Korea and the World Economy, Vol. 16, No. 3 (December 2015) 491-519

Corporate Financing Choices in South Korea: Trends in the Aggregate Financials in Regards to the Pecking Order Theory*

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Corporate financing patterns can be observed either from firm-level data or aggregate financial data. Although many prior studies use firm-level data, aggregate data also has its own benefits: It shows how the trend of aggregate corporate financing choices in the economy has evolved over time. This paper looks at the aggregate corporate financing patterns over time in South Korea, particularly focusing on changes around crises. Specifically, the paper attempts to reflect the trends in the aggregate financials in South Korea upon the pecking-order theory of corporate financing decisions. In particular, this paper finds that debt issuance exhibits tendency of growing upon economic and financial crises. In addition, there is a clear pattern that net debt issuance follows financing deficit in the aggregate financials. These results in general support the implication of the pecking-order theory of corporate financing decisions.

JEL Classification: G3, G32
Keywords: corporate financing choices, Pecking Order Theory, aggregate financials, debt issues, equity issues

* Received November 9, 2015. Revised November 30, 2015. Accepted December 10, 2015. I would like to thank Yeonho Lee (editor) and two anonymous referees of KWE for their invaluable comments.
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1. INTRODUCTION

Since Bagehot (1873) and Schumpeter (1912), there has been discussion on the role of financial intermediaries and markets in economy. Prima facie, banks offer monitoring and screening functions which otherwise are expensive to be undertaken by a large number of investors. Especially for smaller firms without credit ratings, it may be less costly to apply for bank loans than gaining credit ratings, as banks can help in overcoming information asymmetry problem. Also, while issuing corporate bond in capital markets have benefits arising from economies of scale, bank debt is a useful way of financing for small amounts of funds in addition to its benefit of meeting flexible and unanticipated needs through a line of credit. On the other hand, financings from securities markets may have favorable transaction costs and tax shields compared to bank loans, and can avoid potential problems from bank corruption and failures. According to corporate finance theories, there are several factors that should influence financing choice of firms. This paper looks at the aggregate corporate financing patterns over time in South Korea, particularly in regards to the famous pecking order theory of corporate financing decisions.

These are various factors that affect corporate financing decisions of firms according to the existing corporate finance theories. As different theories consider different factors, this paper does not intent to offer an examination of or claim for particular theories over others, but rather the goal is very modest in that it aims to provide mere explanation as to which extent the evidence of corporate financing choices in Korea are consistent with the pecking order theory in particular. The leading theories of corporate financing choices include the capital structure irrelevance theory, the trade-off theory, the pecking order theory, and agency theories. The capital structure irrelevance theory (Modigliani and Miller, 1958) claims that firm values should not be influenced by corporate financing choices in perfect capital markets. According to the static trade-off theory, companies have optimal leverage ratios that may be determined by the trade-off between

costs and benefits of debt (e.g., Scott, 1976; Modigliani and Miller, 1963; Miller, 1977). Similarly, a dynamic trade-off theory explains corporate leverage in the light of the trade-off between benefits and costs of debt, however, goes further in explaining temporary deviation from and mean reversion to the target leverage (Kane *et al*., 1984; Brennan and Schwartz, 1984). Assuming asymmetric information in the market, firms' capital structure choices can act as signals from insiders to the markets on the fair values of the firms (Myers and Majluf, 1984). In particular, the result by Myers and Majluf (1984) is the famous pecking order of corporate financing choices: In presence of asymmetric information between insiders and outside investors and when firms face new investment opportunities, preference ordering of different types of financing choices depends on the sensitivity of securities' valuations to asymmetric information. Agency theories of capital structure choices allow for cases where managers' incentives might not be aligned with those of shareholders (Jensen and Meckling, 1976).

According to the empirical literature on corporate financing decisions, no single theory can simultaneously explain all stylized facts, since each theory considers different factors. In particular to the cross-sectional studies on capital structure, there exist numerous factors that affect corporate capital structure choices (e.g., Bradley *et al*., 1984; Rajan and Zingales, 1995; Frank and Goyal, 2009). According to the study by Frank and Goyal (2009), there exists a set of six financially significant and empirically robust factors, which are profitability, growth opportunity, firm size, tangibility, median industry leverage, and expected inflation. The existing studies agree on the following relationships between these factors and corporate leverage: leverage is positively related to firm size, median industry leverage, tangibility, and expected inflation, and negatively related to growth opportunity and profitability.[1)] Since each theory considers different

[1)] These empirical findings cannot be simultaneously explained by one theory. For example, the negative relationship between and cross-sectional leverage ratios and profitability is consistent with the implication of the pecking order theory rather than static trade-off theory, i.e., the pecking order theory explains that a higher profitability results in higher retained earnings, which in turn decreases the needs for external debt.

factors, there is no rationale for one theory being better than others. This paper is modest in its attempt that it tries to test the implication of the pecking order theory using aggregate corporate financing data. Among several famous corporate financing theories, i.e., the trade-off theory, the pecking order theory, this paper focuses on the pecking order theory since it allows for presence of asymmetric information when the presence of asymmetric information and importance of it is widely documented in the literature (i.e., Errunza *et al*., 2013; Errunza and Ta, 2015). Also, the pecking order theory is easily testable using aggregate corporate financials. Moreover, some recent studies have shown that the pecking order theory generally explains corporate financing choices better when the implications of static trade-off theory and the implications of the pecking order theory disagree (e.g., Jong *et al*., 2011).[2)] In particular, this paper tests whether debt issuance exhibits tendency of growing upon economic and financial crises and whether there is a pattern that net debt issuance follows financing deficit in the aggregate financials.

Corporate financing patterns can be observed either from firm-level data or aggregate financial data. Although many prior studies use firm-level data, aggregate data also has its own benefits: It shows how the trend of aggregate corporate financing choices in the economy has evolved over time, and it allows us to understand any differences in sources of finance between public versus private firms and by firm size. This paper looks at the aggregate corporate financing patterns over time in South Korea, particularly focusing on changes around crises. Specifically, the paper attempts to reflect the trends in the aggregate financials in South Korea upon the famous Pecking Order Theory of corporate financing decisions. In particular, this paper finds that debt issuance exhibits tendency of growing upon economic and financial crises. In addition, there is a clear pattern that net debt issuance follows financing deficit in the aggregate financials. These results in general support the implication of the pecking-order theory of corporate

[2)] Prior studies referenced in this paper can be found in JSTOR using the keywords such as Corporate Financing Choices, Pecking Order Theory, Aggregate Financials, Debt Issues, and Equity Issues.

financing decisions.

As a last minor note, when I disaggregate the data by company size and type, smaller and private firms tend to use bank loans as it may be less costly and difficult to apply for bank loans than gaining credit ratings. When it is difficult for outsiders to have correct estimation of future prospect of the firm, and banks can offer monitoring and screening functions which otherwise are expensive to be undertaken by a large number of investors. Also, while issuing corporate bond in capital markets have benefits arising from economies of scale, bank debt is a useful way of financing for small amounts of funds in addition to its benefit of meeting flexible and unanticipated needs through a line of credit. On the other hand, financings from securities markets may have favorable transaction costs and tax shields compared to bank loans and can avoid potential problems from bank corruption and failures, therefore it might be worthwhile to consider breeding corporate bond markets for mid-to-high risk firms.

2. DATA, METHODOLOGY, AND PREDICTION

The goal of this paper is very modest in that it attempts to understand how the trend of corporate financials in the economy has evolved over time in Korea using aggregate financial data rather than firm-level data which many other studies commonly use. Specifically, the paper attempts to reflect the trends in the aggregate financials in South Korea upon the famous Pecking Order Theory. The aggregate corporate financial data is collected from Bank of Korea and Financial Supervisory Service. Some variables are calculated using the raw data following prior relevant studies of Shyam-Sunder and Myers (1999) and Frank and Goyal (2009). All other data are as provided by Bank of Korea and Financial Supervisory Service. The sources of data and details of calculations are summarized in Appendix. Also, as this paper looks at the aggregate financials instead of firm-level data, this research does not involve detailed statistical analyses. Please refer to

prior studies such as Frank and Goyal (2009) for detailed firm-level panel analyses of determinants of corporate financing decisions.

As to predictions, this paper does not offer specific predictions regarding the trends of aggregate financials. However, the paper attempts to reflect the trends in the aggregate financials in South Korea upon the famous Pecking Order Theory, which says when asymmetric information is present firms prefer debt to equity when accessing external finance. And this theory implies that financing deficit drives debt issuance. Therefore, I attempt to empirically confirm this prediction using the financing deficit data and corporate financing data of non-financial firms in Korea. Also, please note that for the scope of this paper, I do not present detailed theoretical discussions on this prediction; please refer to the study by Myers and Majluf (1984) for theoretical discussion and the study by Shyam-Sunder and Myers (1999) for detailed discussion of the empirical implications of the pecking order theory. In the following section, let me first discuss the overall pictures of the trends in corporate bond and equity issuance in Korea over the past decades, then proceed to testing the implication of the pecking order theory.

3. TRENDS IN THE AGGREGATE FINANCIALS

3.1. Overview of Assets, Liabilities, and Profitability

The benefit of looking at the aggregate data rather than firm-level data is that aggregate data presents how the trend of corporate financials in the economy has evolved over time, and it allows us to understand any differences in sources of finance between public versus private firms and by firm size. This section presents and compares the aggregate financials of Korea and the U.S.

Table 1, 3, and figure 1 present aggregate financials of Korea and the U.S. In terms of asset structure, particularly the proportion of assets in tangible

Table 1 Aggregate Financials – Korea

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010+
Cost of Sales, Selling & Admin. Expenses/Sales		0.93	0.92	0.94	0.93	0.93	0.82	0.89	0.93	0.93	0.94	0.95	0.95	0.95	0.95	0.95
Interest Coverage Ratio	7.42	5.69	1.15	0.64	0.71	1.41	1.46	2.63	3.51	4.83	4.60	4.14	4.05	3.31	2.41	2.83
Financing Deficit/Total Assets	–0.06	–0.06	–0.02	0.02	0.03	–0.04	0.04	0.00	–0.01	–0.05	–0.02	–0.03	–0.02	–0.03	0.01	–0.02
Net Debt Issuance/Total Assets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Liabilities/Total Assets	0.74	0.75	0.79	0.75	0.70	0.53	0.50	0.45	0.43	0.53	0.53	0.51	0.52	0.56	0.61	0.60
Tangible Assets/Total Assets	0.39	0.40	0.37	0.41	0.43	0.45	0.44	0.41	0.40	0.41	0.38	0.37	0.35	0.34	0.35	0.34
Net Income/Total Assets	0.02	0.01	–0.01	–0.03	–0.02	–0.01	0.00	0.04	0.03	0.06	0.06	0.05	0.05	0.02	0.03	0.03
Operating Income/Total Assets	0.07	0.05	0.05	0.04	0.04	0.05	0.04	0.05	0.05	0.08	0.07	0.06	0.06	0.05	0.04	0.04
Net Income/Total Equity	0.08	0.02	–0.04	–0.11	–0.05	–0.01	0.01	0.07	0.05	0.13	0.12	0.10	0.10	0.05	0.07	0.07
Operating Income/Total Equity	0.25	0.20	0.25	0.16	0.12	0.10	0.08	0.09	0.09	0.16	0.14	0.12	0.12	0.12	0.10	0.11

Notes: Key aggregate financial statement data in % of total assets, total equity, or sales, for all non-financial firms in Korea. Cost of Sales, Selling & Administrative expenses/Sales is for all industry for 2004 and onwards, and for manufacturing firms for 1996-2003, due to limitation on data availability; Interest Coverage Ratio = operating Income divided by interest expenses; Financing Deficit = investments plus changes in working capital plus dividends less internal cash flow; Net Debt Issuance = debt issuance net of any redemption.

Source: Bank of Korea, Author's Calculation.

Table 2 Change in Industry Composition – Korea

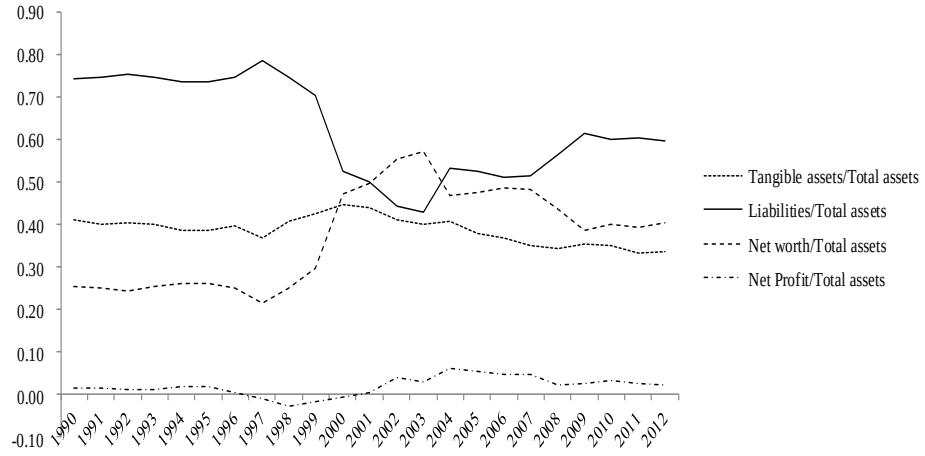
	1990	2012	Tangible Assets/ Total Assets (2012)	Debt/ Total Assets (2012)	Short-term Borrowings/ Total Assets (2012)
Industry Composition, Top 3 Industries by Total Assets (KRW bln)					
Total Assets - All industry	275,822	3,720,433	33.7%	59.6%	9.7%
Total Assets - Manufacturing	161,714	1,740,633	36.7%	45.5%	9.4%
Total Assets - Wholesale & Retail Trade	28,446	388,179	23.2%	44.8%	7.2%
Total Assets - Construction	39,297	292,759	12.7%	85.3%	17.1%
Industry Composition (in percent)					
Manufacturing Total Assets/ All industry Total Assets	58.6%	46.8%			
Wholesale & retail trade Total Assets/All industry Total Assets	10.3%	10.4%			
Construction Total Assets/ All industry Total Assets	14.2%	7.9%			

Notes: Total assets, Tangible/Total assets for top three industries (by the 2012 year-end total assets) and the changes in industry composition in Korea.
Source: Bank of Korea.

assets vs. financial assets, firms in the U.S. tend to maintain more assets in financial assets compared to firms in Korea, although the difference is not large. The trend, however, is similar in that the proportions of financial assets in total assets are increasing over time in both countries. Possible explanations for such a trend may be increased proportion of service firms, introduction of different types of financial assets, decrease in real estate prices, and/or increased needs for asset classes liquidable upon financial difficulty, i.e., in the lieu of repeated financial and economic crises.

Table 2 presents the change in industry compositions over the past decades. The top three industries, by the 2012 year-end total assets, are manufacturing, wholesale and retail trade, and construction. Although the top three industries were the same in the year 1990 as well, please notice that the shares of manufacturing and construction industries have declined over the past decades. Also, such a change in industry composition attests, at

Figure 1 Aggregate Financials – Korea



Note: Aggregate financial statement data of all non-financial firms in Korea, in % of total assets.
Source: Bank of Korea.

least in part, to changes in average tangibility and corporate financing choices of firms in Korea. For example, the construction industry tends to have more tangible assets and higher leverages including short-term borrowings compared to other industries. Therefore, the change in industry composition could have contributed to the change in the overall average trends of corporate financing choices as well as tangibility.

In terms of liabilities as a ratio of total assets, firms in Korea used to have huge liabilities before the 1997 economic crisis attributable to the policy-driven lending practices while lacking appropriate risk management in place. Then post crisis, liabilities have adjusted to a lower level through restructuring efforts. However, still the figures are above those of the U.S. Although not presented here in aggregate financials, it is important to note that the market leverage ratio of non-financial firms in the economy is known to be stationary over time according to many existing empirical corporate finance literature, i.e., firm-level analysis of Lemmon *et al*. (2007), where market leverage ratios are leverage ratios re-evaluated using each firms' mark-to-market valued equity.

Table 3 Aggregate Financials and External Debt Finance Breakdown – U.S.

	1945-1949	1950s	1960s	1970s	1980s	1990s	2000+
Financials							
Total Assets	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Tangible Assets/ Total Assets	0.78	0.77	0.74	0.73	0.68	0.58	0.49
Liabilities/Total Assets	0.26	0.28	0.34	0.37	0.43	0.51	0.53
Net worth/Total Assets	0.74	0.72	0.66	0.63	0.57	0.49	0.47
Profit After Taxes/ Total Assets	0.05	0.03	0.03	0.03	0.02	0.02	0.01
Net Debt Issues/ Total Assets	0.01	0.01	0.02	0.02	0.02	0.01	0.01
Sources of Debt Financing							
Commercial Papers	0.000	0.000	0.000	0.001	0.001	0.001	–0.002
Corporate Bonds	0.007	0.006	0.007	0.008	0.008	0.009	0.011
Municipal Securities	0.000	0.000	0.000	0.001	0.001	0.001	–0.002
Bank Loans	0.004	0.004	0.006	0.005	0.005	0.002	–0.001
Other Loans	0.000	0.001	0.002	0.003	0.004	0.001	0.002
Mortgages	0.002	0.001	0.002	0.004	0.001	0.000	0.002

Notes: Aggregate financial statement data in % of total assets for all non-farm non-financial firms in the U.S., as provided by Frank and Goyal (2008) using the data of Federal Flow of Funds. The data are averaged over years in each category. 2000+ category includes data for year 2000 and 2001 only.
Source: Frank and Goyal (2008).

In terms of profitability, Korean firms suffered largely around the 1997 economic crisis, then recovered in early and mid-2000s. Then their profitability decreased a bit after the global financial crisis in 2008 but is still sustaining a positive figure at the aggregate. The recent figure of the average profitability of Korean firms is higher, although marginally, compared to that of U.S. firms. Also, it is interesting to see that profits of firms in the U.S. have been marginalized at the aggregate over the past several decades as shown in the table 3.[3)]

[3)] Aggregate financials of firms in Korea and firms in the U.S. are presented for different time periods in this paper due to difference in data sources.

3.2. Sources of External Capital

Table 3, 4, and figures 2, 3, 4 present sources of external finance in Korea and in the U.S. As shown in the table 3, the main sources of debt financing for firms in the U.S. in the most recent decade are corporate bonds, however bank loans also have been of quite some use as well till 1980s.

As shown in the table 4, Korean firms use both bank loans and corporate bonds as major sources of financing, although relative preference over the two are largely different by company size. Bank loans exhibit apparent pro-cyclicality with strong tendency of protracting after economic and financial crises, i.e., from 13% in 1997 to 1% in 1998 after the 1997 economic crisis, and from 46% in 2008 to 7% in 2009 after the global financial crisis in 2007-2008, as ratios of total external finance. Corporate bond issues have tendency of growing during economic and financial crises, i.e., from 23% in 1997 economic crisis to 164% in 1998, and from 11% in 2008 to 46% in 2009 after the global financial crisis in 2007-2008, as ratios of total external finance. Equity issues also tend to grow in crises, however with a more prolonged effect, i.e., from 10% in 1997 to 53% in 1998, then to 83% in 1999, after the 1997 economic crisis, and from 12% in 2008 to 22% in 2009, then to 25% in 2010 after the global financial crisis in 2007-2008, as ratios of total external finance. The increases seem to be due to increased financing deficits of corporations and their needs to finance. Refer to table 7 for financial deficits of Korean firms over time. Moreover, it is interesting to observe that use of foreign borrowing has peaked from the 1998 economic crisis, and then has been again increasing over the period of 2010 to 2012. Furthermore, as shown from figure 2, direct finance and indirect finance seem to have worked as substitutes although not perfect substitutes.

As shown from figure 2 and 3, direct finance has been the main source of external finance for public non-financial firms in Korea, i.e., 89% of external finance by public non-financial firms in 2012 comes from direct finance, however with the increasing proportion of corporate bonds. Such increased use of corporate bonds is more apparent for public firms, i.e., corporate bonds

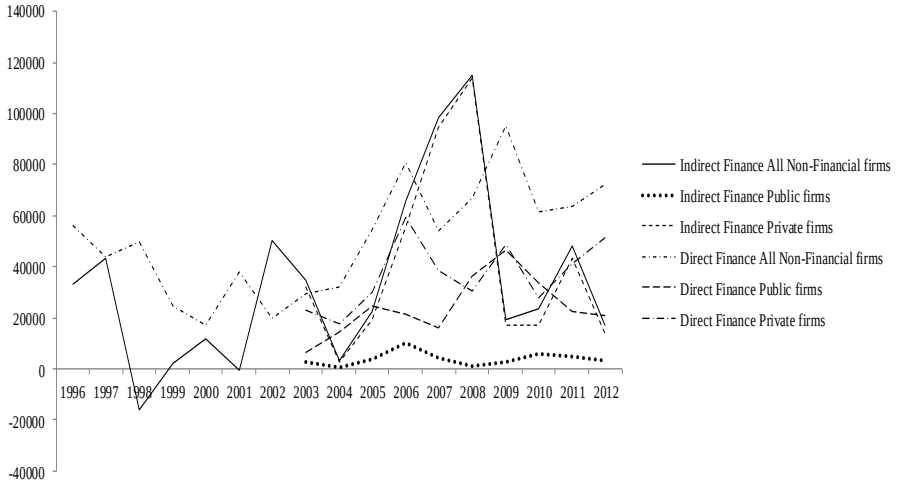
Table 4 External Finance Breakdown – Korea

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
External Finance (KRW bln)	118,490.5	118,044.7	28,017.5	52,994.8	65,759.1	50,645.0	83,317.9	85,454.6	65,235.4	107,565.1	182,034.9	184,321.7	230,372.8	152,302.4	117,124.1	151,282.7	127,901.3
Government Bonds	0%	0%	2%	0%	–2%	–1%	–1%	0%	0%	1%	0%	0%	0%	1%	1%	0%	0%
Commercial Paper	18%	4%	–42%	–30%	–7%	9%	–5%	–3%	–3%	3%	8%	13%	6%	–6%	2%	5%	17%
Corporate Bonds	18%	23%	164%	–5%	–3%	23%	–9%	–1%	3%	12%	14%	–3%	11%	46%	24%	19%	25%
Equity	12%	10%	53%	83%	39%	44%	39%	38%	50%	35%	21%	18%	12%	22%	25%	18%	14%
Commercial Banks	14%	13%	1%	29%	35%	6%	49%	48%	23%	19%	33%	50%	46%	7%	4%	22%	–1%
Insurance Firms	3%	2%	–20%	0%	3%	–3%	1%	1%	1%	1%	1%	1%	2%	0%	2%	1%	3%
Merchant Banks	0%	2%	–22%	–3%	–6%	–2%	–1%	–7%	–6%	2%	2%	3%	1%	–1%	1%	2%	3%
Other Non-bank FIs	12%	20%	–15%	–23%	–15%	–2%	11%	–2%	–13%	–1%	0%	–1%	0%	6%	13%	6%	8%
Borrowing from Abroad	10%	6%	–34%	24%	26%	1%	3%	6%	13%	5%	3%	3%	4%	4%	4%	10%	12%
Borrowing from Gov’t	0%	1%	6%	4%	7%	1%	1%	–1%	6%	–1%	0%	–1%	1%	1%	2%	–1%	1%
Inter-firm Borrowing	7%	11%	–27%	10%	6%	6%	5%	14%	22%	19%	6%	3%	6%	16%	21%	2%	7%
Others	8%	8%	35%	11%	17%	18%	7%	6%	4%	5%	10%	11%	10%	4%	1%	15%	11%

Notes: For all non-financial firms in Korea, total of public and private firms. Flow data of sources of financings for all non-financial firms in Korea. The units are in % of external finance, unless stated otherwise. Separate breakdowns of external finance by public vs. private firms are only available from 2003 from Bank of Korea. A sub-category may be larger than a higher ranked- category in case any of the other sub-categories has a negative figure due to repayment being larger than issuance.

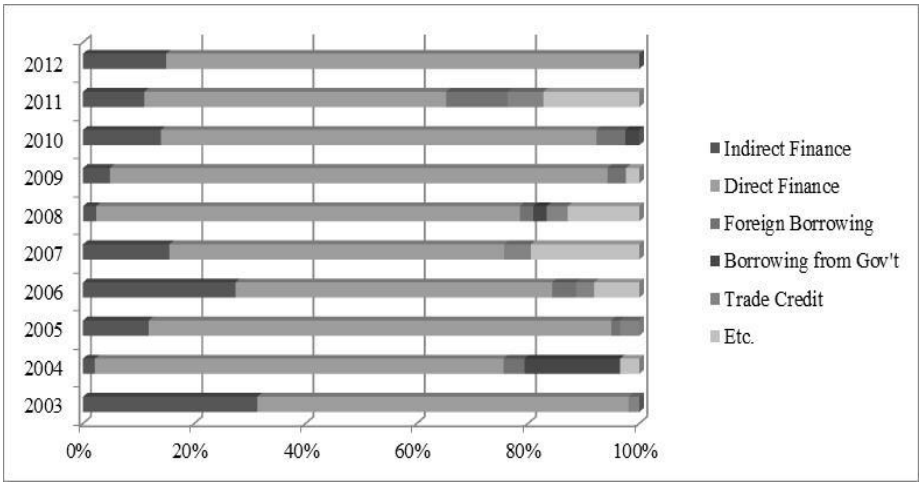
Source: Bank of Korea.

Figure 2 Indirect vs. Direct Finance – Korea



Note: Flow data of sources of financings for all non-financial firms in Korea, in KRW billion.
Source: Bank of Korea.

Figure 3 External Finance Breakdown of Public Non-financial Firms in Korea



Note: Flow data of sources of financing by all public non-financial firms in Korea presented in % out of external finance total.
Source: Bank of Korea.

account for 57% of total external finance by public firms, whereas corporate bonds account for 17% of total external finance by private firms in 2012. Also, as shown in the table 5, the increased uses of corporate bonds are largely driven by the increasing issues of corporate bond by large firms rather than SMEs, i.e., the ten-year growth rate for the period of 2004-2013 is 191% for corporate bonds issued by large firms and –70% for corporate bonds issued by SMEs.[4] The reasons for such differences in use of corporate bonds by firm size and public vs. private are as follow. In case of large issues, the risk is shared by a large number of bond investors; therefore, bonds can have favorable terms of financing compared to bank loans. Therefore, for public firms with credit ratings, corporate bonds should be favorable source of financing over bank loans.

In contrast, for smaller and private firms without credit ratings, it is may be less costly and difficult to apply for bank loans than gaining credit ratings. When it is difficult for outsiders to have correct estimation of future prospect of the firm, and banks can offer monitoring and screening functions which otherwise are expensive to be undertaken by a large number of investors. Also, while issuing corporate bond in capital markets have benefits arising from economies of scale, bank debt is a useful way of financing for small amounts of funds in addition to its benefit of meeting flexible and unanticipated needs through a line of credit. On the other hand, financings from securities markets may have favorable transaction costs and tax shields compared to bank loans, and can avoid potential problems from bank corruption and failures. Figure 4 shows external finance breakdown of private non-financial firms in Korea. Indirect finance, i.e., bank loans, is much more important source of financing for private firms than it is for public firms.[5]

Upon economic and financial crises, indirect finance drops sharply, whereas

[4] To be exact, the analysis must be done for issues net of any redemption. However, corporate bond redemption data is available only as total of those of public and private firms, from Bank of Korea.

[5] As the external finance breakdown by public vs. private is only available from 2003, Observation 3 by public vs. private is difficult to be made due to the limited time period for which data is available.

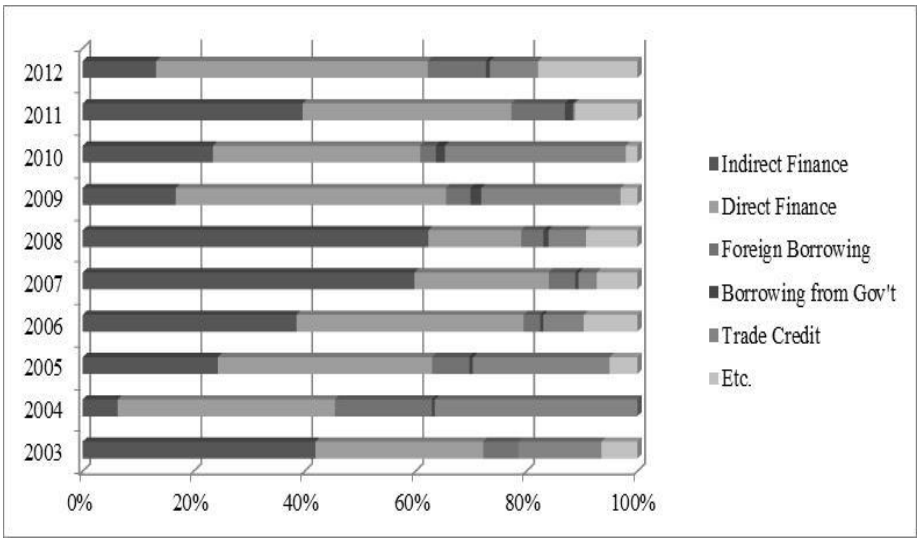
Table 5 Corporate Bond Issuance

Year	Issue										Redemption	Net Issuance	Outstanding (As of Yr-end)
	Large Corporation				Small and Medium Sized Companies								
	KRX Listed Companies		Un-listed Companies	Subtotal	KRX Listed Companies		Un-listed Companies	Subtotal	ABS	Total			
	Stock Market	Kosdaq Market			Stock Market	Kosdaq Market							
1995	17,576.45		3,363.81	20,940.26	573.93		2,084.04	2,657.97		23,598.23	10,335.37	13,262.86	61,024.11
1996	20,201.99		6,321.63	26,523.62	902.59		2,478.71	3,381.29		29,904.91	14,922.48	14,982.43	76,006.54
1997	26,057.58		6,290.45	32,348.03	603.16		1,370.93	1,974.09		34,322.12	20,221.40	14,100.72	90,107.27
1998	43,780.50		11,512.80	55,293.30	443.00		264.00	707.00		56,000.30	23,425.23	32,575.07	122,682.33
1999	18,702.34		6,236.30	24,938.64	685.60		602.50	1,288.10	4,444.70	30,671.44	33,692.11	–3,020.67	119,661.67
2000	13,446.66		3,821.40	17,268.06	195.80		204.59	400.39	40,994.39	58,662.85	44,675.91	13,986.93	133,648.60
2001	31,289.99		14,672.51	45,962.50	201.50		1,412.00	1,613.50	39,618.95	87,194.94	66,443.14	20,751.80	154,400.40
2002	21,261.95		25,115.28	46,377.23	323.82		1,794.57	2,118.38	29,026.37	77,521.98	51,873.88	25,648.10	180,048.50
2003	18,624.70		15,295.80	33,920.50	14.10		149.30	163.40	27,673.60	61,757.50	54,450.10	7,307.40	187,355.90
2004	18,870.20		15,107.10	33,970.30	80.10		138.50	218.60	16,190.20	50,379.00	84,451.80	–34,072.80	153,283.10
2005	19,542.10	1,123.20	10,280.00	30,945.30	20.00	34.90	28.00	334.90	16,822.90	48,103.10	58,836.60	–10,733.50	142,549.80
2006	16,942.10	70.30	9,677.90	27,323.00	93.50	9.90	224.00	416.50	13,938.70	41,678.20	49,787.10	–8,108.90	134,440.90
2007	19,817.30	830.70	13,997.20	34,645.20	100.90	453.40	210.10	764.40	9,750.30	45,159.80	43,916.60	1,243.20	135,684.10
2008	32,297.90	795.90	31,010.10	64,103.90	758.50	140.30	756.00	1,654.80	8,356.90	74,115.50	38,618.00	35,497.50	171,161.10
2009	41,103.10	457.70	53,111.50	94,672.30	340.10	359.10	430.00	1,129.20	19,139.40	114,940.90	44,813.20	70,127.70	241,288.80
2010	43,087.20	560.00	57,367.10	101,014.30	127.50	215.80	438.20	781.50	11,123.30	112,919.10	70,597.10	42,322.00	281,127.20
2011	52,308.00	1,355.00	63,286.70	116,949.70	193.10	88.90	662.00	944.00	12,598.20	130,491.90	86,161.40	44,330.50	329,337.30
2012	46,546.00	1,831.30	61,479.10	109,856.40	23.00	66.80	299.90	389.70	18,446.60	128,692.70	94,960.10	33,732.60	363,070.00
Est. 2013	32,871.49	769.09	65,195.02	98,835.60	0.00	26.40	38.18	64.58	19,660.36	118,560.55	97,440.65	21,119.89	384,856.50

Notes: Corporate bond issues, redemptions, and outstanding amounts by company size for all firms in Korea. Net Issuance is defined as total issues minus total redemption during the year. 2013 figures of issues and redemptions are estimated assuming the average amounts of issues and redemptions of Jan.-Nov. 2013 happened during December 2013. Outstanding amount as of 2013 year end is a trajectory assuming the same growth rate from its previous month. The unit is in KRW billion.

Source: Bank of Korea, Financial Supervisory Service.

Figure 4 External Finance Breakdown of Private Non-financial Firms in Korea



Note: Flow data of sources of financing by all private non-financial firms in Korea presented in % out of external finance total.
Source: Bank of Korea.

direct finance increases. For example, indirect finance drops from 37% to –57% of total external finance from 1997 to 1998 following the 1997 economic crisis, and from 46% to 7% of total external finance from 2008 to 2009 following the 2007-2008 global financial crisis. This supports the general consensus that bank lending is pro-cyclical. The pattern is most apparent for bank loans in particular. In contrast, direct finance increases sharply upon economic and financial crises. For example, direct finance increases from 37% to 177% of total external finance from 1997 to 1998 following the 1997 economic crisis, and from 29% to 63% of total external finance from 2008 to 2009 following the 2007-2008 global financial crisis. The pattern is most apparent for corporate bonds.

Figure 3 and figure 4 provide separate breakdowns of external finance by public vs. private firms.[6] It is interesting to see that the pattern I noted in

[6] Note that such separate breakdowns are only available from 2003 from Bank of Korea.

Observation 5 differs by public vs. private firms. Upon a financial crisis, indirect finance such as bank loans, drops sharply, but by a larger magnitude for private firms than for public firms. For example, bank loans by private firms drops from 59% to 14% in ratios of total external finance from 2008 to 2009 following the 2007-2008 global financial crisis. In contrast, direct finance such as corporate bonds increases for both private and public firms by similar magnitudes. For example, corporate bonds increases from 49% to 71% for public firms and from 1% to 33% for private firms in ratios of total external finance from 2008 to 2009 following the 2007-2008 global financial crisis.[7)]

3.3. Financing Deficit and Issues of Corporate Bonds and Equity

The main goal of this paper is to reflect the trends in the aggregate financials in South Korea upon the famous Pecking Order Theory, which says when asymmetric information is present firms prefer debt to equity when accessing external finance. And this implies that financing deficit drives debt issuance. Let me first discuss the stylized facts of trends in corporate bond and equity issuance then test the implication of the pecking order theory.

Table 6 presents corporate bond issues, redemptions, and outstanding amounts by company size. Please note that the data from this section onwards refer to all firms in Korea rather than non-financial firms only, as provided from Financial Supervisory Service in Korea. Net Issuance is defined as total issues minus total redemption during the year. 2013 figures are estimates by the following methods: issues and redemptions are estimated assuming the average amounts of issues and redemptions of Jan.-Nov. 2013 happened during December 2013. Outstanding amount as of 2013 year end

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Refer to Lim (2003) for firm-level data analyses of corporate financing decisions around financial crises.

7) There are many studies considering other aspects of leverage, i.e., changes in leverage of households around financial crises by Karasulu (2010), bank lending behavior by Li and Lee (2015).

Table 6 IPOs and SPOs

Year	Larges Corporations			Small and Medium-Sized Companies				Total Market Capitalization (As of Yr-end)
	Initial Public Offerings	Seasoned Equity Offerings	Subtotal	Initial Public Offerings	Seasoned Equity Offerings	Subtotal	Total Offerings	
1995	453.04	5,253.01	5,706.05	127.10	330.87	457.97	6,164.02	141,151.40
1996	1,207.72	3,205.12	4,412.83	184.26	446.41	630.67	5,043.50	117,369.99
1997	194.42	2,146.33	2,340.75	284.88	529.99	814.87	3,155.62	70,988.90
1998	-	13,206.55	13,206.55	36.78	245.54	282.32	13,488.87	137,798.45
1999	1,446.75	33,019.51	34,466.26	273.37	407.42	680.78	35,147.04	349,503.97
2000	-	5,678.72	5,678.72	-	110.03	110.03	5,788.74	188,041.49
2001	140.20	4,608.62	4,748.82	77.63	489.16	566.78	5,315.60	255,850.07
2002	567.03	5,561.86	6,128.88	27.51	649.55	677.06	6,805.94	258,680.76
2003	479.20	6,582.20	7,061.40	45.60	584.20	629.70	7,691.20	355,362.63
2004	504.30	4,333.80	4,838.10	137.10	192.40	329.50	5,167.60	412,588.14
2005	346.30	1,631.20	1,977.50	105.40	245.60	351.00	2,328.50	655,074.60
2006	990.60	2,194.80	3,185.40	126.10	194.70	320.80	3,506.20	704,587.51
2007	1,395.30	10,121.70	11,517.00	130.00	358.20	488.20	12,005.20	951,900.45
2008	214.10	1,078.30	1,292.40	106.30	390.00	496.30	1,788.70	576,927.70
2009	360.60	5,130.30	5,490.90	112.10	529.60	641.70	6,132.60	887,935.18
2010	2,772.60	2,918.00	5,690.60	166.00	220.70	386.70	6,077.30	1,141,885.46
2011	1,358.90	8,754.00	10,112.90	0.00	49.30	49.30	10,162.20	1,041,999.16
2012	205.90	1,291.50	1,497.40	0.00	64.30	64.30	1,561.70	1,154,294.17
Est. 2013	721.64	2,591.45	3,313.09	0.00	31.09	31.09	3,344.18	1,214,664.10

Notes: KRX stock market initial public offerings and seasoned public offerings by company size for all firms in Korea. 2013 figures are estimated assuming that the average amounts of issues during the period of Jan.-Nov. 2013 happened during December 2013. The unit is in KRW billion.

Source: Financial Supervisory Service.

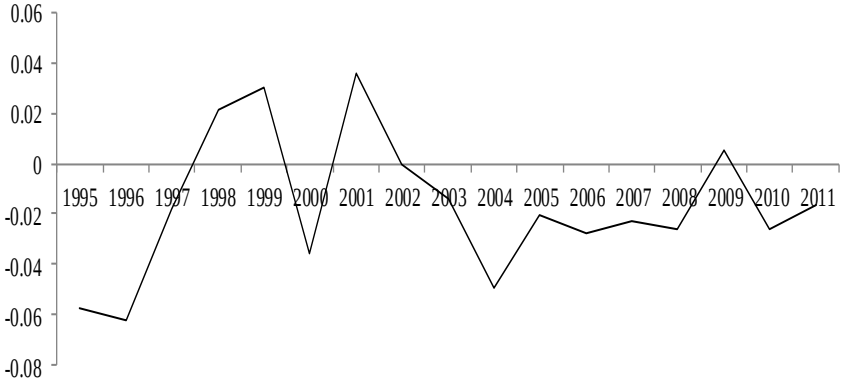
is a trajectory assuming the same growth rate from previous month. As shown in table 5, the increase in corporate bond issues by all firms in Korea is largely driven by increased issues by large firms, and particularly by large firms listed in KRX and un-listed large firms rather than large firms listed in Kosdaq. Also, it is apparent that corporate bond issues by SMEs remain low, and even exhibit a decreasing trend. Moreover, as to the trend of net issuance of bonds, it is relieving to see a decreasing trend in net debt issuance in recent three years. That is, despite the apparent increase in corporate bond issues, firms have made redemptions enough to keep the net bond issuance decreasing.

Also, consistent with Observation 5, it is interesting to see that corporate bond issuance peaks right after the 1997 economic crisis and the global financial crisis in 2007-2008, i.e., the growth rate of corporate bond issuance from 1997 to 1998 is 131%, and the growth rate of corporate bond issuance from 2007 to 2008 is 2,755% then subsides to the growth rate of 98% in the following year. Such a dramatic increase in corporate debt issuance during the economic and financial crises is also shown in figure 6. And such a growth pattern during economic and financial troubles is more apparent for large firms than SMEs, i.e., the growth rate of corporate bond issuance from 1997 to 1998 is 71% for large firms, –64% for SMEs, and 63% for ABS, and the growth rate of corporate bond issuance from 2007 to 2008 is all positive for large firms, SMEs, and for the growth of ABS.[8)] These patterns of debt issuance remain similar when netted of any redemption.

Table 5 also provides patterns of net debt issuance, which is defined as debt issuance net of any redemption. Figure 6 graphs net debt issuance for all firms in Korea as provided by Financial Supervisory Service, and figure 5 presents the graph of financing deficit of all non-financial firms in Korea as provided by Bank of Korea. It is interesting to observe that the pattern of net debt issuance closely follows the pattern of financing deficit for firms in Korea. This is consistent with the implication of the model by Myers and

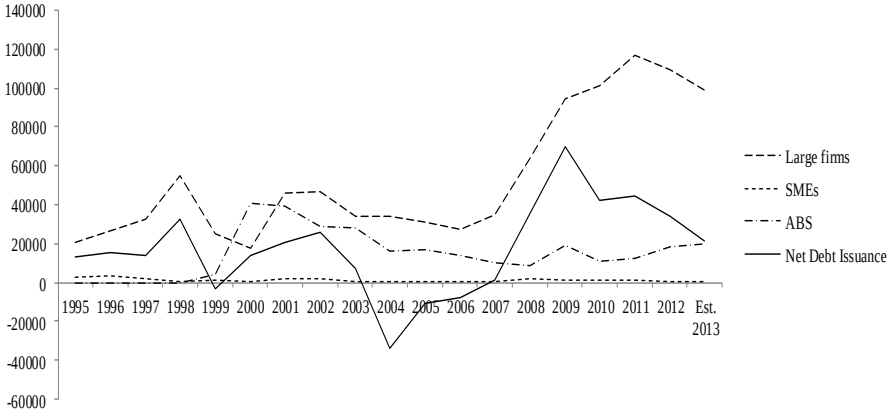
8) The split of ABS issues by large firms and SMEs is not available from Bank of Korea Database.

Figure 5 Financing Deficit



Notes: Financing deficit of all non-financial firms in Korea in %. Financing deficit is defined and calculated as in the studies by Shyam-Sunder and Myers (1999) and Frank and Goyal (2009): investments plus changes in working capital plus dividends less internal cash flow.
Source: Bank of Korea, Author's Calculation.

Figure 6 Corporate Bond Issuance



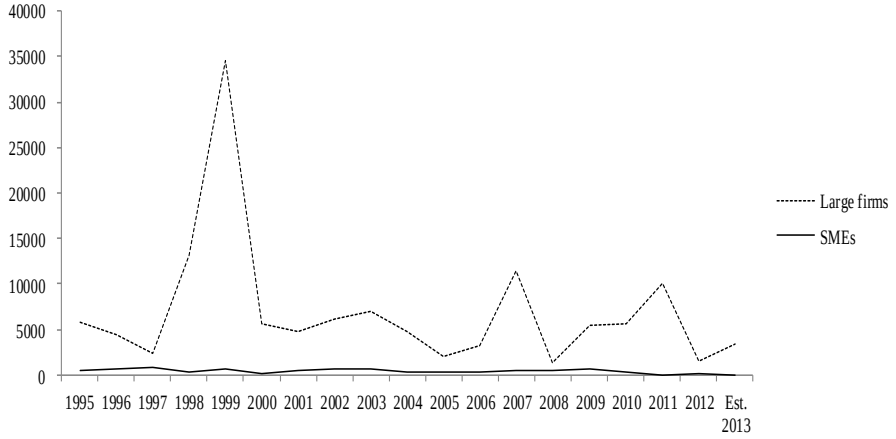
Notes: Corporate bond issues of large firms and SMEs, as well as ABS issues and net debt issuance. 2013 figures are estimates by the following methods: issues and redemptions are estimated assuming the average amounts of issues and redemptions of Jan.-Nov. 2013 happened during December 2013. The unit is in KRW billion.
Source: Bank of Korea.

Majluf (1984) and the result of the empirical study of the U.S. non-financial firms by Shyam-Sunder and Myers (1999). Financing deficit refers to external finance a firm has to raise in order to cover expenditure. It is defined as investments plus changes in working capital plus dividends less internal cash flow. Definitions of financing deficit and net debt issuance follow Frank and Goyal (2009).[9] The financing deficit figures are normalized by total assets to give ratios as shown in figure 5. As shown in figure 5, there is a huge increase in net financing deficit around the economic crisis in 1997, and accordingly increase in corporate net debt issuance. The same is true around the global financial crisis in 2007-2008. Also, the patterns of these two graphs are surprisingly similar in other years as well. Such evidence supports the claim of the pecking-order theory. Myers and Majluf (1984) show that in the existence of asymmetric information and when firms face investment opportunities, firms should prefer debt to equity when accessing external finance. This is the rational for net debt issuance following financing deficit, as shown by the analysis of U.S. non-financial firm data by Shyam-Sunder and Myers (1999). Consistent with these studies, my analysis of aggregate financials of non-financial firms in Korea also supports the implication of the pecking-order theory.

Table 6 presents KRX stock market initial public offerings and seasoned public offerings for all firms in Korea. The entries of table 5 have been graphed and provided in figure 7. As shown in table 6 and figure 7, the equity issuance has increased largely over the past decade, especially following the 1997 economic crisis, i.e., the growth rate of equity issuance from 1997 to 1999 is 1014% for the total of large firms and SMEs listed on KRX. A similar pattern arises following the global financial crisis in 2007-2008 but at much less magnitude, i.e., the growth rate of equity issuance from 2008 to 2010 is 240% for the total of large firms and SMEs listed on KRX. It is interesting to see that the speed of response is more lagging for equity issuance than for bond issuance. This is consistent with the prediction

[9] In the study by Frank and Goyal (2009), net debt issuance does not include bank loans and other private financings, although their analysis of leverage ratios includes bank loans and other private financings.

Figure 7 IPOs and SPOs



Notes: Total of KRX stock market initial public offerings and seasoned public offerings by company size for all firms in Korea. 2013 figures are estimated assuming that the average amounts of issues during the period of Jan.-Nov. 2013 happened during December 2013. The unit is in KRW billion.
Source: Financial Supervisory Service.

prediction of pecking-order theory. Equity issue of a firm implies insiders trying to decrease their positions in the firm. Under asymmetric information, this means that insiders of the firm have negative perception as to the fair value of the firm compared to the market perception, according to the pecking-order theory. As equity issuance has bad signaling effect as to the value of the firm, insiders should prefer issuing debt over equity when accessing external finance, ceteris paribus.

Figure 7 provides graphs of KRX stock market initial public offerings and seasoned public offerings for all firms in Korea by company size. As shown in figure 7, first, equity issuance exhibits tendency of dropping during economic and financial crises, i.e., total equity issuance drops by 37% in 1997 by 85% in 2008, potentially due to capital flights from the equity markets. Such a tendency is only apparent for large firms, but not for SMEs: i.e., equity issuance of large firms drops by 47% in 1997 by 89% in 2008, whereas equity issuance of SMEs either increases or remains the same

Table 7 Financing Deficit and Debt Issuance

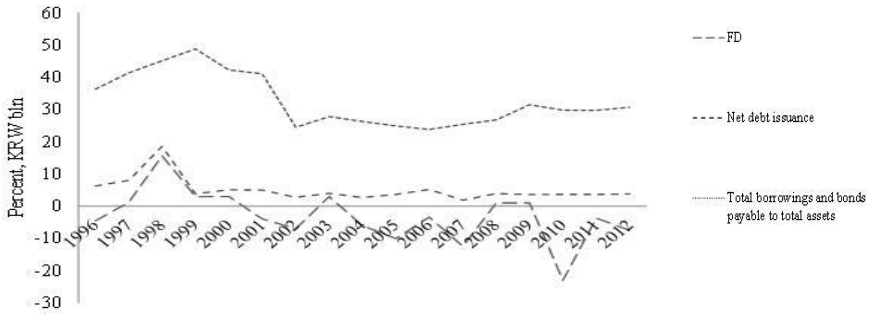
	Wholesale and Retail Trade				Manufacturing				Construction			
	Financing Deficit	Net Debt Issuance	Debt Ratio (%)	Total Borrowings and Bonds Payable to Total Assets (%)	Financing Deficit	Net Debt Issuance	Debt Ratio (%)	Total Borrowings and Bonds Payable to Total Assets (%)	Financing Deficit	Net Debt Issuance	Debt Ratio (%)	Total Borrowings and Bonds Payable to Total Assets (%)
1996	–4.5	6.3	510.5	36.3	–9.0	12.0	317.1	47.6	–1.1	7.4	562.7	49.8
1997	1.2	8.0	612.6	41.4	–13.0	12.6	396.2	54.2	3.0	9.0	655.7	51.1
1998	15.6	18.6	400.1	45.1	11.1	11.0	303.0	50.8	3.4	11.4	659.4	51.9
1999	3.0	3.8	841.4	48.8	10.0	2.1	214.7	42.8	3.9	6.7	405.9	42.9
2000	3.0	5.1	463.7	42.3	–32.3	3.2	210.6	41.2	9.7	7.2	625.7	47.1
2001	–3.9	5.0	448.6	41.1	34.0	6.3	182.2	39.8	1.4	6.6	352.5	34.6
2002	–7.0	2.8	216.2	24.5	–4.2	2.7	135.4	31.7	4.7	2.1	196.8	26.3
2003	3.0	4.0	180.5	27.8	–17.0	2.6	123.4	28.3	–3.3	1.9	164.9	22.8
2004	–6.0	2.7	152.9	26.3	–17.0	2.8	104.2	24.0	0.7	2.9	165.8	24.1
2005	–10.0	3.7	145.7	24.9	–20.1	4.0	100.9	22.9	5.6	4.1	143.7	23.8
2006	–3.4	5.2	133.5	23.8	–27.0	4.4	98.9	22.4	8.3	3.9	121.8	22.0
2007	–12.4	1.9	147.8	25.4	–23.0	5.1	107.1	24.9	3.5	5.8	135.4	29.1
2008	1.0	3.9	150.6	26.8	–61.2	5.0	123.2	26.3	23.2	9.3	149.4	30.2
2009	1.0	3.6	215.5	31.5	–6.0	5.0	116.8	25.1	5.3	8.0	165.9	29.1
2010	–23.0	3.7	195.8	29.8	–83.7	5.2	108.3	24.6	–20.3	5.9	154.4	28.4
2011	–3.7	3.7	177.7	29.7	–49.0	5.9	109.2	25.5	1.7	6.0	154.7	27.9
2012	–7.5	3.8	172.8	30.7	–18.0	5.9	101.0	25.6	–3.1	3.7	147.0	27.0

Notes: Financing deficit, net debt issuance, debt ratio, total borrowings and bonds payable to total assets of wholesale and retail trade firms, manufacturing firms, and construction firms in Korea in % (These three industries are the top three industries by the total asset size as of 2012 year-end.). The unit is in KRW trillion if not stated otherwise.

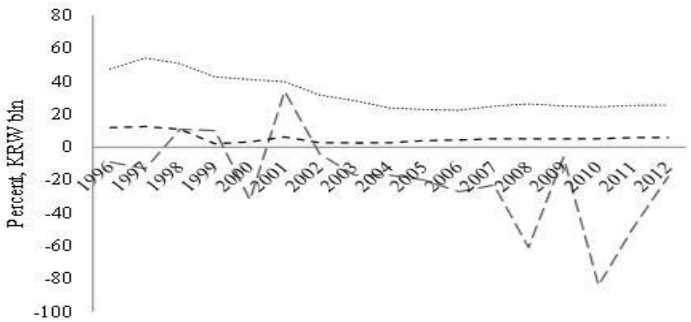
Source: Bank of Korea, Author's Calculation.

Figure 8 Financing Deficit and Debt Issuance by Industry

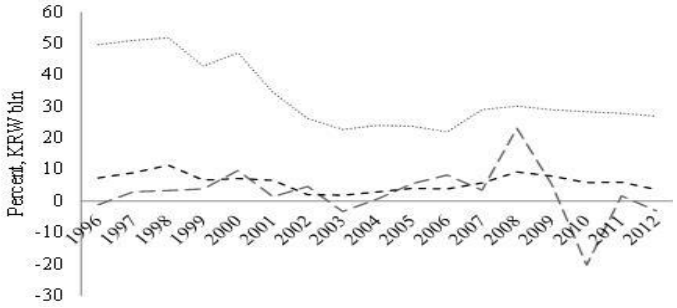
Panel I: Wholesale and Retail Trade



Panel II: Manufacturing



Panel III: Construction



Notes: Financing deficit (KRW trillion), net debt issuance (KRW trillion), total borrowings and bonds payable to total assets (%) for top three industries by the total asset size as of 2012 year-end, namely wholesale and retail trade firms, manufacturing firms, and construction firms in Korea.

in 1997 and 2008. Secondly, after equity issuance drops during economic and financial crises, it increases thereafter but at a slower speed than that of corporate bonds issuance, i.e., the highest growth in equity issuance takes place two years post of the crisis in case of the 1997 economic crisis, i.e., total equity issuance increases by 327% in 1998, then by 1,014% in 1999, and by 243% in 2009. Again, such a tendency is apparent only for large firms, i.e., equity issuance of large firms increases by 464% in 1998, then by 1,372% in 1999, and by 325% in 2009. Again, as in the aforementioned presentation of corporate bonds in Korea, the patterns of equity issuance in Korea is also consistent with the pecking-order theory as well as with the empirical evidence that the pecking-order theory explains corporate financing preference of large firms well in particular.

Furthermore, table 7 and figure 8 show that the aforementioned pattern of debt issuance following financing deficit is also apparent when I look at the corporate financing data by industry as well. Please note that I only present these results for the top three industries by total assets as of 2012 year-end, namely manufacturing, wholesale and retail trade, and construction, for simplicity of presentation. Notice that debt issuance data of the firms in these industries also follow financing deficit in general but such a pattern is most apparent for firms in wholesale and retail trade. This is not surprising as wholesale and retail trade firms should suffer most from asymmetric information and adverse selection problem compared to firms in manufacturing and construction industries which tend to have much more tangible assets (Refer to table 2 for the tangibility comparison by industry). Thus, the picture of financing deficit and debt issuance by industry also at least roughly confirms the implication of the pecking order theory. Going forward, it would be interesting and meaningful to conduct further detailed analyses on this point using firm-level data as well.

4. CONCLUSION

Although many prior studies use firm-level data, aggregate data also has its own benefits: It shows how the trend of aggregate corporate financing choices in the economy has evolved over time, and it allows us to understand any differences in sources of finance between public versus private firms and by firm size. This paper looks at the aggregate corporate financing patterns over time in South Korea, particularly focusing on changes around crises. Specifically, the paper attempts to reflect the trends in the aggregate financials in South Korea upon the famous Pecking Order Theory, which says when asymmetric information is present firms prefer debt to equity when accessing external finance and this implies that financing deficit drives debt issuance. In particular, this paper finds that debt issuance exhibits tendency of growing upon economic and financial crises, and there is a clear pattern that net debt issuance follows financing deficit in the aggregate financials. These results in general support the implication of the pecking-order theory of corporate financing decisions.

APPENDIX

Table A1 Sources of Data

Data		Source
Aggregate Financial Statement Data	Total assets, Operating income, Net Income, Depreciation, Interest expense, Taxes, Dividends, Liabilities, Tangible assets, Total equity, Total borrowings and bonds payable, Cost of sales, Selling & administrative expenses, Financing deficit (investments plus changes in working capital plus dividends less internal cash flow, following the studies by Shyam-Sunder and Myers (1999) and Frank and Goyal (2007)), Net debt issuance **(**debt issuance net of any redemption, following the studies by Shyam-Sunder and Myers (1999) and Frank and Goyal (2007)), Interest coverage ratio (operating Income divided by interest expenses)	Bank of Korea (Economic Statistics System)
Flow Data of Sources of Financings	External finance, Indirect finance, Direct finance, Foreign borrowing, Borrowing from government, Inter-firm credit	Bank of Korea (Economic Statistics System)
Corporate Bonds	Corporate bond net issuance, Redemptions, Outstanding amounts	Financial Supervisory Service
IPOs and SPOs	KRX stock market initial public offerings, KRX stock market seasoned public offerings	Financial Supervisory Service

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