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# Public debt, bank debt, and non-bank private debt in emerging and developed financial markets

## Abstract

Using an effective sample of 3,453 observations selected from the Taiwanese stock exchange, this study documents and attempts to reconcile divergent outcomes from the extant literature on debt structure (public, bank, and non-bank private debt). Sampled firms from this emerging market generally acquire debt from both public and private sources, with a strong preference for bank debt, suggesting, among other things, that bank debt and public debt complement each other rather than acting as substitutes. Four interesting alternative explanations are provided in an attempt to reconcile the contra indicative results that arise when modeling the use of public debt.

## Introduction

Traditionally, the world's financial markets are viewed as either developed or emerging ones. Today, however, this description is better restated as a process of emerging and merging markets. To continue in an orderly process, reconciling the practices and conventions across the growing world financial market is necessary. This paper contributes to this process by analyzing debt structure for publicly traded firms in one of the world's recognized emerging markets and attempts to reconcile differential outcomes with the extant literature.

In the U.S., debt financing has been the predominant source of external funds over the past two decades (Denis and Mihov, 2003). In the last decade, the same is true in the emerging market of Taiwan with roughly 60% of needed funds being raised by way of external debt based on estimates from the Central Bank of Taiwan. About 40% of this corporate debt is raised from financial institutions (namely, commercial banks), suggesting the Taiwanese financial system is significantly bank-based. Additionally, the openness of the market over the past decade has allowed a number of Taiwanese firms to readily issue bonds. Thus, most Taiwanese, as well as U.S., firms face a mixture of debt sources.

In both markets, the use of bank debt as opposed to public debt is casually perceived as an issue of firms being at opposite ends of the reputation-credit quality spectrum. That is, bank debt is assumed to be more expensive than public debt and hence less desirable because of monitoring and agency costs. However, certain lending practices are significantly different in the two markets. For example, the common employment of convertible debt in the Taiwanese public debt market is almost unheard of in the corresponding U.S. market. Consequently, investigating firms from an emerging market with access to public debt and their subsequent debt structure is an interesting topic.

What drives the makeup of this mixture of public and private debt in developed markets is the subject of much debate in the extant literature. Numerous works attempt to explain corporate preferences in debt mixture. Fama (1985), Berlin and Loeys (1988), Diamond (1991), and Berlin and Mester (1992) provide a representative sample of these works. Generally, these works conclude that banks help mitigate problems stemming from information asymmetries between firms and debt holders. Specifically, firms can use bank monitoring to reduce these asymmetric information related problems, thus increasing optimal leverage and firm value. Additionally, some studies hypothesize that private debt financing has a significant advantage over public debt in terms of monitoring efficiency (e.g., Diamond, 1984; and Boyd and Prescott, 1986), while other stress access to private information and the efficiency of liquidation and renegotiation in financial distress (e.g., Fama, 1985; Chemmanur and Fulghieri, 1994; Gertner and Scharfstein, 1991). Interestingly, however, Rajan (1992) argues private lenders can negatively affect the borrower by extracting rents and distorting management incentives.

Other works including, but not limited to, Smith and Warner (1979), Blackwell and Kidwell (1988), Diamond (1984, 1991), and Berlin and Loeys (1988) argue that the difference between public and private debt is that the former has higher agency costs relative to the latter. In particular, and with regards to monitoring bond issuers, public debt is associated with lower incentives of individual bondholders. Monitoring on the part of numerous bondholders, as is the case with public debt, is also inefficient, since monitoring involves wastage through the duplication of monitoring costs. By contrast, private debt is asso-

ciated with fewer free rider problems and results in an increase in monitoring efficiency.

Arguments exist in favor of the use of public debt. For example, Diamond (1993) argues that excluding short-term private debt may be costly because borrowers become unable to determine whether a loan can be rolled over or whether liquidation may be enforced. On the other hand, using a mixture of both public and private debt allows borrowers to reduce the control exercised by the private lender and thereby avoid costly liquidations. Diamond (1991) and Hoshi, Kashyap, and Scharfstein (1993) suggest that reliance on private lending is related to the credit quality and the reputation of the borrower with high net worth firms tending to rely more on public rather than private debt providers. Of particular note, Blackwell and Kidwell (1988) hypothesize that firms with higher credit-worthiness rely more on public debt than firms with lower credit-worthiness, because of the lower transaction costs associated with public debt which more than offset the higher agency costs.

Houston and James (1996) further examine the determinants of the mix of private and public debt using detailed information on debt structure. Their findings suggest that the relationship between bank borrowing and the importance of growth opportunities depends on the number of banks used by the firm, and on whether or not the firm has public debt outstanding. Specifically, when firms borrow from many different banks, a positive relationship exists between bank debt and growth opportunities. By contrast, when firms borrow from a single bank, the relationship is negative.

The availability of collateral and its use as security also affect debt mixture. Rajan and Winton (1995) indicate a positive correlation between the use of private debt and financial distress. Therefore, banks only require collateral in the bad state of the world; thereby, signaling their asymmetric information to the public. Furthermore, as firms draw nearer to financial distress, the ratio of secured claims increases. Besanko and Thakor (1987) and Boot, Thakor, and Udell (1991), among others, however, suggest that collateral can be viewed as a signal of quality. Obviously, at some point, collateral can be sufficient enough so as to eliminate worries on the part of creditors over financial distress.

All private debt is not the same however. Hooks and Opler (1993) illustrate this point when they note that the vast majority of theoretical models on the choice of debt structure assume that bank and non-bank private debts are equivalent. Johnson (1997) seems to follow this argument and expands the mixture of debt financing to include non-bank private financ-

ing. Johnson finds a difference between bank and non-bank private debts. Specifically, bank debt use is negatively correlated with the market-to-book ratio, and positively correlated with the fixed assets ratio and leverage, while non-bank private debt is positively and statistically significantly correlated with the market-to-book ratio, and negatively correlated with the fixed assets ratio and leverage. The only similarity that Johnson finds is that bank debt and non-bank private debt are both negatively correlated with age. Denis and Mihov (2003) follow from finding firms with the highest credit quality borrow from public sources, while those with medium credit quality borrow from banks, and finally those with the lowest credit quality borrow from non-bank private lenders. Thus, non-bank private debt plays a unique role in accommodating the financing needs of firms with low credit quality.

This study continues in the vein of Hooks and Opler (1993), Johnson (1997), and Denis and Mihov (2003) in that a distinction is made between public, bank, and non-bank private debt in an effort to learn more about the overall debt mixture of publicly traded firms. The remainder of this study is organized as follows: Section 1 describes the data sources, Section 2 discusses modeling specifications, Section 3 presents the empirical results, and the last section provides concluding remarks.

## 1. Sample data

This study empirically examines the choice of public and private debt among Taiwanese companies using a sample of 3,453 observations selected from 579 firms listed on the Taiwanese stock exchange over the period of 1991-2000. Data were obtained from three sources: (i) the *Taiwan Economic Journal* (*TEJ*) – financial statements, (ii) the *TEJ* annual lending database, and (iii) the *Taiwan Security and Exchange Council* (*TSEC*).

In this study, bank debt is defined as firm borrowings from commercial banks, while non-bank private debt is defined as borrowing from insurance, finance, or leasing companies. Finally, public debt includes corporate bonds, commercial paper and bankers' acceptances. Consistent with Johnson (1997), among others, all of the above forms of debt are further reclassified according to whether they are long-term (maturity of three years or more) or short-term (maturity less than three years).

## 2. Empirical methodology

The relationship between debt structure and firm characteristics is examined by way of Tobit regression analysis with limits at zero and unity. Maintaining consistency with many prior works, this work employs the ratio of long-term sources of debt (pub-

lic, bank, and non-bank private) to total debt as its dependent variables. In other words, the tendencies to employ particular debt sources are the primary dependent variables for this study.

With respect to the cited works above, explanatory proxies for firm characteristics are briefly discussed next to provide the reader with a general understanding of the models specifications. A firm's access to debt sources, both public and private, is deemed to increase with reputation. Accordingly, firm age, defined as the number of years since the firm was first incorporated, is specified as a proxy for reputation and should be positively associated with the tendency to employ public debt. Additionally, as in most prior studies, the natural log of the book value of total assets is used as a proxy for firm size and size should favor the use of debt in general.

The fixed assets ratio, including net property, plant, and equipment divided by total assets, is used as a proxy for asset collateral value. Collateral value depends on liquidation value, and so asset collateral value can be regarded as a proxy for project liquidation values. Hence, firms with higher fixed assets ratio are viewed as highly collateralized firms and should positively influence the use of debt irrespective of its source.

Tobin's Q is used when calculating the market to book value ratio as a proxy for firm performance. The literature as a whole generally agrees that firms with higher Tobin's Q (Q>1) have better performance than those with lower Q (Q<1) and that better performance is related to higher quality firms and the use of public debt. Consequently, this measure should be positively related to the tendency to use public debt according to the extant literature.

This investigation uses leverage as a proxy for firm liquidation risk, and firms with different levels of leverage should have different debt source preferences. For example, bank monitoring creates a public good that reduces the cost of issuing public debt. Conversely, lower costs of public debt financing may lead to greater use of leverage. Alternatively, if the recovery of bank debt is prioritized over private debt, and enforced by stricter regulations, higher-leveraged firms may choose to limit bank debt to avoid the risk of liquidation.

The coverage ratio, which is measured by EBIT divided by interest expenses, is another explanatory variable. The generally accepted belief is that financial structure of the firm improves as the coverage ratio increases. Moreover, debt sources vary with the financial structure. Since the monitoring of public debt is inefficient, public debt involves higher agency costs than private debt. Accordingly, firms with lower coverage ratios are expected to use more public debt than private debt in order to reduce monitoring.

This study uses a three-year moving average standard deviation of net income as a proxy for earnings volatility. Since earnings volatility represents a firm's business risk, the quantity of debt that the firm will take on decreases as earnings volatility increases. In addition, a firm's growth opportunity is measured by its sales growth rate. Most works employ the ratio of R&D to sales as a proxy for growth opportunity. However, most of Taiwanese firms do not disclose their expenditure on R&D. Therefore, to avoid too many missing observations from the data analysis, this work employs a firm's sales growth rate as a proxy for growth opportunity. In the absence of bank information monopolies, a positive relationship is expected to exist between growth opportunities and the reliance on bank debt.

The cash dividend payout ratio is used to test if agency problems exist in the different types of debt sources. The retrenchment of bondholders' wealth by firms with higher dividend payout ratios is well accepted in the literature. Accordingly, the correlation coefficient increases with agency problems between stockholders and bondholders. Additionally, well accepted is the tendency for profitable firms to exhibit higher returns on equity calling for return on equity as a control variable, which should sign positive and significant in the employment of debt.

Strictly for control purposes, three dummy variables are used to indicate firm involvement with different types of banks: government owned banks (51% or more of the stock ownership of a bank is government-owned), banks established since 1989 (i.e., established since the most recent banking reform laws), and foreign owned banks involved in lending. Also, in Taiwan, banks often act in concert with one another by forming banking syndicates to diversify the risk of large loans. Accordingly, the presence of a lending syndicate is controlled by way of a dummy variable. Finally, collateral is also represented by a dummy variable and should sign the same as fixed asset ratio discussed above.

## 3. Empirical results

**3.1. A brief review of expected findings per the extant literature.** By way of a general review of the extant literature on debt structure and for the purpose of a quick comparison for this section, empirical results should indicate that older and highly leveraged firms will favor public debt over private debt. Larger firms will have a tendency to increase their use of debt across all types as there will be the availability of collateral. More profitable firms will

show a tendency to use public debt, and public debt and private debt will generally serve as substitutes for one another.

**3.2. Summary statistics.** Tables 1 and 2 provide summary statistics for the study. Perhaps of greatest interest to this study is the causal relationship between the employment of bank debt and public debt across firms.

Table 1. Descriptive statistics for the cross-sectional debt sources

This table reports on the distribution of the 3,453 observations for the period of 1991-2000 by way of the three different sources of debt.

| | Proportion of debt held publicly | Proportion of debt held by non-bank private lenders | Proportion of debt held by banks |
|---|---|---|---|
| Full sample (N = 3453) | | | |
| Mean | .32 | .08 | .60 |
| Median | .25 | .00 | .64 |
| Interquartile range | .53 | .56 | .56 |
| Firms with some public debt (N = 2581, 75%) | | | |
| Mean | .43 | .07 | .50 |
| Median | .38 | .00 | .53 |
| Interquartile range | .44 | .06 | .48 |
| Firms with no public debt (N = 872, 25%) | | | |
| Mean | | .11 | .89 |
| Median | | .00 | 1.00 |
| Interquartile range | | .01 | .01 |
| Firms with some bank debt (N = 3161, 92%) | | | |
| Mean | .29 | .06 | .65 |
| Median | .22 | .00 | .69 |
| Interquartile range | .48 | .05 | .50 |
| Firms with no bank debt (N = 292, 8%) | | | |
| Mean | .74 | .25 | |
| Median | 1. 00 | .00 | |
| Interquartile range | .56 | .55 | |
| Firms with some non-bank private debt (N = 1425, 41%) | | | |
| Mean | .29 | .19 | .51 |
| Median | .25 | .08 | .54 |
| Interquartile range | .39 | .21 | .46 |
| Firms with no non-bank private debt (N = 2028, 59% | | | |
| Mean | .33 | | .66 |
| Median | .23 | | .76 |
| Interquartile range | .60 | | .60 |

The mean and standard deviation values for the firm characteristics of sample firms classified according to predominating debt source are formally reported in Table 2. In this table, BDR is bank debt ratio which equals long-term bank debt divided by total long-term debt. PDR is public debt ratio which equals long-term public debt divided by total long-term debt. NBPDR is non-bank private debt ratio which equals long-term non-bank private debt divided by total long-term debt. AGE is the number of years since the firm's first incorporation. LOGTA is the natural log of the firm's total assets. FATA is the fixed assets ratio, which is net property, plant and equipment divided by total assets. LR is leverage in terms of total liabilities divided by total assets. COVER is the coverage ratio which equals the ratio of EBIT to interest paid. TOBINQ is the market-to-book ratio (i.e., book value of total assets minus the book value of equity plus the market value of equity to the book value of total assets). SALEGR is the sales growth rate for each year. NISD is earnings volatility, which is the standard deviation of net income during three-year intervals. DIVC is the cash dividend payout. ROEA is the return on equity ratio. BPD is a dummy variable for a bank that is majority owned by the government. BAD is a dummy variable for an old bank (i.e., that was established before the Banking Law modification of 1989). BFD is a dummy variable for foreign banks. COLLAT is a dummy variable for the requirement of heavily collateralized loans. Finally, SYND is a dummy variable for syndicated loans.

More to the point, Diamond (1991) argues that the reputation of firms with access to public debt substitutes for bank monitoring. However, if firms use bank debt to monitor benefits and if reputation is a perfect substitute for monitoring, then firms accessing public debt markets should not require bank debt. A casual examination of Table 1 reveals that bank debt of firms using public debt is as high as 50%. Also, combining the total numbers of firms using different debt sources reveals that approximately 75% of firms borrow simultaneously from at least two out of the three debt sources. These two observations in tandem suggest that bank debt and public debt complement each other rather than acting as substitutes for one another as in accepted arguments and practices found in developed financial markets.

Table 2. Descriptive statistics for the cross-sectional debt sources

| Variables | Firms predominantly using bank debt | | Firms predominantly using public debt | | Firms predominantly using non-bank private debt | |
|---|---|---|---|---|---|---|
| | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
| Debt structure: | | | | | | |
| BDR | 0.81 | 0.17 | 0.22 | 0.17 | 0.09 | 0.13 |
| PDR | 0.16 | 0.16 | 0.74 | 0.18 | 0.12 | 0.14 |
| NBPDR | 0.03 | 0.07 | 0.04 | 0.08 | 0.74 | 0.20 |
| Firms characteristics: | | | | | | |
| AGE | 20.90 | 11.16 | 24.51 | 9.99 | 19.88 | 12.67 |
| LOGTA | 6.68 | 0.46 | 6.88 | 0.47 | 6.74 | 0.53 |
| FATA | 0.38 | 0.19 | 0.29 | 0.18 | 0.31 | 0.20 |
| LR | 0.33 | 0.24 | 0.33 | 0.19 | 0.37 | 0.27 |
| COVER | 40.54 | 581.42 | 136.60 | 3457.99 | 25.37 | 120.11 |
| TOBINQ | 1.48 | 0.96 | 1.29 | 0.83 | 1.42 | 1.25 |
| SALEGR | 26.72 | 194.46 | 30.92 | 269.36 | 13.55 | 47.54 |
| NISD | 206,580 | 598,169 | 247,739 | 552,291 | 307,200 | 625,013 |
| DIVC | 0.70 | 0.37 | 1.83 | 0.97 | 0.84 | 0.30 |
| ROEA | 1.04 | 9.37 | 1.64 | 6.31 | -0.13 | 12.28 |
| BPD | 0.98 | 0.13 | 0.75 | 0.44 | 0.57 | 0.50 |
| BAD | 0.88 | 0.32 | 0.62 | 0.48 | 0.43 | 0.50 |
| BFD | 0.44 | 0.50 | 0.41 | 0.49 | 0.07 | 0.25 |
| COLLAT | 0.91 | 0.29 | 0.69 | 0.46 | 0.65 | 0.48 |
| SYND | 0.06 | 0.24 | 0.03 | 0.17 | 0.03 | 0.17 |

Table 2 reclassifies the sample into three groups based on the predominant debt source applied, and lists statistics on firm characteristics for each group. All three groups have high ratio of debts secured by collateral; the secured debt ratios are 0.91, 0.75 and 0.57 for firms that predominantly use bank, public and non-bank private debts, respectively. These findings suggest that most of the market for debt in Taiwan depends on collateral-security as opposed to credit-security that is typically favored in developed markets.

Table 3. Univariate comparisons between different types of debts

| | P values for equality across categories | Differences between bank vs. public [a]- [b] | | Differences between bank vs. non-bank private [a]- [c] | | Differences between public vs. non-bank private [b]- [c] | |
|---|---|---|---|---|---|---|---|
| | | Mean | P values | Mean | P values | Mean | P values |
| Debt structure: | | | | | | | |
| BDR | 0.000 | 0.550*** | 0.000 | 0.660*** | 0.000 | 0.108*** | 0.000 |
| PDR | 0.000 | -0.580*** | 0.000 | 0.030** | 0.007 | 0.612*** | 0.000 |
| NBPDR | 0.007 | -0.017** | 0.029 | -0.140*** | 0.000 | -0.123*** | 0.000 |
| Firms characteristics: | | | | | | | |
| AGE | 0.000 | -3.620*** | 0.005 | -5.280*** | 0.005 | -4.070** | 0.049 |
| LOGTA | 0.000 | -1.450*** | 0.000 | 0.030 | 0.930 | 0.179** | 0.018 |
| FATA | 0.000 | 0.109*** | 0.000 | 0.074*** | 0.007 | -0.340 | 0.435 |
| LR | 0.051 | -0.013 | 0.651 | -0.040 | 0.440 | -0.028 | 0.736 |
| COVER | 0.405 | -235.74 | 0.707 | 11.67 | 0.926 | 247.41 | 0.675 |
| TOBINQ | 0.000 | 0.310*** | 0.000 | 0.008 | 1.000 | -0.297 | 0.282 |
| SALEGR | 0.597 | -7.811 | 0.968 | 14.655 | 0.472 | 22.465 | 0.481 |
| NISD | 0.072 | -35,204 | 0.700 | -74,119 | 0.748 | -38,914 | 0.957 |
| DIVC | 0.000 | -1.340* | 0.090 | -0.840 | 0.411 | 0.501 | 0.902 |
| ROEA | 0.023 | -0.660 | 0.134 | 0.387 | 0.982 | 1.047 | 0.74 |
| BPD | 0.000 | 0.190*** | 0.000 | 0.320*** | 0.000 | 0.130* | 0.087 |
| BAD | 0.000 | 0.210*** | 0.000 | 0.410*** | 0.000 | 0.210*** | 0.003 |
| BFD | 0.000 | 0.140*** | 0.000 | 0.500*** | 0.000 | 0.36*** | 0.000 |
| COLLAT | 0.000 | 0.140 | 0.000 | 0.120 | 0.064 | -0.020 | 0.967 |
| SYND | 0.004 | -0.012*** | 0.000 | -0.024** | 0.043 | -0.011 | 0.982 |

Note: This table reports the results of t-tests for differences in characteristics of firms classified according to predominating debt source. All variables are as originally defined in Table 2. ***, ** and * indicate that the coefficient is significantly different from zero at the 0.01, 0.05 and 0.1 levels, respectively.

**3.3. Univariate results.** Table 3 reports the results of the comparisons across the three different types of borrowers. Generally speaking, firms predominantly using public, bank, and non-bank private debt show significant differences in characteristics in terms of age, size, bank debt and public debt ratios, firms borrowing from public, old, and foreign banks, fixed assets ratio, and Tobin's Q. However, no significant differences exist in collateral, leverage and coverage ratios, sales growth rate, earnings volatility, cash dividend payout, and return on equity among the three types.Of particular interest in Table 3 and consistent with the extant literature concerning debt choice based on information asymmetry, public borrowers are significantly older (reputable) and larger than bank and non-bank private borrowers with less information asymmetry. However, the results in Table 3 are inconsistent with the argument that more profitable firms (higher Tobin's Q) will show a greater tendency to use public debt. In fact, the results are contra indicative. Additionally, predominant bank borrowers show the highest collateral-secured ratios as expected. Reported results are also consistent with accepted arguments concerning information asymmetry, which indicate that bank and non-bank borrowers have significantly higher proportion of fixed-assets ratio than do public issuers.

The combined results from Tables 1, 2, and 3 are casually suggestive of a systematic divergence from the findings in the extant literature. However, these results are in the form of summary statistics or are from isolated t-test and do not consider the presence of other variables. Therefore, in order to further highlight the juxtaposition between emerging and developed markets, the next sub-section reports the formal results of three Tobit regressions, modeling the tendency to employ public, bank, and non-bank private debts, respectively.

**3.4. Empirical determinants of public, bank and non-bank private debt.** Long-term debt ratios (long-term public debt to total long-term debt, long-term bank debt to long-term total debt, and long-term non-bank private debt to long-term total debt) are applied as the respective dependent variables in order to highlight the tendency to employ the varying sources of debt.

Model 1 reports the Tobit regression results for the relationship between the tendency to employ public debt and traditionally specified firm characteristics. Models 2 and 3 report the tendency to use bank and non-bank private debt, respectively. For quick reference, abbreviated variable definitions are found in Table 2.

From Model 1, the tendency for a firm to employ public debt is positively influenced by its size and negatively influenced by its age, fixed asset ratio, use of leverage, coverage ratio, Tobin's Q, use of syndicated bank loans and availability of collateral. These results are mostly unexpected. In fact, with exception for increasing firm size, all the remaining results are either insignificant or most troublingly display contra indicative signs.

From Model 2, the tendency for a firm to employ bank debt is positively related to its size, fixed asset ratio, anticipated future performance, dividend coverage ratio, return on equity, banking relationships, and availability of capital, while firm age and volatility in earning reduce the use of bank debt. These results are highly correlated and consistent with predictions from the extant literature.

From Model 3, little is gained with only affiliation with foreign banks negatively influencing the tendency to employ non-bank private debt. These results are not consistent with the finding from Johnson (1997) and as a whole suggest work remains to be done on unearthing the drivers for firm use of non-bank private debt in emerging markets. This model is not for naught, however, in that its estimation serves to isolate this source of debt from a firm's tendency to employ public and bank debt, thereby reducing random variability that would otherwise arise, perhaps spuriously, in Models 1 and 2.

So, a firm's tendency to employ bank debt in emerging markets appears to be in line with the extant literature with a firm's size, indicators of future growth, and ability to repay debt all increasing the use of bank debt. However, the use of public debt is highly inconsistent with previous findings with a firm's ability to repay the debt and future expected performance being contra indicative. Taken together, these findings suggest an underlying fundamental difference in the purpose and function of public debt markets between emerging and developed markets. The source of this anomaly is not apparently clear from this analysis, but several pieces of casual evidence are present indicating possible causation for this divergence. This evidence is discussed in the next sub-section of this work.

Table 4. Tobit analysis

|  | Model 1: Tendency to employ public debt | Model 2: Tendency to employ bank debt | Model 3: Tendency to employ non-bank private debt |
|---|---|---|---|
| Constant | -10.59 | -0.96 | -12.78 |
|  | (7.50)*** | (6.79)*** | (1.56) |
| AGE | -0.02 | -0.01 | -0.020 |
|  | (2.96)*** | (3.50)*** | (0.60) |
| LOGTA | 1.76 | 0.06 | 1.24 |
|  | (8.34)*** | (3.10)*** | (1.08) |
| FATA | -1.82 | 0.68 | 2.54 |
|  | (4.61)*** | (17.51)*** | (1.36) |
| LR | -3.82 | 0.04 | -5.31 |
|  | (6.28)*** | (0.74) | (1.41) |
| COVER | -0.01 | -0.01 | -0.01 |
|  | (1.74)* | (0.76) | (0.20) |
| TOBINQ | -0.53 | 0.04 | -0.23 |
|  | (4.61)*** | (3.22)*** | (0.52) |
| SALEGR | -0.01 | -0.01 | -0.01 |
|  | (1.53) | (0.55) | (1.10) |
| NISD | 0.01 | -0.01 | -0.01 |
|  | (0.33) | (1.79)* | (0.74) |
| DIVC | -0.01 | -0.01 | 0.01 |
|  | (0.56) | (2.14)** | (0.15) |
| ROEA | 0.01 | 0.01 | 0.12 |
|  | (0.26) | (2.71)*** | (1.57) |
| BPD | 0.14 | 0.28 | -0.96 |
|  | (0.53) | (7.10)*** | (0.83) |
| BAD | -0.32 | 0.08 | -1.23 |
|  | (1.59) | (3.26)*** | (1.31) |
| BFD | -0.11 | 0.01 | -2.01 |
|  | (0.80) | (0.25) | (1.72)* |
| COLLAT | -0.68 | 0.19 | 1.25 |
|  | (3.78)*** | (7.80)*** | (1.12) |
| SYND | -0.73 | 0.15 | -10.31 |
|  | (2.47)*** | (5.07)*** | (0.00) |
| Pseudo R2 | 0.16 | 0.38 | 0.16 |
| N | 2410 | 2410 | 2400 |

Note: In this table, the tendency to employ a particular debt sources are the dependent variables, where tendency to employ public debt is defined as long-term public debt divided by total long-term debt, and so on for bank and non-bank private debt. All other variables are as originally defined in Table 2. Absolute values of t-statistics are in parentheses. ***, ** and * indicate that the coefficient is significantly different from zero at the 0.01, 0.05 and 0.1 levels, respectively.

**3.5. Discussion for empirical results.** The Glass-Steagall Act which separated commercial banking from investment banking in the U.S. until 1999 may be the proximate cause for these anomalies (i.e., divergence from the extant literature). Due to this legislation, commercial banks in the U.S. could not readily participate in the issuance of debt; however, investment banking was (and is) centrally focused on this market as its primary source of business with many viewing the role and function of the public

debt market in the U.S. as a direct result of this legislation. Since most of the extant literature on the role of public debt is conducted from a U.S. standpoint, the role of public debt in developed markets as outlined in the literature could well be in actuality the role of public debt in the presence of Glass-Steagall. Said another way, when considering the role of public debt, the use of the U.S. market as a benchmark may be problematic. European and other developed public debt markets may better serve as a baseline of comparison as they are not influenced by Glass-Steagall or other similar bits of legislation.

Another explanation could arise from the lack of depth in the Taiwanese debt market, where depth is defined in terms of scope rather than scale. In this instance, debt markets may have to serve multiple roles which are typically performed by specialized segments in developed debt markets such as the junk bond market in the U.S. Therefore, the divergence from the extant literature for emerging public debt markets could easily be a result of the lack of scope in this market place with many specialized functions being performed by generalist.

Another rationale for these inconsistent findings is witnessed by the overly abundant use of convertible debt in the Taiwanese public debt market. Heavy use of convertible debt could be reflective of adverse selection problems typical to emerging markets. However, these debt issues may be functioning as an indirect method of acquiring equity by high risk firms. This backdoor, high risk equity argument is offered in Stein (1992) and seems to have some level of support in the empirical results. For example and referring to Model 1, if convertible debt is prevalent in the market place and if this debt is really just disguised high risk equity, then the negative coefficients associated with variables such as the fixed asset ratio and the availability of collateral as well as the insignificant coefficients associated with variables that are typically reflective of a firm's ability to repay debt are more easily explained.

Reasoning put forth by Hackbarth, Hennessy, and Leland (2007) provides a final alternative explanation for the atypical results reported in the public debt model. The authors show that flexible bank debt in terms of a bank's ability to negotiate outside of formal bankruptcy helps produce an optimal mixture of public and bank debt. Furthermore, in markets where bankruptcy is strictly enforced, as in Taiwan, high debt capacity develops among firms and bank debt is preferred to public debt. This story is consistent with the Taiwanese business environment and readily explains the contra indicative results in Model 1 as well as the results for Model 2. More specifically, under these circumstances banks are the primary lenders, while the public debt mar-

ket acts as a lender of last resort. Firms with the greatest capacity to take on debt (significant size, collateral, and ability to repay debt) secure bank debt, while others default to the public debt market.

This last explanation is most appealing and seems likely; however, results are inconclusive at this point. Regardless, the exact function of emerging public debt markets is beyond the scope of this work and therefore subject to future research leaving the identification of these anomalies in emerging public debt markets and possible explanations as this work's contribution to the literature.

## Conclusion

All research is at best fallible, with each individual work hoping to add a grain of insight as part of the normal paradigm building process. This work is no exception to this process in that anomalies are identified within the extant literature concerning public debt and the work provides alternative explanations for these anomalies as its contribution to the body of knowledge.

Specifically, this work identifies inconsistencies in the extant literature in its attempt to explain the debt structure of publicly traded firms from emerging markets. While the tendency to employ bank debt in these markets is well explained, the reasoning behind the use of public debt in emerging markets remains perplexing. Possible explanations range from implications brought about by the Glass-Steagall Act to fledgling public debt markets in emerging economies filling multiple roles to backdoor issuance of high risk equity to an optimal debt mixture arising from tradeoffs in bargaining power in private bankruptcy workouts. However, divining the exact explanation for the role and function of public debt markets in emerging markets is beyond the scope of this work and is left for future research.

A final caveat is worth noting. This work uses Taiwan and the U.S. as respective representatives of emerging and developed markets for the purpose of comparison and is subject to their validity as representative proxies.

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