groups

to reduce the tax payments of affiliated firms. We also find that the relation between business group association and tax avoidance is negative in common law countries, regardless of economic development. This suggests that business group firms pay a higher degree of taxes than stand-alone firms in common law countries.

Our results support the findings on U.S. (a common law country, but excluded from our sample) firms documented by Chen et al. (2010) that a common law system provides minority shareholders with legal recourse and the threat of legal action leads business group firms to pay higher taxes as a bonding mechanism to show that they are not extracting rents to benefit the controlling shareholder. The results also support the findings on U.S. firms documented by McGuire, Wang, and Wilson (2014) that the corporate governance systems in common law countries exacerbate agency problems generated by the separation of ownership from control, causing business group affiliated firms to pay more taxes than stand-alone firms and suggest that the additional monitoring by stakeholders in code law countries is effective in encouraging managers to invest in tax planning strategies.

Overall, our study contributes to the literature that investigates the role of organizational structure on a firm's tax avoidance. Specifically, our evidence suggests that the prior evidence that business groups facilitate tax avoidance in Japan and Korea does not necessarily extend to other countries. Our finding that business groups facilitate tax avoidance in other developed-market, code-law countries suggest that the findings documented by Gramlich, Limpaphayom, and Rhee (2004) with respect to Japan are not restricted to Keiretsu, but apply more broadly to countries with similar market development and legal systems. On the other hand, the absence of a significant relation between business group affiliation and tax avoidance in other emerging-market, code-law countries suggests that the positive relation documented by Jung, Kim, and Kim (2009) might be limited to Korean chaebol firms.

Our study also provides insights into the non-tax costs of tax avoidance. First, our finding that business groups in common law countries pay higher taxes than stand-alone firms support the assertion by Chen et al. (2010) that the risk of expropriation by controlling shareholders leads firms to pay higher tax rates as a bonding mechanism. To the extent that our finding represents differences in firm governance across countries, it also supports the contention by McGuire, Wang, and Wilson (2014) that the separation of cash flow and voting rights creates an agency problem whereby firm managers are not properly incentivized or monitored to identify tax planning opportunities.[5]

We also extend the literature on how different economic and legal systems influence tax avoidance. Specifically, while Atwood et al. (2012) identify direct relations between country characteristics and tax avoidance, we show that country characteristics can also impact how business ownership structure affects tax avoidance within individual countries. We also extend the findings of Luna and Murray (2010) who examine how state tax rates affect the decision to structure a business as a corporation or a pass-through entity in the U.S., by examining the impact of organizational structure on tax avoidance across countries.

Our study also extends the literature on how country-specific conditions influence the economic effects of the business group structure. Mahmood and Mitchell (2004) use cross-country tests to document that the benefits associated with business group affiliation such as the increased access to internal financing and a greater degree of innovation, and Masulis, Pham, and Zein (2011) illustrate that family-controlled business group structure emerges in order to maintain control, as well as to circumvent external financing constraints. Our study provides evidence that country-level institutional characteristics also impact the tax advantages associated with the business group form.

2. Business groups and tax avoidance

A growing strand of research has investigated how a firm's ownership and governance structure impacts the firm's tax avoidance. One prominent example is Chen et al. (2010), who identify a sample of founding family-run firms in the U.S. and compare their cash effective tax rates against

a comparable sample of non-family-run firms. They find that family-run firms pay higher cash effective tax rates than their non-family-run counterparts and attribute this result to family-run firms foregoing tax savings in order to avoid the potential minority shareholder discount from family rent-seeking activities. Another example based on U.S. firms is McGuire, Wang, and Wilson (2014) who provide evidence that the separation of control and cash flow rights influences the degree of tax avoidance by examining the relative tax avoidance of dual-class versus single-class ownership firms. They argue that the divergence between control and ownership associated with dual-class ownership structures increases the agency problem and reduces managerial incentives to exert effort to identify tax-saving opportunities. Consistent with this view, McGuire, Wang, and Wilson (2014) find that dual-class share firms exhibit a lower degree of tax avoidance than comparable single-class firms, and conclude that managerial entrenchment arising from the separation of ownership from control leads to suboptimal tax planning, which results in a lower level of tax avoidance.

In an international context, Gramlich, Limpaphayom, and Rhee (2004), examine the tax avoidance of keiretsu firms in Japan. A keiretsu is a diversified group of manufacturing and trading firms that share the same financial institutions and coordinated business strategies. As noted by Gramlich, Limpaphayom, and Rhee (2004), keiretsu provide formidable barriers to entry and represent a substantial part of the Japanese economy. Gramlich, Limpaphayom, and Rhee (2004) test the proposition that keiretsu work to generate a lower tax rate (higher tax avoidance) despite the potential frictions and find evidence that Keiretsu firms are able to shift income between group members in a manner that allows group firms to avoid more taxes than non-group firms.

Jung, Kim, and Kim (2009) examine the relative tax avoidance of firms affiliated with chaebol. Chaebol represent business groups in Korea that have complicated ownership structures that lead to substantial separation between ownership and control in which controlling shareholders have almost complete control over all affiliated firms. They document evidence that chaebol affiliated firms avoid more taxes than independent firms.

While the latter two studies suggest that a business group ownership structure, such as a keiretsu and chaebol facilitate tax avoidance, it is not clear whether the findings extend beyond the individual countries examined. Keiretsu and chaebol are unique structures developed within their home countries that dominate their respective economies. Keiretsu and chaebol tend to be very large groups. Gramlich, Limpaphayom, and Rhee (2004) report that 1,245 companies belong to the six keiretsu groups they study. Jung, Kim, and Kim (2009) report an average of 259 firms per year for 30 chaebols in their sample. Keiretsu are also unique in that they dominate their local economies. Gramlich, Limpaphayom, and Rhee (2004) report that keiretsu represent over 17% of the sales in Japan and Jung, Kim, and Kim (2009) argue that in Korea the potential non-tax costs from agency problems and shareholder expropriation are unusually low. In addition, although Gramlich, Limpaphayom, and Rhee (2004) restrict their study to publicly traded firms, Jung, Kim, and Kim (2009) include privately held firms for which there is no risk that majority shareholders would expropriate funds from minority shareholders and there is no separation of cash flow rights (ownership) and decision/voting rights (control).

Thus, it is not clear whether the prior findings apply more generally to business groups in other countries, or whether there are specific country characteristics that allow the business group form to facilitate tax avoidance. This question is particularly relevant given the findings of Chen et al. (2010) and McGuire (2014), because the business group ownership structure has been widely shown to be subject to the costs of minority shareholder protection referred to by Chen et al. (2010) and is characterized by the separation of cash flow rights and decision/control rights referred to by McGuire, Wang, and Wilson (2014).[6] If these forces lead U.S. family firms and U.S. dual-class share firms to pay more taxes, they should provide upward pressure on the tax payments of business group firms. Thus, the first empirical question we address is whether business group affiliation leads to a greater degree of tax avoidance across a broad range of countries.

Our second question is whether the degree of tax avoidance associated with business group affiliation differs across countries based on the country's economic development and legal origin. There is a substantial amount of empirical evidence that minority shareholder price discounts are greater in emerging market countries (Bertrand, Mehta, and Mullainathan 2002; Bae, Kang, and Kim 2002; Joh 2003; Baek, Kang, and Lee 2006; Kim and Yi 2006). This occurs because emerging markets are generally characterized by having less well developed information systems and regulatory regimes. This creates additional opportunities for tunneling activities and increases the concerns that ultimate owners will use their voting rights to extract rents from minority shareholders. In addition, the weaker regulatory regime and information environment in the emerging market countries also exacerbate the underlying agency problem by making it more difficult (costlier) for ultimate owners to monitor managerial actions of group firms and for managers to identify effective tax planning opportunities (Gallemore and Labro 2015). These arguments suggest that the incremental tax avoidance from business group association would be greater in countries with a developed market economy.[7]

The second country characteristic we consider is the legal origin. La Porta et al. (1998) note that a country's legal origin is a fundamental characteristic that drives the governance systems within the country. One key attribute of a common law system is that it provides a greater degree of investor protection than a code law system (La Porta et al. 1998, 2002: Claessens et al. 2002; Dyke and Zingales 2002;; Leuz, Nanda, and Wysocki 2003). The threat of lawsuits from minority shareholders can play a role similar to the price discount from minority shareholders in constraining income shifting among business group firms. In this case, ultimate shareholders may forego tax-planning opportunities as a bonding mechanism to convey to outside stakeholders a credible signal that they are not extracting wealth from minority shareholders. An alternative view is that the stronger legal protection afforded minority shareholders in common law countries serves to reduce the minority shareholder discount, thereby allowing the ultimate owner to more easily shift income between firms. In this case, w

e would expect the extent of relative tax avoidance on the part of business group firms to be greater in common law countries.

Legal origin could also affect the agency costs identified by McGuire, Wang, and Wilson (2014). Ball, Kothari, and Robin (2000) note that code law countries tend to have a stakeholder governance approach, whereas common law countries tend to have a shareholder governance approach. In code law countries, this leads to direct monitoring over corporate tax policies by various stakeholders, such as loan providers and unions. Because the various stakeholders are able to share the benefits of tax avoidance they are likely to provide the monitoring necessary to encourage management to pursue tax avoidance strategies. This argument is consistent with the findings of Cheng et al. (2012) who provide evidence that hedge fund intervention, particularly by hedge funds with specific tax expertise, leads to a reduction in firm cash effective tax rates or an increase in tax avoidance. An alternative view is that the common law system generates a greater degree of governance transparency (Bushman, Piotroski, and Smith 2004) that allows minority shareholders to be better able to hold managers accountable. In this case, a common law system would reduce the potential agency cost and further facilitate tax avoidance by business group firms.

3. Research design

3.1. Sample and descriptive statistics

We construct our sample from the intersection of Compustat Global (for accounting data) and the Bureau van Dijk (BvD) Osiris database and the Worldscope database (for ownership-related data). BvD collects ownership information from companies, government agencies or associated information providers, such as company registrars of national statistical offices, credit registries, stock exchanges, and regulatory filings. Our sample period covers the 14-year period of 2000–

2013. We identify business groups using detailed firm ownership links from the Osiris and Worldscope databases, and merge business group data with accounting data from the Compustat Global database. We define a business group as a group where two or more listed firms are controlled by the same ultimate controlling owner. Control is typically enhanced through ownership pyramids, cross-shareholdings and to a lesser extent dual class shares. To identify whether a firm has an ultimate controlling owner, we use annual Osiris DVD updates from 2002 through 2013, supplemented by Worldscope.[8] Osiris tracks control by computing voting rights rather than cash flow rights and identifies a shareholder of a firm to be the ultimate owner at a given threshold if that shareholder's stake in the firm exceeds that threshold directly or he controls it via a control chain whose links all exceed that threshold. A shareholder might be a corporation, an individual, a family, a foundation, or a government.[9] In tracing control, Osiris presets the threshold of either 25% or 50% and we choose a 25% threshold.[10] We supplement the Osiris ownership information by manually gathering data on business group attributes from several information sources, including LexisNexis (e.g. the Major Companies Database), Factiva (e.g. the Taiwan Economic Journal database of Asian companies), stock exchange and securities regulator websites (in Argentina, Belgium, Chile, Colombia, India, Indonesia, Italy, and Sri Lanka), directly from company annual reports available in Standard and Poor's Mergent Online database or other online sources (providing a substantial portion of the ownership data collected for firms in Israel, Malaysia, Mexico, Pakistan, Sri Lanka, Singapore, and Thailand), and other online sources, such as Dun and Bradstreet's Who Owns Whom and Thomson Reuters' OneSource.

To ensure that our results are not driven by prior findings with regard to U.S. multinationals, we exclude business groups with U.S. ultimate owners.[11] In addition, because governments receive tax payments, rather than making tax payments, we exclude business groups with governmental bodies, or agencies, as ultimate owners. As noted above, we limit our study to publicly traded corporations. Exhibit 1 illustrates a typical business group in our sample. In this example, Edizione has significant ownership stakes and effective control of eleven firms, two of which, Atlantia S.p.a. and Autogrill S.p.a, are public firms included in our sample. The remaining firms in the group are either 100% owned by Edizione, and hence are not subject to minority shareholder concerns and there is no separation of ownership from control, or firms for which we do not have data. Edizione has an ownership percentage through its subsidiaries of 50.1% in Atlantia and 45.56% in Autogrill. The percentage ownership indicates Edizione's cash flow rights in the subsidiary. However, research in business groups generally considers Edizione to have effective control over the operations over the two subsidiaries, either as the controlling shareholder (Atlantia) or as the largest, dominant shareholder (Autogrill). Our approach therefore examines whether Edizione is able to shift taxable income or resources to or from Atlantia and Autogrill to reduce their tax payments, relative to matched stand-alone firms, or whether the cost from minority shareholder protection, and the agency cost from the separation of ownership from control result in Atlantia and Autogrill paying higher taxes than their matched stand-alone firms.

To identify our matched stand-alone firms we begin with all firm-year observations having sufficient data in the Compustat Global database to compute the variables used in our empirical analyses and merge them with the business group membership data from the Osiris database. Next, we use a propensity score matching procedure (Dehejia and Wahba 2002) to control for observable differences between group-affiliated firms and stand-alone firms.[12] Details regarding the propensity matching procedure can be found in Appendix 3.

We classify countries as being in an emerging or developed market based on the 2015 index constructed by MSCI, an investor research and analysis firm. According to MSCI, emerging market countries have lower degrees of openness to foreign ownership, lower capital inflows/outflows, lower efficiency of operational framework, and less stable institutional framework. Thus, emerging market countries generally have less developed capital markets with limited access to foreign

capital. The 'efficiency of operational framework' reflects the 'level of advancement of the legal and regulatory framework governing the financial market,' and the stability of institutional framework includes the 'basic institutional principles such as the rule of law and its enforcement.'

Our measure of tax avoidance follows Atwood et al. (2012) as the reduction in explicit taxes paid relative to the country's statutory rate. Specifically, tax avoidance (*TaxAvoid*) for firm i in year t is defined as follows:

$$TaxAvoid_{it} = \frac{\left[\sum_{t-2}^{t}(PTEBX * \rho)_{it} - \sum_{t-2}^{t} CTP_{it}\right]}{\sum_{t-2}^{t} PTEBX_{it}} \tag{2}$$

where:

PTEBX = pre-tax earnings before exceptional items (*PI–XI* or Item 21–Item 57)[13];

ρ = home-country statutory corporate income tax rate[14]; and

CTP = current taxes paid (*TX*–the change in *TXP* or Item 24–the change in Item 1000).[15]

Our measure indicates that a higher value of *TaxAvoid* reflects the amount of actual tax paid below the amount of statutory corporate tax to be paid under the current tax law.

Panel A of Table 1 provides the number of firms and firm-year observations for stand-alone firms and group-affiliated firms by country. The table also provides the legal system and market classifications for each country. As noted above, Japan is classified as a code-law, developed-market country and Korea is classified as a code-law, emerging- market country. For comparison, the U.S. would be considered to be a common-law, developed-market country. Notably, each of the four legal system/economic development categories includes firms from multiple countries.

Panel B of Table 1 provides data regarding the ownership by the ultimate owner (at the firm level) and the number of firms in each business group. We impose a minimum ownership of 25%. The mean (median) ownership is 67% (60%). The mean (median) number of public affiliates in a business group is 4 (2) firms. However, our sample is highly skewed with several large business groups. At the firm level, which is our level of analysis, larger business groups have greater representation, which leads to a mean (median) of about 8 (3) firms from each business group.

Table 2 presents the data separated by the business-group ownership structure. Panel A of Table 2 reports the distribution of firms by industry (Campbell 1996). We find a relatively high representation of firms in the Services and Leisure industries. Panel B of Table 2 presents the summary statistics for the variables used in our analysis separately for stand-alone firms and group-affiliated firms.[16] We find that the level of tax avoidance, *TaxAvoid*, is higher for group-affiliated firms (median = 8.7%) than for stand-alone firms (median = 8.2%). Though only suggestive of the underlying relation, this finding is in line with the view that group-affiliated firms tend to engage in higher levels of tax avoidance than stand-alone firms.

3.2. Empirical model

We use the following baseline model to test for the effect of the group affiliation on tax avoidance conditional on a country's economic development:

$$TaxAvoid_{it+1} = \beta_0 + \beta_1 Group_{it} + \Sigma\beta_n Z_{it} + \alpha_{Year} + \gamma_{Industry} + \eta_{Country} + \varepsilon \tag{3}$$

where *TaxAvoid*$_{it+1}$ is the tax avoidance measure from Equation (2); and *Group*$_{it}$ is an indicator variable that equals one if the firm belongs to a business group and zero otherwise; Z_{it} is a vector of firm-level controls; and α_{Year}, $\gamma_{Industry}$, and $\eta_{Country}$ are indicator variables for the year, Fama-French 48 industry, and country, respectively. Following Atwood et al. (2012), we include a set of firm-level controls, including pre-tax return on assets [*Pre-Tax ROA*], firm size [*LogSize*], cash size [*CashSize*], research and development expenditures [*R&D*], capital

Table 1. Sample firms.

Panel A: Distribution by country

Country	Legal	Economy	Stand-alone Firms		Group-affiliated firms	
			Firms	Firm-years	Firms	Firm-years
Australia	Common	Developed	223	1,354	91	552
Austria	Code	Developed	37	206	17	117
Belgium	Code	Developed	46	332	29	235
Brazil	Code	Emerging	123	863	93	600
Canada	Common	Developed	103	511	37	67
Chile	Code	Emerging	69	563	64	514
Colombia	Code	Emerging	15	84	8	53
Denmark	Code	Developed	47	361	20	159
Finland	Code	Developed	58	513	25	125
France	Code	Developed	272	2,081	170	1,237
Germany	Code	Developed	266	1,831	146	956
Greece	Code	Emerging	82	539	54	300
Hong Kong SAR	Common	Developed	248	1,664	94	660
India	Common	Emerging	743	5,969	310	2,100
Indonesia	Code	Emerging	118	587	73	335
Ireland	Common	Developed	11	79	5	38
Israel	Common	Developed	126	578	92	400
Italy	Code	Developed	105	657	74	515
Japan	Code	Developed	1,761	12,962	825	5,101
Korea, Republic of	Code	Emerging	316	1,546	246	1,289
Malaysia	Common	Emerging	339	2,209	171	1,187
Mexico	Code	Emerging	56	425	26	126
Netherlands	Code	Developed	71	537	39	296
New Zealand	Common	Developed	51	419	22	153
Norway	Code	Developed	70	380	45	230
Peru	Code	Emerging	43	300	39	306
Philippines	Code	Emerging	43	244	52	357
Poland	Code	Emerging	130	734	75	437
Portugal	Code	Developed	24	189	14	91
Singapore	Common	Developed	255	1,626	120	822
South Africa	Common	Emerging	135	915	86	559
Spain	Code	Developed	57	498	39	309
Sweden	Code	Developed	135	932	64	446
Switzerland	Code	Developed	103	861	62	472
Taiwan	Code	Emerging	514	2,942	199	1,038
Thailand	Common	Emerging	121	976	55	376
Turkey	Code	Emerging	113	507	77	383
United Kingdom	Common	Developed	466	3,259	171	863
Total			7,495	51,233	3,829	23,804

Panel B: Business group ownership structure

	Mean	Median	Q1	Q3
Direct ownership by the ultimate owner	0.67	0.60	0.39	1.00
Number of affiliated firms (Business group level)	4.53	2.00	2.00	4.00
Number of affiliated firms (Firm Level)	8.28	3.00	2.00	7.00

This table displays information regarding the stand-alone and business-group affiliated firms in our sample. Panel A provides the number of firms and firm-years by country and each country's classification. For each business group, Panel B provides the percentage of direct ownership by the ultimate owner, and the number of affiliated firms for each business group and the number of firms in the sample affiliated with a given business group.

structure [*Lev*], sales growth [*SalesGrowth*], asset mix [*CapInt* and *InvInt*], firm age [*FirmAge*] and an indicator variable for multinational operations [*Multi*]. We also include variables representing other ownership structure characteristics of firms that include the dual-class structure [*Dual*] and the family ownership [*FamilyFirm*] (e.g. Chen et al. 2010; McGuire, Wang, and Wilson 2014). The variables are defined in Appendix 1.

Table 2. Sample descriptions.

Panel A: Sample distribution by industry

Industry (Campbell 1996)	.Stand-alone Firms		Group-affiliated firms	
	Firm-years	%	Firm-years	%
Basic industry	664	1.3	692	2.91
Capital goods	6,188	12.08	2,200	9.24
Construction	130	0.25	61	0.26
Consumer durables	2,567	5.01	1,159	4.87
Finance & real estate	6,026	11.76	1,733	7.28
Food & tobacco	1,905	3.72	2,310	9.7
Leisure	7,617	14.87	3,660	15.38
Others	405	0.79	547	2.3
Petroleum	3,578	6.98	1,988	8.35
Services	10,465	20.43	4,104	17.24
Textiles & trade	2,146	4.19	1,358	5.7
Transportation	4,558	8.9	2,431	10.21
Utilities	4,984	9.73	1,561	6.56
Total	51,233	100.00	23,804	100.00

Panel B: Descriptive statistics for variables

	Stand-alone Firms				Group-affiliated firms			
	N	Mean	Median	Std	N	Mean	Median	Std
Key variable:								
TaxAvoid	51,233	0.120	0.082	0.227	23,804	0.124	0.087	0.222
Firm-level:								
Dual	51,233	0.008	0.000	0.086	23,804	0.021	0.000	0.140
FamilyFirm	51,233	0.039	0.000	0.193	23,804	0.047	0.000	0.212
Pre-Tax ROA	51,233	0.092	0.072	0.075	23,804	0.090	0.070	0.074
Size	51,233	5.525	5.389	1.902	23,804	6.660	6.529	2.075
CashSize	51,233	0.172	0.121	0.166	23,804	0.155	0.107	0.155
R&D	51,233	0.011	0.000	0.025	23,804	0.009	0.000	0.023
Lev	51,233	0.227	0.185	0.210	23,804	0.246	0.217	0.208
SalesGrowth	51,233	0.169	0.113	0.241	23,804	0.171	0.114	0.250
CapInt	51,233	0.305	0.276	0.206	23,804	0.322	0.298	0.212
InvInt	51,233	0.129	0.107	0.115	23,804	0.108	0.087	0.101
FirmAge	51,233	10.132	9.000	6.140	23,804	10.833	10.000	6.165
Multi	51,233	0.070	0.000	0.256	23,804	0.072	0.000	0.258
Country-level:								
BTaxC	23,777	0.012	0.011	0.005	51,195	0.012	0.011	0.005
WW	19,430	0.656	1.000	0.475	43,974	0.703	1.000	0.457
TaxEnf	23,804	3.559	3.700	0.985	51,233	3.664	3.960	0.973
TaxRate	23,804	0.304	0.300	0.074	51,233	0.310	0.300	0.075
VarComp	19,867	0.324	0.300	0.128	44,708	0.306	0.240	0.127
Earnvol	23,804	0.725	0.766	0.181	51,233	0.720	0.750	0.182
Legal Factor	23,367	3.370	3.682	1.432	50,499	3.616	3.682	1.414

This table presents descriptive statistics for stand-alone firms and group-affiliated firms for the full sample. Variable definitions are in Appendix 1.

4. Empirical results

4.1. Full sample test

We first examine the general relation between business groups and tax avoidance. Column 1 of Table 3 reports the results using OLS estimation. The coefficient on the business group indicator variable (0.003) is significantly positive (t-statistic = 2.21). This suggests that, on average, business group firms are able to avoid a greater amount of taxes than stand-alone firms and that the expected cash tax savings from tax planning opportunities provided by the business group structure exceed the associated nontax costs.

Table 3. The effect of the group affiliation on corporate tax avoidance.

| | OLS (1) | Two-Stage Simultaneous Equations | |
		Stage 1 (2)	Stage 2 (3)
Dep. Variable =	TaxAvoid	Pr(Group Indicator = 1)	TaxAvoid
Group	**0.003****		
	(2.21)		
Group Probability			**0.100***
			(1.96)
Firm-level controls:			
Dual	0.007	0.015	−0.007
	(1.26)	(1.16)	(−0.77)
FamilyFirm	−0.020***	0.117***	−0.033***
	(−5.50)	(23.93)	(−4.82)
Pre-Tax ROA	0.170***	0.02	0.175***
	(13.18)	(1.33)	(17.3)
Size	−0.003***	0.029***	−0.001
	(−6.15)	(48.85)	(−0.41)
CashSize	0.003	−0.039***	0.022***
	(0.56)	(−5.29)	(4.12)
R&D	0.077***	0.007***	0.000
	(4.60)	(3.12)	(−0.54)
Lev	0.034***	−0.051***	0.033***
	(7.78)	(−9.46)	(7.51)
SalesGrowth	0.132***	−0.004	0.076***
	(26.88)	(−0.89)	(28.63)
CapInt	0.008**	−0.008	0.034***
	(1.97)	(−1.28)	(8.71)
InvInt	−0.044***	−0.141***	0.006
	(−5.64)	(−13.48)	(0.58)
FirmAge	0.001***	−0.001**	0.000
	(4.78)	(−2.53)	(−1.29)
Multi	0.018***	0.006	0.027***
	(5.41)	(1.32)	(9.22)
Instrumental variables:			
Idiosyncratic Risk		0.262***	
		(3.52)	
RD_Intensity		0.736***	
		(9.64)	
External Finance Dependence		0.131***	
		(5.17)	
LernerIndex		0.28***	
		(7.13)	
Index Return at Listing		−0.015***	
		(−4.58)	
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	No	Yes
Country dummies	Yes	Yes	Yes
Obs.	75,037	75,037	75,037
R^2/Pseudo R^2	0.27	0.09	0.23
Partial F-Statistic		F = 141.12 (P-value < 0.0001)	
Over-identification test		Chi-sq = 171.11 (P-value = 0.0000)	
Under-identification test		Chi-sq = 176.52 (P-value = 0.0000)	
Weak identification test		Cragg-Donald Wald F = 35.28 Stock-Yogo C.V.: 10% Max IV size 26.87 Stock-Yogo C.V.: 15% Max IV size 15.09	
Endogeneity test		Chi-sq = 3.77 (p < 0.05)	

The dependent variable is the extent of tax avoidance. Data are annual for the period 2000–2013. Variable definitions are in Appendix 1. Panel A presents OLS regression results. Panel B presents results for a two-stage simultaneous equation estimation. In the first stage, the dependent variable is an indicator variable that equals to one if the firm is in a business group. The estimated probability is an independent variable in the second stage. Standard errors are robust standard errors clustered by year and country (Peterson 2009). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Columns 2 and 3 of Table 3 present results using a two-stage instrumental variable approach. We use the Compustat Global universe to estimate the first-stage model and then use firm-year observations in our full sample for the second-stage estimation. In the first stage, group membership is the dependent variable and the control variables include the set of explanatory variables from the tax avoidance regression and a set of instruments to address the self-selection issue. We follow prior studies and use two identification strategies in selecting a set of instruments that are predicted to be associated with group affiliation, but not with the unexplained components of tax avoidance (Belenzon and Berkovitz 2010; Masulis, Pham, and Zein 2015). Country-level characteristics are defined in Appendix 2.

We use a firm-level instrument, *Idiosyncratic Risk*, and three separate industry-level (three-digit SIC) instruments capturing R&D intensity [*RD_Intensity*], the level of dependence upon external capital [*ExternalFinance*] and firms' market power [*LernerIndex*] (Belenzon and Berkovitz 2010). Idiosyncratic risk is a popular instrument for ownership structure in prior studies (e.g. Himmelberg, Hubbard, and Palia 1999; Villalonga and Amit 2006 and; Masulis, Pham, and Zein 2015). Idiosyncratic risk could be related to the likelihood of group membership because a controlling party can diversify their exposure to firms with high firm-specific risk, but should not be directly related to a firm's tax avoidance (Guenther, Matsunaga, and Williams 2016). Business groups are more likely to occur in R&D-intensive industries, since groups facilitate research and development projects through their ability to provide their affiliates with lower cost financing. Groups are also expected to be more prevalent in industries with higher dependence on external financing. We follow Rajan and Zingales (1998) and rank industries according to their dependence on external financing, using U.S. firms from Compustat America.[17] Using the U.S. firms in our setting is advantageous because business groups are rare in the United States due to higher tax and regulatory costs of maintaining a business group (La Porta, Lopez-De-Silanes, and Shleifer 1999; Masulis, Pham, and Zein 2015). We compute *External Finance Dependence* as the ratio of capital expenditures minus cash flow from operations to capital expenditures.[18] We also employ the Lerner index as a proxy for the firms' market power, e.g. the ability of a firm to profitably raise the market price of a good or service over marginal cost. Finally, group membership can be related to historical market conditions around a firm's listing date. Stand-alone firms are more likely to go public when capital market conditions are favorable (to raise more cash proceed from external capital markets and finance their investment projects) than affiliates (firms that belong to the business group), given that the affiliates can receive funding from other affiliates within the same group or the group headquarters for their investment projects (Masulis, Pham, and Zein 2011). We employ the cumulative return on the domestic stock market index in the listing year of each firm as an instrument (*Index Return at Listing*).

To validate our choice of instruments we follow Larcker and Rusticus (2010) and conduct weak instrument identification and Hausman specification tests. The partial R^2 of the first stage regression is 9.2% and partial F is 141.12. The Cragg-Donald Wald F statistic is 35.28, which exceeds the 10% (25%) critical value of 26.87 (15.09) based on Stock and Yogo (2005). Overall, the results suggest that the instrument passes the weak instrument tests by explaining a significant amount of the *GROUP*. The Hausman test yields a Wu-Hausman F value of 3.77 ($p < 0.05$). This test supports the contention that the instrumental variable improves the specification over the OLS estimation.

The results in column 3 of Table 3, though slightly weaker, are generally consistent with the OLS estimation. The coefficient for the probability of group affiliation is significantly positively associated with tax avoidance (t-statistic = 1.96). Thus the two-stage model lends further support to the conclusion that group-affiliated firms exhibit a greater degree of tax avoidance than stand-alone firms.

To further alleviate concerns about correlated omitted variables and reverse causality, we estimate a change regression by examining how becoming a part of a business group through the mergers and acquisitions process relates to changes in a firm's tax avoidance. We identify

acquisitions and divestitures from the SDC Platinum database. The dependent variable is the change in tax avoidance (tax avoidance year t +1 less tax avoidance year t-1). Our test variable is the change in business group status, *ΔGroup*, where it equals one if the firm joins a business group in year t, zero if the status does not change, and −1 if the firm ceases to be affiliated with a business group in year t. The coefficient on this variable captures the change in tax avoidance associated with the change in ownership structure. In the regression we also include changes in the same firm-level controls from year t-1 to year t +1.

Table 4 presents the results. We find a significantly positive coefficient on the group variable for the full sample (coefficient = 0.009, t-statistic = 1.69). To provide further insight we separate the sample into developed and emerging markets. Developed markets are likely to have the regulatory and enforcement infrastructure necessary to enable the business groups to shift income to reduce taxes. We find that the impact of change in business group status to be significant in the overall sample (0.009, t-statistic = 1.69) and the developed market sample (coefficient = 0.017, t-statistic =

Table 4. Shock to the business group ownership structure: Evidence from merger and acquisition, and divestiture.

Model	Overall sample	Developed market	Emerging market
ΔGroup	**0.009***	**0.017****	**−0.008**
	(1.69)	**(2.31)**	**(−0.67)**
Firm-level controls:			
ΔDual	0.058**	0.007	0.162***
	(2.23)	(0.22)	(5.03)
ΔFamilyFirm	−0.008	−0.012	0.003
	(−0.54)	(−0.64)	(0.15)
ΔPre-Tax ROA	0.470***	0.615***	0.222
	(5.11)	(5.78)	(1.63)
ΔSize	0.007	0.031**	−0.029**
	(0.67)	(2.20)	(−2.14)
ΔCashSize	0.007	0.028	−0.015
	(0.18)	(0.63)	(−0.26)
ΔR&D	−0.603	−0.710	−0.309
	(−1.18)	(−1.49)	(−0.47)
ΔLev	0.094***	0.088**	0.109**
	(3.32)	(2.39)	(2.51)
ΔSalesGrowth	0.139***	0.142***	0.116***
	(5.62)	(4.36)	(2.86)
ΔCapInt	−0.159***	−0.119	−0.126**
	(−3.04)	(−1.65)	(−2.21)
ΔInvInt	−0.042	−0.104	0.042
	(−0.55)	(−1.13)	(0.38)
ΔFirmAge	0.012***	0.010***	0.020***
	(7.00)	(5.12)	(5.77)
ΔMulti	0.015	0.010	0.054*
	(1.02)	(0.55)	(1.81)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Obs.	3,604	2,561	1,043
Adj. R^2	0.14	0.15	0.16

The table presents OLS regression results with the dependent variable representing the change in levels of tax avoidance two years before and after the merger and acquisition as well as divestiture, which induces firms to be affiliated to the business group. 'ΔGroup', is an indicator variable set equal to one if the firm is affiliated with a business group after the merger and acquisition as well as divestiture, −1 if the firm is not affiliated with a business group after the merger and acquisition as well as divestiture, and 0 otherwise. All the change values (Δ) are computed as the difference of a given variable two years before and after the merger and acquisition. Variable definitions are provided in Appendix 1. t-statistics in parentheses are based on robust standard errors clustered by country and year (Petersen, 2009). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

2.31) and insignificant in the emerging market sample (coefficient =−0.008, t-statistic = 0.67). The findings in Table 4 show that the degree of a firm's tax avoidance increases after they become a member of a business group, particularly in developed-market countries, and thus reinforce our earlier results on the full sample.

4.2. Samples categorized by economic development and legal origin

To investigate whether the impact of business group affiliation on tax avoidance differs across country characteristics, we categorize our sample based on the country's legal origin and market development and estimate the regression based on each economic development/legal origin sample. We present the results in Table 5.

Column (1) presents the results for the sample from developed market, code law countries, such as Japan and Germany. The coefficient on the business group indicator variable is significantly positive (coefficient = 0.17; t-statistic = 6.99). This suggests that the business group ownership structure allows the ultimate owner to allocate resources to take advantage of

Table 5. The effect of business group affiliation on corporate tax avoidance: Emerging versus developed markets.

	Developed market			Emerging market	
	Code	Common		Code	Common
	(1)	(2)		(3)	(4)
Group	0.017***	−0.021***		0.003	−0.011**
	(6.99)	(−4.26)		(0.80)	(−2.57)
Firm-level controls:					
Dual	−0.038***	−0.054*		−0.014	0.035
	(−3.51)	(−1.75)		(−0.96)	(0.63)
FamilyFirm	−0.024***	−0.011		−0.014*	−0.007
	(−3.27)	(−0.82)		(−1.96)	(−0.44)
Pre-Tax ROA	0.238***	0.098***		0.211***	0.112***
	(4.71)	(2.92)		(6.65)	(4.12)
Size	−0.004***	−0.007***		0.004***	−0.005**
	(−3.17)	(−3.65)		(3.01)	(−2.52)
CashSize	0.022*	0.023*		−0.036**	−0.014
	(1.81)	(1.79)		(−2.53)	(−0.95)
R&D	0.035	−0.163**		0.133	0.080
	(0.80)	(−2.40)		(1.07)	(1.64)
Lev	0.050***	0.012		−0.017	0.043***
	(5.61)	(1.28)		(−1.53)	(3.55)
SalesGrowth	0.120***	0.064***		0.084***	0.031***
	(8.86)	(8.59)		(9.71)	(4.23)
CapInt	0.027***	0.038***		−0.001	−0.002
	(3.10)	(3.26)		(−0.08)	(−0.12)
InvInt	−0.057***	−0.024*		−0.010	−0.004
	(−3.75)	(−1.74)		(−0.42)	(−0.21)
FirmAge	0.002***	−0.001*		0.001	−0.001
	(5.12)	(−1.98)		(1.20)	(−1.56)
Multi	0.135***	0.011		0.077*	0.007
	(5.38)	(1.02)		(1.90)	(0.53)
Year dummies	Yes	Yes		Yes	Yes
Industry dummies	Yes	Yes		Yes	Yes
Country dummies	No	Yes		No	Yes
Obs.	32,629	13,045		15,072	14,291
Adj. R^2	0.22	0.12		0.16	0.28

The table presents OLS regression results with the dependent variable representing the extent of tax avoidance. 'Group', is an indicator variable set equal to one if the firm is affiliated with a business group, and 0 otherwise. Variable definitions are provided in Appendix 1. T-statistics in parentheses are based on robust standard errors clustered by country and year (Petersen, 2009). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively

favorable tax provisions in countries that have developed capital markets and code law legal regimes, and is consistent with the keiretsu results documented by Gramlich, Limpaphayom, and Rhee (2004).

However, the results reported in column (2) for developed market, common law countries, such as the U.K., and Hong Kong, are strikingly different. We find a significantly negative coefficient (coefficient = −0.021; t-statistic = −4.26) for the group indicator variable. This suggests that firms affiliated with a business group exhibit a lower degree of tax avoidance than stand-alone firms in developed market countries with a common law legal origin. One interpretation is that, consistent with Chen et al. (2010), the threat of legal action on the part of minority shareholders leads group firms to bond themselves against expropriation by paying higher tax rates. Another interpretation is that, consistent with McGuire, Wang, and Wilson (2014), the governance system derived from common law (La Porta et al. 1998) exacerbates the agency problem created by the separation of cash flow and decision/control rights, leaving group firms less likely to invest in effective tax planning strategies.

In columns (3) and (4) of Table 5, we examine the results for emerging markets for code and common law countries, respectively. In the sample for emerging market, code law countries, such as South Korea and Poland, we find an insignificant coefficient for the group indicator (coefficient = 0.003; t-statistic = 0.80). This result suggests that the results documented by Jung et al. (2009) with regard to chaebol in Korea do not apply to code law emerging market countries more broadly. This conclusion is further supported by the findings for emerging market countries with common law origins, such as India and South Africa. For that sample the coefficient on the group variable is significantly negative (coefficient = −0.011, t-statistic = −2.57), which suggests that group firms exhibit a lower degree of tax avoidance than stand-alone firms in these common law countries. Thus, just as in developed market economies, the common law system appears to impact the tax avoidance activities of the business group structure, such that group firms are unwilling or unable to take advantage of tax avoidance opportunities available to stand-alone firms. Stated another way, concerns about relatively high non-tax costs in common-law, emerging-market countries lead business group firms to engage in less tax planning.

To assess the statistical significance of the impact of a country's economic development and legal origin on the relative tax avoidance of business group firms, we pool the sample and include interaction variables for the country's economic development and legal origin. We report the results in Table 6. Panel A presents the regression results. In Panel B we aggregate coefficients to highlight the overall effects of economic development and legal origin. Consistent with the contention that business group affiliation enables firms to engage in greater tax avoidance, we find the coefficient for group affiliation (*Group*) to be significantly positive (0.026; t = 5.98). We also find the interactions between group and emerging markets and between group and common law to be significantly negative (−0.034; t = −4.88 for emerging markets and −0.069; t = −8.31, for common law). These findings are consistent with the incremental effect of business group affiliation on tax avoidance being smaller for emerging market countries and common law countries, and suggest that the nontax costs of tax avoidance to business group firms being higher in emerging market and common law countries than in developed market and code law countries, respectively. We also find a significantly positive coefficient for the interaction of the group indicator with both common-law and emerging-market indicators, i.e. *Group*Common*Emerging*, (0.064; t = 5.90). This is consistent with the view that relatively high non-tax costs in common law systems or emerging markets inhibit the business group firms from engaging in tax avoidance, and that the presence of one reduces the importance of the other.

In Panel B we find that the significantly positive relation between business group affiliation and tax avoidance is restricted to countries with developed markets and code law systems. Panel B also shows that the incremental impact of code law in enabling business group tax avoidance is greater in developed markets than in emerging markets (difference in coefficients = −0.034) and that the impact of developed markets in enabling business group tax avoidance is greater in code law countries than in common law countries (difference in coefficients = −0.069).

Table 6. The effect of business group affiliation on corporate tax avoidance economic development and legal origin.

Panel A: Pooled regression results

Variables	Estimate
Common	0.123***
	(31.19)
Emerging	0.039***
	(10.05)
Group (β_1)	**0.026***
	(5.98)
Group*Common (β_2)	**−0.069***
	(−8.31)
Group* Emerging (β_3)	**−0.034***
	(−4.88)
Group*Common*Emerging (β_4)	**0.064***
	(5.90)
Firm-level controls:	
Dual	0.002
	(0.17)
FamilyFirm	0.008
	(1.31)
Pre-Tax ROA	0.332***
	(17.06)
Size	0.002**
	(2.05)
CashSize	−0.055***
	(−6.07)
R&D	0.016
	(0.55)
Lev	0.040***
	(5.74)
SalesGrowth	0.097***
	(19.09)
CapInt	−0.006
	(−0.76)
InvInt	0.007
	(0.49)
FirmAge	−0.001*
	(−1.84)
Multi	0.042***
	(6.61)
Year dummies	Yes
Industry dummies	Yes
Country dummies	Yes
Obs.	75,037
Adj. R^2	0.21

Panel B: Two-by-two analysis of the emerging market versus the developed market, by legal origin

	The coefficients on Group (N = 74,697)		
	Developed market	**Emerging market**	
	(i)	*(ii)*	*(ii)-(i)*
Code law *(iii)*	0.026***	−0.008***	−0.034***
	(β_1)	**(β_1+ β_3)**	**(β_3)**
Common law *(iv)*	−0.043***	−0.013	0.030
	(β_1+ β_2)	**(β_1+ β_2+ β_3+ β_4)**	**(β_3+ β_4)**
(iv)-(iii)	−0.069***	−0.005***	0.064***
	(β_2)	**(β_2+ β_4)**	**(β_4)**

Table 5, Panel A presents OLS regression results. The dependent variable is the extent of tax avoidance, defined as the difference in taxes paid versus the amount that would be due under the statutory rate, scaled by pretax income, all accumulated over a three-year period. The test variable, 'Group', is an indicator variable set equal to one if the firm is affiliated with a business group, and 0 otherwise. The regressions are estimated separately for firms in emerging markets countries and developed market countries as well as in code law countries and common law countries. Panel B reports two-by-two analysis where control variables are included but not reported. Data are annual for the period 2002–2013. Variable definitions are provided in Appendix I. T-statistics in parentheses are based on robust standard errors clustered by country and year (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (one-tailed when the sign of coefficients are predicted, otherwise, two-tailed).

Table 7. Excluding Japan and Korea.

	Developed Market/Code Law Countries Excluding Japan (1)	Emerging Market/Code Law Countries Excluding Korea (2)
Group	**0.013*****	**0.002**
	(4.10)	**(0.54)**
Firm-level controls:		
Dual	−0.026***	−0.040*
	(−2.96)	(−1.87)
FamilyFirm	−0.009*	−0.022
	(−1.75)	(−1.45)
Pre-Tax ROA	0.039	0.196***
	(1.38)	(5.78)
Size	−0.006***	0.006***
	(−5.17)	(3.95)
CashSize	0.027**	−0.042***
	(1.97)	(−2.61)
R&D	−0.020	0.167
	(−0.60)	(1.25)
Lev	0.014	−0.025*
	(1.40)	(−1.90)
SalesGrowth	0.102***	0.085***
	(8.72)	(8.53)
CapInt	0.014	−0.016
	(1.46)	(−1.41)
InvInt	−0.072***	−0.027
	(−4.39)	(−1.12)
FirmAge	0.000	0.001
	(0.50)	(0.00)
Multi	0.135***	0.067
	(17.84)	(1.29)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Country dummies	Yes	Yes
Obs.	13,367	12,237
Adj. R^2	0.16	0.21

The table presents OLS regression results with the dependent variable representing the extent of tax avoidance. 'Group', is an indicator variable set equal to one if the firm is affiliated with a business group, and 0 otherwise. 'Large Group', is an indicator variable set equal to one if the firm is affiliated with a business group with more than three firms, and 0 otherwise. Variable definitions are provided in Appendix 1. T-statistics in parentheses are based on robust standard errors clustered by country and year (Petersen, 2009). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 8. The effect of business group affiliation on corporate tax avoidance: Within group analysis.

	(1)	(2)	(3)
Ultimate owners' direct ownership	**−1.599****		
	(−2.47)		
PctForeignSales		**−0.034****	
		(−8.42)	
Vertical			**0.004**
			(1.11)
Firm-level controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Obs.	19,616	21,410	16,381
Adj. R^2	0.19	0.13	0.26

The table presents OLS regression results with the dependent variable representing the extent of tax avoidance. Variable definitions are provided in Appendix 1. T-statistics in parentheses are based on robust standard errors clustered by country and year (Petersen, 2009). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

5. Additional tests

5.1. Excluding Japan and Korea

Given the previous findings documented by Gramlich, Limpaphayom, and Rhee (2004) with respect to keiretsu and Jung et al. (2009) with respect to chaebol, we examine whether our findings are driven by Japan, and Korea, respectively. Specifically, we are concerned whether the positive coefficient for developed-market, code-law countries applies to countries other than Japan and the extent to which the results for emerging markets are affected by the inclusion of Korea.

In Table 7, column (1) reports the results for our sample of developed market/code law countries excluding Japan. We continue to find a significantly positive coefficient for the group indicator variable (coefficient = 0.013; t-statistic = 4.10). This suggests that the findings for Keiretsu documented by Gramlich (2004) apply more broadly to business groups in other developed-market, code-law countries. The findings also suggest that the market development and legal system underlying the keiretsu allow the business group firms to generate a greater degree of tax avoidance.

In column (2) we present the results for code-law, emerging-market countries excluding Korea. We find that the coefficient for the group indicator variable is not significant (coefficient = 0.002; t-statistic = 0.54). This provides additional evidence that the greater degree of tax avoidance for chaebol documented by Jung et al. (2012) does not apply to other code law, emerging market countries, and further supports the contention that the positive relation between group affiliation and tax avoidance documented in developed-market, code-law countries does not appear to apply to emerging-market countries, even if they have a code law system.

5.2. Determinants of the extent of business group tax avoidance

To provide additional insight into how the nontax costs impact tax avoidance for business group firms, we conduct tests on the extent of tax avoidance *within* our business group sample (excluding stand-alone firms) and report the results in Table 8. Our first variable is the extent of the ultimate owners' direct ownership. We find that ultimate owners' direct ownership is negatively associated with firms' tax avoidance behavior. This result is in line with the view that an increase in the ultimate owners' direct ownership increases the nontax costs, such as price protection by minority shareholders that are more severe in emerging market countries, leading to a lower degree of tax avoidance.

Our second variable is the percentage of foreign sales revenue. We find a significantly negative relation between the percentage of foreign sales and tax avoidance. This suggests that among business group firms, firms that generate a higher proportion of revenue from foreign sources tend to exhibit a lower degree of tax avoidance. While this finding is contrary to findings based on U.S. multinationals, we note that the U.S. tax rate is generally higher than foreign tax rates, and U.S. companies often invest in tax haven countries. In contrast, the tax rates in emerging market countries could be below the rates paid by affiliated firms operating outside the domestic market.

Our third variable identifies whether a group is vertically structured (a.k.a. pyramidal structures) or horizontally structured. The findings of Cen et al. (2017) suggest that customer and supplier relationships can enhance tax avoidance. To the extent that vertically organized groups capture customer/supplier relationships documented by Cen et al. (2017), we would expect the tax avoidance of vertically organized groups to be greater than the findings for horizontal groups. On the other hand, vertical groups could experience a greater degree of agency issues as group firms are farther from the ultimate owner. However, we do not find that group structure has a significant effect on tax avoidance within business groups.

6. Summary and conclusion

In this paper we investigate how the business group ownership structure influences the degree of a firm's tax avoidance across a broad multinational sample and whether broad country-level characteristics impact the strength of the relation between business group affiliation and tax avoidance. We use the Osiris and Worldscope databases to identify firms as being affiliated with a business group, and the MSCI Emerging Markets Fund to identify emerging market countries. Our sample period covers the 14-year period of 2000–2013. We compare the tax avoidance of group-affiliated firms, i.e. publicly traded firms that belong to a business group where firms are linked with one another via corporate ownership relationships and the ultimate owner has at least a twenty-five percent effective decision/control rights over another firm, to the tax avoidance of stand-alone firms.

On average, we find that business group firms exhibit more tax avoidance than stand-alone firms. This suggests that, consistent with the findings by Gramlich, Limpaphayom, and Rhee (2004) with respect to keiretsu and Jung (2009) with respect to chaebol, ultimate owners are able to use their financial flexibility and control rights to allocate resources to reduce their tax liability and overcome the associated nontax costs. However, we also find that this result is concentrated in developed market countries with code law traditions. In countries with common law tradition we find that business group firms exhibit a lower degree of tax avoidance than stand-alone firms. This finding holds for common law countries with developed markets, such as the U.K. and Australia, and for common law countries with emerging markets, such as India and South Africa. Therefore, our results suggest that the legal origin of a country has a major impact on the ability of the business group ownership form to influence a firm's tax liability.

Our findings also have implications for recent studies that have investigated the role of ownership structure and tax avoidance among U.S. firms. In particular, Chen et al. (2010) find that the threat of wealth expropriation from founding families leads family-controlled firms to pay higher taxes, and McGuire, Wang, and Wilson (2014) find that the separation of ownership from control increases a firm's tax payments. As these are two characteristics endemic to business groups, our findings suggest that their results are likely to apply to other common law countries and that the U.S. common law tradition provides an important underlying condition for their findings.

Notes

1. Examples include CEO characteristics (Dyreng, Hanlon, and Maydew 2010), CEO compensation (Rego and Wilson 2012), monitoring from labor unions (Chyz et al. 2013) and hedge funds (Cheng et al. 2012), and country characteristics (Atwood et al. 2012).
2. Studies of business groups in India and Korea find that minority shareholders use market or legal means to protect their interests, thereby passing the value loss from managerial expropriation back to the ultimate owner (Bertrand, Mehta, and Mullainathan 2002; Bae, Kang, and Kim 2002; Joh 2003; Baek, Kang, and Lee 2006; Kim and Yi 2006). More recently, Hong, Kim, and Welker (2017) focus their attention on control-ownership wedge and its effect on bad news hoarding.
3. Private control benefits include opportunities to engage in tunneling, self-dealing, perquisite consumption, empire building, and the expropriation of corporate growth opportunities (Grossman and Hart 1980; Barclay and Holderness 1989; Shleifer and Vishny 1997; La Porta et al. 1997; La Porta et al. 1998; Johnson et al. 2000; Nenova 2003; Dyck and Zingales 2004; Djankov et al. 2008).
4. Using a sample of U.S. firms, Chyz et al. (2013) argue that labor unions would prefer less tax avoidance to avoid risk. In contrast, we expect labor unions to favor more tax avoidance to generate cash flows that could be shared with union workers.
5. Cheng et al. (2012) use ownership by activist hedge funds to show evidence that monitoring affects the degree of tax avoidance.
6. See Bae, Kang, and Kim (2002), Joh (2003), Bertrand, Mehta, and Mullainathan (2002) and Baek, Kang, and Lee (2006) for additional discussion about the business group structure and how minority share discounts relate to the threat of wealth expropriation in business groups.
7. Emerging market countries may not have strong tax enforcement regimes (Beck, Lin, and Ma 2014) in which case firms in those countries would not need sophisticated transactions, such as transfer pricing, to reduce their taxes.

8. We extrapolate the ownership structure in 2000 and 2001 based on the 2002 ownership data and validate it by using Worldscope and the ownership data constructed by Faccio and Lang (2002).
9. In some cases the ultimate owner is a publicly traded firm. In this case, the ultimate owner is included in the sample.
10. We have used various thresholds to define the ultimate owner. Our results remain qualitatively unchanged.
11. Klassen and Laplante (2012) investigate tax avoidance of U.S. multinational firms.
12. Business groups could engage in 'winner-picking' by identifying profitable stand-alone firms (Belenzon and Berkovitz 2010).
13. Item numbers reference the Compustat Global FTP database.
14. We hand-collected these statutory rates from a KPMG LLP online summary, PricewaterhouseCoopers LLP's online information, and Coopers & Lybrand LLP's worldwide tax summary guides.
15. When current tax expense (*txc*) is missing, we replace it with total tax expense less deferred taxes (*txt-txdI*) when available. We delete observations where current tax expense (*txc*) is missing and either total tax expense (*txt*) or deferred taxes (*txdI*) is missing.
16. Note that the propensity score matching was based on the values of variables as of the IPO date. We use firm-level controls in our regressions to control for differences across samples in the current values of the financial variables.
17. Rajan and Zingales (1998) argue that using U.S. firms is advantageous in three ways: (i) Because U.S. firms face low market frictions in attaining external financing, the amount of external financing used by U.S. companies is a strong proxy for their demand for external finance. (ii) Disclosure requirements imply that data on external financing are wide-ranging. (iii) While using U.S. industry data is exogenous to our sample firms across countries, it is likely that an industry's dependence on external funds in the United States is a reasonable proxy for external dependence in our sample countries.
18. When we use the ratio of the net amount of equity issued to capital expenditures as a proxy for the level of the external capital dependence, the results are qualitatively the same.

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Appendix 1. Variable definitions.

Variables of interest

Group	=An indicator variable that equals one if a firm belongs to a business group. A business group is defined as a set of firms owned by the same ultimate owner. We define a shareholder of a firm to be the ultimate owner if that shareholder's stake in the firm exceeds 25 percent directly or via a control chain whose links all exceed 25 percent. (Source: Bureau van Dijk and Worldscope).
Large Group	=An indicator variable that equals one if a firm belongs to a business group with more than three firms. (Source: Bureau van Dijk and Wordscope).
TaxAvoid	=where: PTEBX = pre-tax earnings before exceptional items ($PI - XI$); = home-country statutory corporate income tax rate; and CTP = current taxes paid (TXC – the change in TXP). (Source: Compustat Global).
Ultimate Owners' Cash Flow Right	=The direct ownership of the ultimate owner in percentage. (Source: Bureau van Dijk and Worldscope).
PctForeignSales	=The ratio of foreign sales to total sales (Source: Compustat Global).
Vertical	=An indicator for a business group where the controlling shareholder holds both direct and indirect stakes in affiliated firms. (Source: Bureau van Dijk and Worldscope).

Firm-level control variables

Pre-Tax ROA	=Pre-Tax income before exceptional items ($PI - XI$) divided by lagged total assets (AT). (Source: Compustat Global).
Size	=The natural log of total assets (AT). Source: Compustat Global.
CashSize	=Cash and Short-Term Investments (CHE) divided by lagged total assets (AT). Source: Compustat Global.
R&D	=Research and development expense (XRD) divided by lagged total assets (AT). Source: Compustat Global.
Lev	=Total long-term liabilities ($DLC + DLTT$) divided by total assets (AT). Source: Compustat Global.
SalesGrowth	=The three-year average change in sales ($SALE$). Source: Compustat Global.
CapInt	=Net property plant & equipment ($PPENT$) divided by total assets (AT). Source: Compustat Global.
InvInt	=Inventory ($INVT$) divided by total assets (AT). Source: Compustat Global.
FirmAge	=The number of years after a given firm's initial public offering. Source: SDC Platinum and Compustat Global.
Multi	=An indicator variable which equals zero if foreign income taxes is missing or zero, and equals one otherwise.
Idiosyncratic Risk	=The standard error from estimating the one-factor market model on each firm's monthly stock returns in the five years prior to 2002. Source: Compustat Global.
Index Return at Listing	=The annual market index return in the year of a firm's listing. Sources: Datastream and SDC Global Issue.
Dual	=An indicator variable that equals one if the firm has dual-class shares. Sources: Data Stream, CRSP and National Stock Exchange Documents.
FamilyFirm	=An indicator variable which equals zero if the type of direct ultimate ownership is 'Individual(s) or family(ies)' or 'One or more named individuals'. Source: Osiris.

Industry-level control variables

RD_Intensity	=R&D Intensity computed as the average three-digit SIC level for the period 2000–2013 based on Compustat firms. . R&D intensity is the ratio between R&D expenditures and sales.
ExternalFinance	=External Finance Dependence is the ratio between capital expenditures minus cash flow from operations and capital expenditures.
LernerIndex	=Lerner Index of Competition is based on U.S. firms and is computed as the three-digit industry average of 1 minus profits over sales for the period 2000–2013.

Country-level control variables

BtaxC	=The level of book-tax conformity from Atwood et al. (2012)
WW	=A dummy variable, which takes on the value of one for firms in home countries with a worldwide approach, and the value of zero for firms in home countries with a territorial approach;
TaxEnf	=Managers' perceptions of the strength of tax enforcement in the country, from the 1996 World Competitiveness Report
TaxRate	=The statutory corporate tax rate in the home country (Sources: a KPMG LLP online summary, PricewaterhouseCoopers LLP's online information, and Coopers & Lybrand LLP's worldwide tax summary guides)
VarComp	=The country average of managers' variable pay as a percentage of management compensation (Source: Towers Perrin 2005)
Earnvol	=The scaled descending decile rank of cross-sectional pre-tax earnings volatility by country-year
CommonLaw	=An indicator variable that equals one if the country has a common law origin. (Source: La Porta et al. 1998)
Emerging	=An indicator variable that equals one if the country is classified as an emerging capital market. (Source: MSCI emerging markets fund)
LegalFactor	=Institutional factors (Factor) using the results of a factor analysis of the country's legal tradition (common law versus code law), strength of investor rights, and ownership concentration as developed by La Porta et al. (1998).

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Appendix 2. Measures of country-level tax characteristics from Atwood et al. (2012)

We use the four proxies for country-level tax characteristics from Atwood et al. (2012). *BtaxC* is a proxy for required book-tax conformity. Atwood, Drake and Myers (2010) develop this measure by computing the conditional variance of current tax expense (*CTE*) for a given level of pre-tax book income (*PTBI*) in a given country-year (i.e. Var(*CTE*| *PTBI*)). Countries with a lower conditional variance are assumed to have less flexibility in tax planning activities for a given level of reported pre-tax earnings, thereby requiring higher required book-tax conformity. That is, *CTE* is a proxy for the required level of book-tax conformity in the firm's home country. Specifically, Atwood et al. (2010) measure the conditional variance of current tax expense from the following model, which is estimated by country-year:

$$CTE_t = h_0 + h_1 PTBI_t + h_2 ForPTBI_t + h_3 DIV_t + e_t \tag{4}$$

CTE is current tax expense (Item #23 – Item #25); *PTBI* is pre-tax book income (Item #21); *ForPTBI* is estimated foreign pre-tax book income (foreign tax expense (Item #51)/total tax expense (Item #23) * PTBI); DIV is total dividends (Item #34); and e is the error term. We scale all variables by average total assets (Item #89). *BtaxC* is computed as the ranking of the root mean squared errors (RMSEs) from the equation (4). Countries with higher rankings of RMSEs in a given year have higher required book-tax conformity.

The second control is an indicator variable (*WW*) for firms domiciling in home countries that use a worldwide approach to taxing foreign income as opposed to taking a territorial approach (Attwood et al. 2012). These data are extracted from PricewaterhouseCoopers Corporate Taxes: A Worldwide Summary guides and from the Ernst & Young Worldwide Corporate Tax Guide for years 1990 through 2008. These guides document the percentage of dividends from foreign subsidiaries that are subject to tax. We categorize countries as territorial if they exempt from tax at least 75 percent of foreign subsidiary dividends. The level of tax avoidance is expected to be lower when countries adopt the worldwide approach to taxing foreign income.

TaxEnf is a proxy for perceived tax enforcement. Following Attwood et al. (2012), we use the tax evasion index from the 1996 World Competitiveness Report, which is constructed based on a survey of more than 2,000 business executives per country. Respondents answer their agreement with the statement 'Tax evasion is minimal in your country' on a scale from one through six (where one denotes strongly disagree and six denotes strongly agree). Therefore, higher numbers suggest that tax enforcement is considered to be stronger. Attwood et al. (2012) predicts that the association between tax avoidance and *TaxEnf* will be negative. Finally, the statutory corporate tax rate is included as a significant control variable capturing the impact of tax system characteristics on tax avoidance. As a general rule, the benefits of engaging in tax avoidance are predicted to be greater when the statutory tax rate is higher. Following Attwood et al. (2012), we collect the statutory corporate tax rates (*TaxRate*) from a KPMG LLP online summary, PricewaterhouseCoopers LLP's online information, and Coopers & Lybrand LLP's worldwide tax summary guides.

Appendix 3. Propensity score matching

We use the following logistic regression model to predict the business group affiliation:

$$\begin{aligned} \text{Prob}\left(\text{Group}_{i,t} = 1\right) = \alpha + & \beta_1 \ln(\text{TotalAssets})_{I, t-1} \\ &+ \beta_2 \ln(\text{CashFlow})_{i, t-1} + \beta_3 \text{ROA}_{i, t-1} + \beta_4 \ln(\text{FirmAge})_{i, t-1} \\ &+ \beta_5 \text{RDIntensity}_{i, t-1} + \beta_6 \text{ExternalFinanceDependence}_{i, t-1} \\ &+ \beta_7 \text{LernerIndexofCompetition}_{i, t-1} + \gamma_{\text{Year}} + \eta_{\text{Country}} + \varepsilon \end{aligned} \tag{1a}$$

Prob(Group = 1) is equal to one for a group firm, and zero otherwise; *ln(Total Assets)* is the natural logarithm of a firm's total assets; ln(*Cash Flow*) is the natural logarithm of cash flow from operating activities; *ROA* is net income divided by total assets; ln(Firm *Age*) is the natural logarithm of the number of years since the date of incorporation. *R&D Intensity, External Finance Dependence* and *Lerner Index* are computed as their average values for each of Campbell (1996) industries using Compustat North America firms. *R&D intensity* is the ratio of R&D expenditures to sales. *External Finance Dependence* is capital expenditures less cash flow from operations divided by capital expenditures. *Lerner Index of Competition* is computed as the Campbell (1996) industry average of 1 minus profits over sales estimated. We measure all variables at the year of firms' initial public offering. We estimate Equation (1a) using all firms included in Compustat Global with sufficient data.

Panel A reports the estimation results for Equation (1a). Equation (1a) is a strong predictor of the business group affiliation as reflected in high proportion of concordant pairs (87.1%) and low proportion of discordant pair (12.9%). The results suggest that firms with greater profitability and larger size have a higher probability of affiliation. These findings are generally consistent with the winner-picking view whereby groups identify firms with higher expected profitability. Business groups are more prevalent in industries with higher R&D intensity and external finance dependence. This is consistent with the view that the group structure fosters R&D activity through internal financing (Rajan and Zingales 1998; Belenzon and Berkovitz 2010).

We match each affiliate to the four stand-alones domiciled in the same country whose propensity score distance is closest to that of the affiliate with replacement. Panel B provides the standardized differences in our control variables between group-affiliated and stand-alone firms. The results suggest that the procedure is effective in removing most of the differences between the two samples. However, a few differences, most notably firm size, remain.

Panel A: Logistic regression results on probability of business-group affiliation	
Variable	Coefficient (p-value)
Firm characteristics:	
ln(Total Assets)	0.085***
ln(Cash Flow)	0.003***
ROA	0.000***
ln(Firm Age)	0.013***
Industry characteristics:	
R&D Intensity (R&D/Sales)	6.772***
External Finance Dependence	2.679***
Lerner Index of Competition	2.479***
N	119,694
Pseudo R^2	0.07
Percent concordant	87.1
Percent discordant	12.9
Panel B: Covariate balance – Standardized difference between affiliates and stand-alones	
Variable	Standardized diff.
Dual	0.100
FamilyFirm	0.050
Pre-Tax ROA	−0.047
Size	0.519***
CashSize	−0.108*
R&D	−0.072
Lev	0.092
SalesGrowth	0.007
Multi	−0.085
bTaxC	−0.229**
WW	−0.145*
TaxEnf	−0.159*
TaxRate	−0.134*
VarComp	−0.027
Earnvol	−0.047
LegalFactor	−0.250

Panel A reports coefficient estimates from estimating a logistic model to predict business group affiliation. Panel B reports the standardized differences between group firms and the matched stand-alone firms for covariate balancing. Standardized differences of 0.2, 0.5, and 0.8 correspond to small, medium, and large differences between the treatment sample and the control sample, respectively (Cohen 1988). ***, ** and * indicate significance at the 0.2, 0.5, and 0.8 level, respectively. The dependent variable, Group, is equal to 1 if a firm belongs to a business group, and 0 otherwise. Independent variables include *ln(Total Assets)*, a natural logarithm of a firm's total assets, and *Cash Flow*, cash flow from operating activities. *ROA* is profits over total assets. *Age* is the number of years since the date of incorporation. *R&D Intensity, External Finance Dependence* and *Lerner Index* are computed as the average Campbell (1996) industry level for the period 2000–2013 based on Compustat North America firms. *R&D intensity* is the ratio between R&D expenditures and sales. *External Finance Dependence* is the ratio between capital expenditures minus cash flow from operations and capital expenditures. *Lerner Index of Competition* is computed as the Campbell (1996) industry average of 1 minus profits over sales for the period 2000–2013. All regressions include a complete set of country and year dummies. The sample period spans 2000 to 2013, containing firms affiliated with the business group and stand-alone firms during this period. Only firm-year observations at the IPO year are included in the sample. Robust standard errors are estimated and are clustered at the firm level.