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Abstract

We document the cyclical behavior of debt, equity, and retained earnings for different firm categories using firm-level Canadian data. There is evidence of both procyclical equity and debt issuance for all firm categories but the timing differs. In particular, there is strong evidence that equity issuance increases in anticipation of an expansion. During this phase, some substitution between debt and equity takes place. After the expansion has reached its peak, equity issuance starts to decrease and during this phase there is strong evidence of procyclical debt issuance and some substitution out of equity seems to take place. Retained earnings is procyclical except for small firms.

JEL classification: E32, G32
Bank classification: Business fluctuations and cycles

Résumé

Au moyen de données recueillies à l'échelon de l'entreprise puis regroupées par taille d'entreprise, les auteurs étudient le comportement cyclique des émissions d'obligations et d'actions et des bénéfices non répartis des sociétés canadiennes. L'analyse de ces données indique que les émissions d'obligations et d'actions présentent un caractère procyclique peu importe la catégorie de taille examinée, mais qu'elles s'échelonnent différemment dans le temps. Elle révèle en particulier que le volume des actions émises augmente à l'approche d'une phase d'expansion, aux dépens de l'émission d'obligations. Passé le pic du cycle d'expansion, l'émission d'actions diminue et semble céder graduellement la place à l'émission d'obligations, dont le caractère procyclique se manifeste alors. Les bénéfices non répartis affichent un comportement procyclique, sauf dans le cas des petites entreprises.

Classification JEL : E32, G32
Classification de la Banque : Cycles et fluctuations économiques

1 Introduction

Cyclical changes in the availability of external financing play an important role in modern business cycle research. Exemplary theoretical papers are Bernanke and Gertler (1989), Carlstrom and Fuerst (1997), and Bernanke, Gertler, and Gilchrist (1999). All three papers only allow for debt as external financing. In a recent paper, Fama and French (2005) document that firms frequently issue equity and that equity finance does have an important role in firm financing. One may, thus, get an incomplete or even misleading picture by ignoring possible cyclical changes in equity finance.

Several theoretical models have been developed to study the cyclical behavior of equity finance. With multiple financing sources the cyclical behavior of *individual* financing sources is harder to determine, because increased agency problems during a recession can still lead to an increase in a financing source if it is used as a substitute for another financing source, for which the worsening of agency problems is even more severe. So perhaps not surprisingly, the predictions of the existing models differ. The models in Covas and den Haan (2006) and Jermann and Quadrini (2006) predict that debt issuance is procyclical, whereas according to the model of Levy and Hennessy (2006) that is only the case for firms facing tight financing constraints. The models also have differences regarding the cyclical behavior of equity. Choe, Masulis, and Nanda (1993), Levy and Hennessy (2006), and Covas and den Haan (2006) argue that equity issuance is procyclical, whereas Jermann and Quadrini (2006) argue that equity issuance should be countercyclical.

The empirical results of Fama and French (2005) are likely to stimulate other researchers to allow for equity finance in their models. Moreover, the development of the financial sector means that models that only consider debt financing are getting outdated. Empirical research to guide the theoretical work is clearly needed. There are a few empirical studies that analyze the cyclical behavior of equity using US data. In particular, Choe, Masulis, and Nanda (1993), Korajczyk and Levy (2003) find equity to be procyclical and Jermann and Quadrini (2006) find equity to be countercyclical. Covas and den Haan (2006) argue that the ambiguous results are due to the use of aggregate data. In contrast to the other empirical studies that rely on aggregate data, Covas and den Haan (2006)

use US data by firm size and argue that both predictions are right. That is, although equity issuance is procyclical for most firm groups, equity issuance is countercyclical for the largest firms, that is, firms in the top 1% or possibly top 5% in terms of the book value of assets. Given the highly skewed distribution of asset size, the relatively small group of large firms is important for aggregate fluctuations. Whether the procyclical behavior of the smaller firms or the countercyclical behavior of the largest firms dominate the cyclical behavior at the aggregate level (or that they roughly off set each other) depends crucially on particular choices such as the definition of the series and the sample period.

Here we follow the strategy of Covas and den Haan (2006) of using firm-level data in analyzing the cyclical behavior of financing sources for Canadian firms. Canadian data not only offer a fresh perspective to investigate the cyclical behavior of firms' financing sources, but are also more comprehensive than its US counterpart, Compustat, in that several private firms are included as well.

The results we find using Canadian data correspond closely to those found with US data, but there are some exceptions. Our first result is that equity is procyclical. Like the results for the US we find that the procyclical changes in equity are decreasing with firm size, but in contrast to the US results, we find equity issuance to be procyclical for the largest firms as well. When using the contemporaneous correlation between debt and real activity, most results indicate that debt financing is procyclical although the results are not as strong as those for the US.

When we pay careful attention to the timing, then a strong cyclical pattern emerges. In particular, we find that equity is leading and debt is lagging the cycle. Similar effect was found for the US but it is stronger for Canada. In anticipation of an expansion (both in terms of firms' assets or aggregate real activity), firms issue equity. During this phase, some substitution between debt and equity takes place, because we find some evidence of negative comovement between debt and next year's real activity. After the expansion has reached its peak, equity issuance starts to decrease and during this phase there is strong evidence of procyclical debt issuance. A possible interpretation is that positive expectations make it easier for firms to attract equity but that they can only attract

additional debt after they have built up additional net worth.

This paper is organized as follows. The second section discusses the data sources and the methods used to construct cyclical components. The third section discusses the results and the last section concludes.

2 Constructing the data

2.1 Data sources

Our first and main data set consists of the annual Report on Business (ROB) data from 1979 to 2004.[1] About two-thirds of the data consists of firms listed on two Canadian stock exchanges (Toronto and Montreal Stock Exchanges) and senior board companies from four other stock exchanges (Vancouver, Alberta, Winnipeg and the Canadian Venture stock exchanges).[2] The remaining one-third of the sample consists of private firms. Some private firms are quite large.[3] We exclude financial firms (activity index 13) and utilities (10) and we require companies to have a non-foreign incorporation code.[4] To deflate nominal series we use the producer price index, since we want to capture the purchasing power of the funds raised.

This data set allows us to condition on firm size. To study the importance of firm size, we rank firms using last period's end-of-period book value of assets. We construct J firm categories. A firm group, $j \in \{1, \ldots, J\}$, is defined by a lower and an upper percentile. Our firm groups are [0,25%], [0,50%], [0,75%], [0,99%], [90%,94%], [95%,99%], and [99%,100%]. The behavior of the larger firms has a significant impact on the aggregate variables. To study the role of large firms in influencing the aggregate statistics, we consider several

[1] See the appendix for details.

[2] Firms are typically included in the data set for several years before they go public. Consequently, our data does include equity raised through IPOs.

[3] Large private firms tend to be subsidiaries of multinationals. Examples of private firms that are large in terms of assets are Imperial Tobacco Canada, Ford Motor Company of Canada, and General Motors of Canada.

[4] Financial firms and utilities are typically excluded because the regulations affecting these firms sets them apart from other firms.

groups in the top decile.

Table 1 provides a set of summary statistics for each of these firm groups. In particular, we find that smaller firms have lower leverage and exhibit higher asset growth. Smaller firms finance a much larger fraction of asset growth with equity, whereas larger firms finance a larger fraction with debt. For large US firms we find retained earnings to be important but this is not the case for Canadian firms.

The second data set consists of net new security issues from 1980 to 2004 for all non-financial corporations, excluding government enterprises. It is from Statscan's Financial Flow Accounts. An advantage of this data set is that the Financial Flow Accounts includes more private firms than ROB.[5] A disadvantage is that it does not allow us to decompose the series by firm size.

2.2 Variables used

The ROB equity variables used are

1. Sale of stock,
2. Sale of stock minus repurchase of stock, and
3. Change in equity, measured as the residual from the accounting identity using the definition of Fama and French (2005). This increase is not affected by retained earnings because accumulated retained earnings are kept track of in a separate balance sheet item.

Our preferred choices for equity issuance are the sale of stock, i.e., the gross issuance of equity, and the change in equity. The first is most cleanly defined and the latter is a comprehensive measure of net stock issuance.

To compare the difference between the gross sale of stock and the net change in equity, we plot in Panels A and B of Figure 1, the sale of stock and the change in the book value of equity for the bottom 25% and for all firms, respectively. For the bottom 25% the two series

[5] ROB's coverage does include the largest private firms in Canada in addition to several smaller private firms.

are very close. This is not surprising because sale of stock is the main instrument through which small firms raise equity and they rarely repurchase stock. Panel B documents that the same is true when we use the aggregate series except for the period between 1987 and 1994 when the total change in equity is remarkably lower than the sale of stock series, indicating that repurchases were important for larger firms during this period. Panel C compares the difference between the net-sale-of-stock measure and the change in equity, again at the aggregate level. It also makes clear that the gap between gross sale of stock and the net change in equity between 1987 and 1994 is due to increased repurchases, since net sales and the net change in equity are very similar during this period. Interestingly, Panel C also shows that net sales and the net change are fairly similar up to 1994 but that in the last decade of the sample the change in equity is substantially above the net sale measure (and as documented in Panel B roughly equal to the gross sale measure). This means that during the last decade of the sample other forms of equity have been important and of roughly equal magnitude as repurchases.

The ROB debt variables used are

1. Bank debt,
2. Issuance of long-term debt minus reduction in long-term debt, and
3. Change in total liabilities.

The first debt measure is the "bank debt" measure from ROB, which in addition to bank debt also includes short-term notes and small loans. The last debt measure follows Fama and French (2005) in defining net debt issues as the change in total liabilities.

For ROB retained earnings we use the balance sheet item for retained earnings. Finally, for leverage we look at

1. Total liabilities over book value of assets,
2. Short-term plus long-term debt over book value of assets, and
3. Long-term debt over assets.

For the Financial Flow Accounts data we focus on new equity issues (gross and net) and new bonds issues (gross and net).

2.3 Flow and level approach

We rely on two different types of statistics. The first type of statistic measures the correlation between real GDP and financing flows, i.e., net or gross amounts of funds raised during a period. This is the "flow approach". The second type of statistics measures the correlation between real GDP and the level of accumulated funds raised. This is the "level approach".

2.3.1 Flow approach

Fama and French (2005) scale flows, such as the sale of stock, by the book value of assets. Using the actual asset value is not appropriate if one wants to document the cyclical behavior of financing sources. For example, equity issuance scaled by assets can be countercyclical, even if equity issuance is procyclical as long as the increase in assets dominates. Therefore, we scale by a deterministic trend value of assets, that is obtained by regressing total assets in group j on a linear and quadratic time trend.

Let

$$A_t(j) = \sum_{i \in j_{t-1}} A^{\$}_{i,t}/p_t. \tag{1}$$

Note that the firm groups in period t are constructed using the book values of assets observed at the end of period $t-1$, i.e., using beginning-of-period t asset values.

The trend value of $A_t(j)$ is denoted by $A^T_t(j)$. As an example of how variables are constructed in the flow approach consider the net change in equity.[6] It is defined as

[6]Suppose that for a particular firm i^* there is no observation for equity in period t, for example, because the firm no longer exists. Then we set $E^{\$}_{i^*,t} - E^{\$}_{i^*,t-1} = 0$ in the construction of $F^E_t(j)$ in Equation (2). Note that this firm is still used to determine the ranking in period t. For example, suppose firm i^* is in the bottom 25% at the end of period $t-1$ and is taken over by firm i' which is in the top 33%. Then the disappearance of firm i^* does not imply a reduction in equity for the bottom 25%. It would imply an increase for the top 33% unless it is financed by debt.

$$F_t^E(j) = \frac{\sum_{i \in j_{t-1}} (E_{i,t}^{\$} - E_{i,t-1}^{\$})/p_t}{A_t^T(j)}. \tag{2}$$

Note that we loose one observation when calculating the change. For comparison, we calculate correlation coefficients for all measures over the same sample, which starts in 1980 and ends in 2004. For several variables, $F_t^E(j)$ still has a trend. Therefore, we use the HP filter to detrend the series but similar results are obtained if we take out a linear trend. For annual data we set the smoothing parameter of the HP filter equal to 100.

2.3.2 The level approach

The advantage of the flow approach is that it focuses on the amount of funds raised each period. The disadvantage of the series constructed this way is that they display at times some hectic swings. This is not surprising given that—by focusing on the change in firm financing variables—it emphasizes the higher frequency movements.

As an alternative, we use the level approach, with which we construct time series that represent the accumulated amount of funds raised by firms in a particular group. As an example, we show how to construct the series when equity issuance is defined as the change in the book value of equity.

We start by initializing the series using the aggregate equity in group j. Thus,

$$L_1^E(j) = \sum_{i \in j_1} E_{i,1}^{\$}/p_1, \tag{3}$$

where j_1 is the set of firms in group j in period 1. In future periods, we have

$$L_t^E(j) = L_{t-1}^E(j) + \sum_{i \in j_{t-1}} \left(E_{i,t}^{\$} - E_{i,t-1}^{\$} \right) / p_t. \tag{4}$$

The variable $L_t^E(j)$ is logged and HP filtered. $L_t^E(j)$ is equal to the accumulated real value of funds raised by firms in group j.

3 Empirical results using ROB

We start by discussing the results for the ROB data set because of its high quality and detail. In particular, we discuss the cyclical behavior of equity, liabilities, retained earnings,

and leverage.

3.1 Cyclical behavior of equity

GDP as the real activity measure. Results for equity issuance are reported in Tables 2 and 3. Table 2 gives the results for the level approach and table 3 for the flow approach. Each table reports results for three definitions, namely the sale of stock, the sale of stock minus repurchases, and the change in equity.

Using the level approach we find a positive and significant correlation between the cyclical components of aggregate equity issuance and GDP for all three definitions. In particular, for the aggregate gross (net) sale of stock we find a correlation coefficient of 0.48 (0.40) and a t-statistic of 7.33 (3.91). When the change in equity is used we find a correlation coefficient of 0.40 and a t-statistic of 4.74.

Interestingly, for all firm categories we find a positive contemporaneous correlation. Using a one-sided test and a 5% significance level only four of the 24 coefficients are not significant. Using a two-sided test seven are not significant. Moreover, correlation is typically stronger and more significant when next period's GDP is used, which suggests that equity issuance leads the business cycle.

In Covas and den Haan (2006) we report that equity issuance in the US is also procyclical for most firm categories but that equity issuance is strongly countercyclical for the largest firms, in particular for the top 1%. Although firms in the top 1% are only a small fraction of the total number of firms, they are so large that their countercyclical behavior and the procyclical behavior of most of the other firms results in inconclusive results at the aggregate level. The distribution of firm sizes for Canadian firms is similarly skewed (if not more so), but the behavior of the largest Canadian firms is consistent with that of the other firms. In particular, we find positive and highly significant positive coefficients for the top 1%. The deviating behavior for the largest US firms can be due to idiosyncratic shocks (because there are only a few firms in the top 1%) or can be due to largest firms behaving differently in a systematic way. That the Canadian top 1% behaves differently from the US top 1% suggests that the different behavior of the largest US firms is due to

idiosyncratic shocks.

Using the flow approach, we find most contemporaneous correlation coefficients to be insignificant and negative. Recall that the flow approach emphasizes higher frequencies so lower significance levels are to be expected. Using next period's GDP, we find all correlation coefficients to be positive and half are significant. The coefficients for the aggregate series are highly significant. Using last period's GDP, we find all correlation coefficients to be negative and again highly significant at the aggregate level. A possible interpretation is that firms expand in anticipation of an expansion and that they finance this at least partly with increased equity issuance. As the expansion really has taken off, firms reduce the equity position, for example, by repurchasing shares.

Cyclical magnitudes. Panels A, B, and C of Figure 2 plot the cyclical component of the sale of stock (level approach) and GDP for firms in the bottom 25%, the bottom 75%, and the bottom 95%, respectively. The following observations can be made. First, the positive comovement between equity issuance and real activity is clear although there are episodes when equity and GDP move in opposite directions. For example, following the recession in the early eighties equity issuance by firms in the bottom 25% and to some extent the bottom 75% continued to decline when GDP recovered. Equity issuance only started to increase just before GDP—after a minor relapse—started a sharp increase in the mid eighties. When we look at equity issuance of the bottom 95% then we do not see such a delay. Equity issuance by all three firm categories also seem to "ignore" the temporary growth slow down observed in the mid nineties. Figures 3 and 4 show that a very similar picture is obtained when using the net sale of stock and the change in equity definition.

Figure 5 plots the cyclical components of GDP and equity issuance for the top 1 per cent. These series display some hectic swings which isn't surprising given that on average only 14 firms are in this group. Interestingly, after the economic downturn of the early eighties equity issuance by the top 1 per cent does increase with GDP whereas, as discussed above, equity issuance by the other firm categories was still decreasing. Also equity issuance by the largest firms reaches a trough during or just before the growth slow

down in the mid nineties whereas other firm categories did not.

Assets as the real activity measure. In the bottom panels of Tables 2 & 3 we report the comovement of equity issuance and assets. Covas and den Haan (2006) find using US data that the procyclical properties of equity issuance are much stronger and more significant when firm assets are used as the real activity measure. It is clear that the same is true for Canadian firms when we consider the bottom 25%, the bottom 50%, and the bottom 75% independent of whether the flow or the level approach is used. Moreover, above we found for these three firm categories evidence of negative comovement when lagged GDP and the flow approach are used. Those results are clearly not there when assets are used instead of GDP. In particular, the correlation of all three equity measures with last year's, this year's, and next year's assets is strong, positive, and highly significant for the bottom 25%, bottom 50%, and the bottom 75%.

At the aggregate level we find a pattern that is very similar to that found using GDP as the real activity measure. That is, using next year's assets we find for all three equity measures and both the level and the flow approach highly significant positive comovement, whereas using last year's assets we find four significant negative coefficients but also two insignificant positive coefficients.

For the other firm categories the results either weaken or strengthen depending on the approach or measure of equity issuance considered. For example, when we consider the bottom 99% and the flow approach then the contemporaneous correlation coefficients obtained are now significantly positive. For the level approach and again the bottom 99% there is some weakening (t-statistic for net sale of stock drops to 1.62) and some strengthening (t-statistic for change in equity increases to 4.85).

3.2 Cyclical behavior of debt

GDP as the real activity measure. In this section, we look at the correlation of GDP with several debt categories. In particular, we look at change in bank debt, net issuance of long-term debt, and change in total liabilities. We use again the level and the

flow approach and correlation coefficients are given in Tables 4 and 5, respectively.

Covas and den Haan (2006) find using US data strong evidence of procyclical debt issuance for different debt measures and for all firm categories except the top 1%. Moreover, cyclical patterns are stronger when lagged GDP is used, that is, debt issuance is lagging GDP. For the flow approach the results are similar to those found for the US. That is, we find positive correlation coefficients of which many are highly significant for all three debt measures and across all firm categories. As for US data, we find for large firms occasionally a negative coefficient when next year's GDP is used.

Using the level approach, we find again positive coefficients for all three measures and all firm categories when lagged GDP is used. Most are significant and several are highly significant. The results are mixed, however, when we consider the contemporaneous correlation. Using short-term debt, debt issuance is clearly positively correlated with current GDP, except for the bottom 25%. The results are inconclusive for the change in liabilities although the two negative coefficients found are small. For the net change in long-term debt there are several negative and significant coefficients for the contemporaneous correlation.

A possible interpretation is the following. The positive contemporaneous correlation coefficients found with the flow approach suggest that Canadian firms increase debt financing as the economy recovers. The positive contemporaneous correlation coefficients for short-term debt and total liabilities using the level approach suggest that this does lead to a sharp increase in the corresponding debt levels. The negative (positive) correlation between long-term debt levels and contemporaneous (lagged) GDP suggest that it takes Canadian firms longer than US firms to build up long-term debt levels.

Cyclical magnitudes. In Figures 7 through 9 we plot the cyclical components of debt issuance for different firm categories and different debt measures for the level approach. The figures highlight two differences with the results for US firms. The first is that although there is some evidence for procyclical debt issuance in Canada, the evidence is not as strong as it is for US firms. Second, whereas for the US we find a strong correlation of debt issuance across the different firm categories, this is less true for Canadian

firms.

Assets as the real activity measure. When we use assets as the real activity measure then the results are much more robust. That is, just like we find for US firms, debt issuance is strongly procyclical and highly significant across firm categories for both the level and the flow approach and for all three debt measures. These results also suggest that debt is lagging the cycle.

3.3 Co-movement of equity and debt

In Table 6, we document the comovement between equity and debt issuance. For the bottom 25%, the bottom 50%, and the bottom 75% the results are similar to those we find using US data. That is, equity issuance and debt issuance are positively correlated. Most coefficients are highly significant for both the level and the flow approach. For larger firms the results are mixed. There are both positive as well as negative statistically significant correlations, depending on the particular measure used and the lead/lags considered. For example, using the most comprehensive measures, namely the change in equity and the change in total liabilities, we find using the level approach a significant positive correlation at the aggregate level. Using net equity and net long-term debt, however, we find a significant negative coefficient.

3.4 Cyclical behavior of retained earnings, profits, and dividends

In Table 7, we report the cyclical behavior of retained earnings, profits, and dividends. We only report results for the flow approach. Retained earnings for the bottom 25% is on average negative, which is a problem for the level approach since it requires taking logs.

The results we find for Canadian firms very closely resemble those obtained with US data. First, as documented in Table 7, size is very important for understanding the cyclical behavior of profits and retained earnings. Whereas, profits and retained earnings are acyclical for small firms, they are procyclical for large firms. Profits and thus retained earnings are possibly depressed for small firms during economic expansions because small

firms accelerate their expansion during these periods. When assets are used as the real activity measure we find a similar pattern.

3.5 Cyclical behavior of leverage

In the corporate finance literature, leverage plays a prominent role. For business cycle analysis this variable is less interesting because then the key question is whether firms' financing sources, debt, equity, and retained earnings increase with the cycle. Changes in leverage reveal only what happens with debt *relative* to equity.

For completeness, we also report results on the empirical behavior of leverage defined using the book value of equity. Table 8 reports using the level approach the cyclical behavior for the three measures we consider. Those are total liabilities to the book value of assets, short-term plus long-term debt to the book value of assets, and long-term debt to the book value of assets.

No clear picture about the cyclical behavior of leverage emerges. This isn't too surprising given that equity and debt both tend to be procyclical. Leverage is countercyclical and significant for all three definitions when aggregate variables are used and GDP is used as the cyclical indicator. This result is driven by large firms. When we consider the bottom 25%, 50%, and 75% then we do not find a single significant negative coefficient but we do find some positive significant coefficients. Also note that the leverage ratio between large and small firms is quite different. Table 1 shows that the leverage ratio for the bottom 25% is 0.35 while it is 0.74 for the top 1%. The lower the leverage ratio, the larger the difference between the amount of equity and debt raised has to be in order to generate a decrease in leverage.

The quite strong result at the aggregate level is not robust to using assets instead of GDP as the real activity measure. Now leverage is significantly *positive* for two of the three measures for leverage. Again large firms are important for this result. This suggests that large firms decrease their leverage when their own expansion coincides with an expansion of overall economic activity but that they increase leverage if their own expansion does not coincide with an economic boom.

4 Results for the financial flow accounts

In this section, we compare some of our results with aggregate data on new issues of preferred and common stocks and corporate bonds compiled by the Bank of Canada and distributed by Statistics Canada. An advantage of this data set is that it is available at quarterly frequency. The sample period starts in 1980 and ends in 2004.

Figure 11 plots the cyclical components of GDP and the gross and net new equity issues constructed using the level approach.[7] The figure documents the procyclical behavior of equity issuance, especially for the gross measure. The contemporaneous correlation between gross (net) new equity issues and output is 0.44 (0.37) and the t-statistic is equal to 3.96 (2.38).[8] Similar to the ROB data, equity issuance doesn't follow the increase in the cyclical component of GDP after the recession in the early eighties until 1985 just GDP takes off after a temporary dip. The correlation for the gross issues over the period from 1989 and 2004 is indeed stronger and equal to 0.70 with a t-statistic equal to 7.38.

For the new issues of corporate bonds the results are similar to the ones obtained from the data set on firm level data using long-term debt. Recall that long-term debt was the debt measure for which results were not robust and switched sign depending on the method to construct the series. Here we find small and insignificant coefficients with both methods. Figure 12 plots the cyclical component of the gross and net debt series together with the cyclical GDP measure. No strong pattern of any kind seems to emerge. The contemporaneous correlation between gross (net) debt issues and HP filtered output is -0.01 (-0.12) and the t-statistics is equal to -0.072 (-0.742).

5 Concluding remarks

In this paper, we have used firm-level data to analyze the cyclical behavior of financing sources for Canadian firms. Our results are similar to the ones for US firms although there are some exceptions. We found equity issuance to be cyclical for all size classes, whereas

[7] Again we use the HP filter to construct cyclical components.

[8] Results are insignificant when the flow approach is used. These data are quarterly and the graphs clearly show highly volatile short-term fluctuations in equity issuance.

for the US we found this not to be the case for the largest firms. The Canadian data has several large privately held firms, not just publicly traded firms. So we can generalize our earlier results to a universe of firms that is broader than the sample of publicly traded firms. Most results indicated that the contemporaneous correlation between debt issuance and the cycle is positive but the results are not as strong as that found for the US. When looking at leads and lags, however, a cyclical pattern emerges that was also found for the US but is much visibly stronger in Canadian data. That is, equity is leading the cycle and debt is lagging the cycle. Moreover, as equity increases in anticipation of the cycle debt may actually decrease and as debt increases when the cycle has reached its peak equity may actually decrease. In Covas and den Haan (2006) we develop a theory that can explain the broad procyclical pattern found for equity and debt issuance. The next challenge is to develop a theory that can also closely mimic the timing.

A Data sources & exact definitions

Output and deflators. Real GDP is defined as the Gross domestic product expenditure-based, chained 1997 dollars, item v1992067. The PPI is the price index for industrial commodities, item v1574377.

Report on Business Database. Our sample starts in 1979, because before 1979 the coverage as well as the data availability are very incomplete in ROB. Book value of assets is total assets (ROB item totlas). Book value of liabilities is total liabilities (totlia). Sales is total sales (tsales). Bank debt is bank indebtness (bankin). Long-term debt due in one year is current portion of long-term debt (curltd). The remaining maturities of long-term debt are in debt and advances (dbtadv). Issuance of long-term debt is increase in debt/advances (incdbt). Retirement of long-term debt is reduction in long-term debt (reddbt). Gross equity issuance is sale of company stock (salstk). Repurchases of equity is purchase of company stock (repstk). Retained earnings includes appropriated and unappropriated retained earnings (retear). Profits is income before extraordinary items (incbei). Finally, dividends is total dividends (divtot).

To be included in our sample we require firms to have total assets for two adjacent fiscal years. We excluded firms with a foreign incorporation code (inccnty), as well as utilities (activityndx = 10) and financial firms (13). We excluded private firms that report a book value of assets equal to zero. Some private firms only disclose some information to ROB, specially foreign-owned subsidiaries, which are no longer required to file financial statements in Canada. Firm-years displaying sales growth of more than 100% are excluded. This is important to eliminate coding errors and firms involved in a major merger or subject to accounting problems and/or irregularities. Finally, we restrict the sample to firms with a reporting period of 12 months.

Net new security issues. Gross bond issues is gross new issues of corporate bonds (v122271). Net bond issues is gross new issues of corporate bonds net of retirements (v122315). Gross equity issues is gross new issues of preferred plus common stock

(v122274+v122277). Net equity issues is gross new issues of preferred plus common stocks net of repurchases (v122318+v122321).

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Table 1: Summary statistics for different size classes

Size classes	n	**Size**	$\frac{\mathbf{L}}{\mathbf{A}}$	$\frac{\mathbf{STD}}{\mathbf{L}}$	$\frac{\mathbf{LTD}}{\mathbf{L}}$	$\frac{\mathbf{\Delta A}}{\mathbf{A}}$	$\frac{\mathbf{\Delta L}}{\mathbf{\Delta A}}$	$\frac{\mathbf{\Delta E}}{\mathbf{\Delta A}}$	$\frac{\mathbf{\Delta RE}}{\mathbf{\Delta A}}$	$\frac{\mathbf{\Delta S}}{\mathbf{\Delta A}}$	$\frac{\mathbf{\Delta D}}{\mathbf{\Delta A}}$
$[0, 25\%]$	323	0.001	0.35	0.11	0.33	0.68	0.27	0.88	-0.15	0.94	0.11
$[0, 50\%]$	646	0.008	0.40	0.14	0.34	0.25	0.34	0.94	-0.28	1.02	0.14
$[0, 75\%]$	970	0.039	0.49	0.16	0.33	0.11	0.45	0.77	-0.22	0.88	0.22
$[0, 99\%]$	1291	0.623	0.61	0.06	0.43	0.07	0.68	0.34	-0.02	0.37	0.34
$[90\%, 95\%]$	67	0.128	0.59	0.06	0.44	0.08	0.70	0.29	0.02	0.34	0.34
$[95\%, 99\%]$	57	0.360	0.64	0.04	0.45	0.06	0.77	0.24	-0.01	0.24	0.35
$[95\%, 100\%]$	71	0.736	0.69	0.03	0.38	0.04	0.77	0.24	-0.01	0.20	0.37
$[99\%, 100\%]$	14	0.377	0.74	0.03	0.32	0.03	0.78	0.23	-0.01	0.13	0.40
All firms	1305	1	0.66	0.05	0.39	0.05	0.70	0.32	-0.02	0.32	0.35

Notes: The data set consists of annual ROB data from 1979 to 2004. The first column gives the average number of observations. The column size states the fraction of the total book value of assets that belongs to that particular size class. Leverage, $\frac{L}{A}$, equals liabilities divided by assets. Short-term debt, $\frac{STD}{L}$, equals bank indebtedness divided by total liabilities. Long-term debt, $\frac{LTD}{L}$, equals current portion of long-term debt plus debt and advances divided by total liabilities. Asset growth, $\frac{\Delta A}{A}$, equals the change in the book value of assets from period $t-1$ to t divided by the current value of assets. Change in liabilities, ΔL equals the change in the book value of total liabilities. Change in equity, ΔE, equals the change in stockholders' equity minus retained earnings. Retained earnings, ΔRE, is the change in the balance sheet item for retained earnings. Net sale of stock, ΔS, equals sale of common and preferred stock minus repurchases and, ΔD, is net issuance of long-term debt. For further details on the data series used, see the data appendix.

Table 2: Cyclical behavior of equity issuance: level approach

Size classes	**Sale of stock and**			**Net sale of stock and**			**Δ in equity and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	0.08	**0.39**	**0.32**	0.13	**0.41**	**0.31**	**0.18**	**0.41**	**0.29**
	(0.88)	(1.80)	(1.65)	(1.29)	(2.08)	(1.87)	(1.85)	(1.90)	(1.64)
$[0, 50\%]$	**0.22**	0.27	**0.40**	**0.24**	0.27	**0.39**	0.17	0.23	**0.40**
	(1.97)	(1.43)	(3.75)	(2.13)	(1.51)	(3.62)	(1.15)	(0.91)	(2.90)
$[0, 75\%]$	**0.22**	**0.48**	**0.54**	**0.22**	**0.47**	**0.53**	**0.18**	0.39	**0.45**
	(2.28)	(2.80)	(4.34)	(2.16)	(2.55)	(3.92)	(1.67)	(1.49)	(2.39)
$[0, 99\%]$	-0.13	**0.40**	**0.64**	**-0.26**	**0.35**	**0.69**	**-0.16**	**0.35**	**0.67**
	(-1.38)	(4.51)	(12.73)	(-4.48)	(2.83)	(7.96)	(-1.65)	(3.14)	(10.30)
$[90, 95\%]$	0.05	**0.37**	**0.45**	-0.10	**0.36**	**0.60**	-0.14	**0.36**	**0.59**
	(0.22)	(2.45)	(8.00)	(-0.51)	(2.29)	(6.14)	(-0.62)	(3.07)	(7.26)
$[95, 99\%]$	**-0.33**	**0.27**	**0.56**	**-0.43**	**0.19**	**0.59**	-0.14	**0.29**	**0.61**
	(-2.33)	(2.27)	(8.60)	(-4.69)	(1.78)	(7.75)	(-0.93)	(4.33)	(6.79)
$[99, 100\%]$	**0.33**	**0.49**	**0.49**	**0.20**	**0.30**	**0.26**	**0.25**	**0.35**	**0.30**
	(4.75)	(6.71)	(4.95)	(2.96)	(3.46)	(1.88)	(1.83)	(3.34)	(2.89)
All firms	0.02	**0.48**	**0.65**	**-0.16**	**0.40**	**0.67**	0.01	**0.40**	**0.59**
	(0.23)	(7.33)	(25.91)	(-2.38)	(3.91)	(10.68)	(0.08)	(4.74)	(8.67)

Size classes	**Sale of stock and**			**Net sale of stock and**			**Δ in equity and**		
	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}
$[0, 25\%]$	**0.45**	**0.93**	**0.60**	**0.49**	**0.94**	**0.59**	**0.48**	**0.93**	**0.54**
	(5.09)	(60.30)	(15.17)	(6.87)	(105.19)	(16.64)	(7.39)	(97.47)	(10.62)
$[0, 50\%]$	**0.63**	**0.93**	**0.54**	**0.65**	**0.94**	**0.53**	**0.63**	**0.93**	**0.53**
	(10.19)	(45.85)	(8.45)	(9.65)	(43.65)	(8.48)	(8.52)	(33.93)	(5.46)
$[0, 75\%]$	**0.44**	**0.84**	**0.77**	**0.46**	**0.86**	**0.76**	**0.42**	**0.87**	**0.68**
	(5.39)	(15.12)	(24.60)	(5.56)	(18.46)	(23.01)	(4.46)	(20.41)	(8.18)
$[0, 99\%]$	-0.12	**0.31**	**0.56**	**-0.33**	0.17	**0.51**	-0.06	**0.40**	**0.57**
	(-1.53)	(2.61)	(2.67)	(-3.79)	(1.62)	(3.08)	(-0.50)	(4.85)	(4.12)
$[90, 95\%]$	-0.06	**0.31**	**0.34**	**-0.15**	**0.25**	**0.39**	-0.04	**0.28**	0.22
	(-0.51)	(2.67)	(2.27)	(-1.85)	(2.39)	(2.35)	(-0.69)	(2.94)	(0.93)
$[95, 99\%]$	**-0.19**	0.03	0.13	**-0.51**	-0.18	-0.01	-0.10	**0.31**	**0.47**
	(-3.61)	(0.14)	(0.68)	(-8.44)	(-0.79)	(-0.02)	(-0.52)	(2.92)	(4.68)
$[99, 100\%]$	**0.44**	**0.48**	**0.48**	**0.34**	**0.31**	**0.20**	**0.73**	**0.78**	**0.53**
	(4.40)	(6.58)	(4.14)	(3.26)	(5.13)	(3.88)	(6.71)	(16.39)	(11.97)
All firms	0.05	**0.30**	**0.53**	**-0.21**	0.11	**0.43**	0.29	**0.55**	**0.61**
	(0.81)	(2.98)	(3.42)	(-2.17)	(1.19)	(4.55)	(1.55)	(5.05)	(8.09)

Notes: All series are logged and HP filtered. Sale of stock is sale of company stock (salstk). Net sale of stock is sale of company stock minus repurchase of company stock (repstk). Change in equity is the change in book value of equity (see text for definition). The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Table 3: Cyclical behavior of equity issuance: flow approach

Size classes	**Sale of stock and**			**Net sale of stock and**			**Δ in equity and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	**-0.34**	0.06	0.34	**-0.31**	0.09	0.33	-0.23	0.12	0.32
	(-2.35)	(0.43)	(1.46)	(-2.33)	(0.67)	(1.25)	(-1.68)	(0.84)	(1.34)
$[0, 50\%]$	-0.22	-0.08	0.23	-0.21	-0.07	0.23	-0.22	-0.10	0.19
	(-1.22)	(-0.61)	(0.59)	(-1.10)	(-0.50)	(0.57)	(-1.21)	(-0.77)	(0.49)
$[0, 75\%]$	**-0.29**	-0.06	0.23	**-0.29**	-0.07	0.21	**-0.26**	-0.07	0.15
	(-2.42)	(-0.46)	(0.78)	(-2.41)	(-0.50)	(0.67)	(-2.31)	(-0.49)	(0.54)
$[0, 99\%]$	**-0.58**	**-0.19**	**0.35**	**-0.70**	**-0.32**	**0.33**	**-0.52**	**-0.20**	**0.35**
	(-4.99)	(-2.13)	(9.23)	(-8.54)	(-3.46)	(5.31)	(-10.17)	(-2.42)	(5.34)
$[90, 95\%]$	-0.28	0.00	0.30	**-0.41**	-0.13	0.25	**-0.37**	-0.05	**0.38**
	(-1.32)	(0.00)	(1.50)	(-2.48)	(-1.17)	(1.36)	(-4.19)	(-0.46)	(5.39)
$[95, 99\%]$	**-0.48**	-0.18	**0.22**	**-0.60**	**-0.31**	**0.26**	**-0.37**	-0.17	**0.31**
	(-4.21)	(-1.01)	(2.14)	(-6.42)	(-1.74)	(2.25)	(-4.00)	(-1.46)	(2.68)
$[99, 100\%]$	-0.09	**0.15**	**0.55**	-0.08	**0.12**	0.35	-0.20	0.12	**0.36**
	(-1.29)	(3.49)	(2.96)	(-0.81)	(2.66)	(1.56)	(-1.26)	(1.46)	(2.44)
All firms	**-0.52**	-0.09	**0.50**	**-0.63**	**-0.21**	**0.41**	**-0.54**	**-0.15**	**0.38**
	(-5.41)	(-0.92)	(7.49)	(-7.52)	(-1.93)	(4.44)	(-8.61)	(-2.17)	(6.28)
	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}
$[0, 25\%]$	**0.25**	**0.92**	**0.21**	**0.29**	**0.94**	**0.20**	**0.25**	**0.93**	**0.18**
	(4.54)	(46.90)	(2.18)	(6.65)	(55.16)	(2.12)	(4.32)	(109.92)	(1.75)
$[0, 50\%]$	**0.43**	**0.94**	**0.22**	**0.45**	**0.94**	**0.21**	**0.39**	**0.92**	0.25
	(6.93)	(42.53)	(1.87)	(7.87)	(43.17)	(1.83)	(5.74)	(16.70)	(1.59)
$[0, 75\%]$	**0.29**	**0.86**	**0.34**	**0.31**	**0.86**	**0.33**	**0.27**	**0.82**	**0.27**
	(3.19)	(10.75)	(3.13)	(3.37)	(9.90)	(3.06)	(2.85)	(3.71)	(2.72)
$[0, 99\%]$	**-0.41**	**0.24**	**0.51**	**-0.55**	**0.21**	**0.47**	**-0.43**	**0.31**	**0.42**
	(-5.54)	(2.55)	(5.95)	(-7.85)	(2.42)	(6.54)	(-2.27)	(1.99)	(7.26)
$[90, 95\%]$	-0.06	**0.21**	0.09	-0.21	0.16	0.10	-0.12	0.16	0.11
	(-0.31)	(2.04)	(0.89)	(-1.61)	(1.09)	(0.79)	(-0.67)	(1.47)	(0.93)
$[95, 99\%]$	-0.12	-0.03	**0.29**	**-0.41**	0.03	0.23	**-0.32**	**0.19**	**0.44**
	(-0.78)	(-0.15)	(2.24)	(-3.35)	(0.28)	(1.00)	(-1.73)	(2.06)	(4.67)
$[99, 100\%]$	-0.12	**0.26**	0.21	**-0.17**	0.27	0.03	-0.13	**0.49**	0.04
	(-1.30)	(1.94)	(0.71)	(-2.35)	(1.57)	(0.10)	(-0.62)	(3.50)	(0.17)
All firms	**-0.43**	**0.16**	**0.39**	**-0.60**	0.06	**0.31**	**-0.42**	**0.29**	**0.27**
	(-4.96)	(1.73)	(3.94)	(-6.19)	(0.77)	(2.22)	(-2.86)	(1.65)	(3.05)

Notes: Real GDP is logged and HP filtered. All other series are HP filtered only. Sale of stock is sale of company stock (salstk). Net sale of stock is sale of company stock minus repurchase of company stock (repstk). Change in equity is the change in book value of equity (see text for definition). The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Table 4: Cyclical behavior of debt issuance: level approach

Size classes	**Δ bank debt and**			**Net LT debt and**			**Δ in liabilities and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	0.00	**-0.28**	**-0.54**	**0.31**	0.04	-0.12	**0.36**	-0.03	**-0.47**
	(0.03)	(-4.14)	(-7.43)	(3.02)	(0.28)	(-1.12)	(3.06)	(-0.25)	(-3.41)
$[0, 50\%]$	**0.62**	0.18	-0.29	**0.35**	0.01	**-0.37**	**0.38**	-0.01	**-0.28**
	(4.36)	(0.78)	(-1.60)	(2.40)	(0.07)	(-2.43)	(2.01)	(-0.04)	(-1.80)
$[0, 75\%]$	**0.56**	**0.46**	-0.03	**0.36**	0.07	**-0.36**	**0.46**	**0.30**	**-0.17**
	(6.86)	(5.26)	(-0.15)	(1.80)	(0.52)	(-2.56)	(3.56)	(2.37)	(-0.87)
$[0, 99\%]$	**0.64**	**0.39**	-0.13	0.15	**-0.34**	**-0.66**	**0.40**	0.13	**-0.36**
	(9.63)	(4.54)	(-0.89)	(1.38)	(-4.51)	(-6.56)	(6.26)	(1.07)	(-2.14)
$[90, 95\%]$	**0.47**	0.14	**-0.60**	0.05	**-0.25**	**-0.50**	**0.32**	0.09	**-0.42**
	(9.68)	(1.44)	(-6.94)	(0.34)	(-2.85)	(-5.10)	(1.69)	(0.57)	(-2.73)
$[95, 99\%]$	**0.47**	**0.40**	**0.31**	0.11	**-0.45**	**-0.71**	**0.28**	0.04	**-0.36**
	(4.49)	(2.59)	(1.78)	(1.18)	(-5.76)	(-6.74)	(4.36)	(0.19)	(-2.73)
$[99, 100\%]$	**0.43**	0.11	-0.30	0.12	**-0.26**	**-0.70**	**0.51**	**0.22**	-0.14
	(1.78)	(1.36)	(-1.54)	(1.34)	(-3.00)	(-5.17)	(2.27)	(1.88)	(-1.08)
All firms	**0.73**	**0.34**	**-0.29**	0.15	**-0.31**	**-0.69**	**0.53**	0.21	**-0.29**
	(7.90)	(2.72)	(-1.74)	(1.55)	(-5.02)	(-6.37)	(2.97)	(1.60)	(-1.64)

Size classes	**Δ in bank debt and**			**Net LT debt and**			**Δ in liabilities and**		
	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}
$[0, 25\%]$	**0.42**	0.30	-0.21	**0.49**	**0.72**	0.25	**0.54**	**0.68**	0.16
	(4.02)	(1.58)	(-1.16)	(8.18)	(3.06)	(1.29)	(5.74)	(3.10)	(0.72)
$[0, 50\%]$	**0.56**	**0.73**	**0.21**	**0.45**	**0.69**	0.13	**0.49**	**0.77**	**0.20**
	(2.93)	(19.84)	(2.14)	(3.50)	(9.54)	(1.78)	(3.54)	(20.05)	(5.17)
$[0, 75\%]$	**0.45**	**0.77**	**0.32**	**0.61**	**0.67**	-0.13	**0.59**	**0.86**	0.16
	(2.22)	(8.24)	(1.79)	(5.02)	(27.41)	(-1.48)	(3.93)	(29.70)	(0.89)
$[0, 99\%]$	**0.29**	**0.76**	**0.34**	**0.37**	**0.53**	**-0.36**	**0.37**	**0.89**	0.01
	(3.07)	(9.05)	(2.62)	(3.49)	(4.75)	(-4.26)	(1.76)	(20.88)	(0.07)
$[90, 95\%]$	-0.06	**0.65**	-0.10	**0.23**	**0.68**	**-0.29**	0.21	**0.93**	-0.00
	(-0.35)	(7.97)	(-1.21)	(2.38)	(9.77)	(-2.43)	(1.12)	(58.30)	(-0.01)
$[95, 99\%]$	0.10	**0.49**	**0.30**	**0.42**	**0.43**	**-0.24**	**0.34**	**0.89**	-0.06
	(0.97)	(3.25)	(3.58)	(4.15)	(5.78)	(-2.57)	(1.95)	(54.64)	(-0.49)
$[99, 100\%]$	**0.51**	**0.74**	**0.44**	0.26	**0.24**	**-0.21**	**0.71**	**0.99**	**0.66**
	(7.19)	(10.12)	(2.46)	(1.57)	(3.77)	(-2.93)	(18.51)	(103.94)	(12.49)
All firms	**0.51**	**0.84**	**0.43**	**0.37**	**0.46**	**-0.24**	**0.63**	**0.96**	**0.40**
	(2.96)	(14.41)	(2.65)	(2.70)	(6.68)	(-2.30)	(5.52)	(118.23)	(4.36)

Notes: All series are logged and HP filtered. Change in bank debt is the change in bank indebtness (bankin) between year t and $t-1$. Net long-term debt is increase in debt/advances (incdbt) minus reduction in debt/advances (reddbt). Change in liabilities is the change in total liabilities (totlia) between year t and $t-1$. The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Table 5: Cyclical behavior of debt issuance: flow approach

Size classes	**Δ bank debt and**			**Net LT debt and**			**Δ in liabilities and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	**0.27**	**0.35**	0.06	**0.33**	0.16	0.11	**0.38**	**0.51**	**0.22**
	(3.34)	(2.45)	(1.15)	(2.71)	(1.06)	(0.94)	(4.44)	(3.59)	(3.35)
$[0, 50\%]$	**0.47**	**0.53**	-0.03	**0.37**	**0.46**	0.01	0.42	**0.39**	0.09
	(2.39)	(3.58)	(-0.11)	(2.91)	(3.73)	(0.05)	(1.11)	(2.25)	(0.38)
$[0, 75\%]$	0.10	**0.59**	**0.36**	0.29	**0.54**	0.08	0.11	**0.57**	0.27
	(0.75)	(4.67)	(2.48)	(1.28)	(5.02)	(0.38)	(0.40)	(3.44)	(1.32)
$[0, 99\%]$	0.23	**0.59**	**0.35**	**0.61**	**0.45**	**-0.36**	**0.26**	**0.57**	0.16
	(1.48)	(3.37)	(2.46)	(8.00)	(5.22)	(-3.01)	(1.81)	(2.99)	(1.43)
$[90, 95\%]$	**0.25**	**0.65**	-0.06	**0.35**	**0.40**	**-0.30**	0.16	**0.59**	0.24
	(3.40)	(4.53)	(-0.93)	(2.34)	(5.14)	(-2.10)	(1.00)	(6.47)	(1.18)
$[95, 99\%]$	0.14	**0.20**	**0.44**	**0.67**	**0.37**	**-0.45**	**0.23**	**0.38**	0.02
	(0.80)	(1.85)	(2.97)	(16.05)	(4.24)	(-4.66)	(2.14)	(1.71)	(0.14)
$[99, 100\%]$	**0.33**	**0.53**	-0.24	**0.34**	**0.47**	**-0.33**	**0.38**	**0.60**	-0.04
	(2.56)	(3.20)	(-1.59)	(8.59)	(7.95)	(-2.35)	(3.65)	(6.40)	(-0.34)
All firms	**0.35**	**0.74**	0.19	**0.56**	**0.48**	**-0.35**	**0.39**	**0.67**	0.08
	(4.54)	(6.65)	(1.12)	(12.53)	(7.25)	(-2.51)	(3.53)	(6.30)	(0.67)

Size classes	**Δ in bank debt and**			**Net LT debt and**			**Δ in liabilities and**		
	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}	ΔA_{t-1}	ΔA_t	ΔA_{t+1}
$[0, 25\%]$	0.26	**0.58**	0.14	0.19	**0.59**	0.05	0.23	**0.70**	0.05
	(1.53)	(2.97)	(1.17)	(1.36)	(4.50)	(0.56)	(0.96)	(5.28)	(0.49)
$[0, 50\%]$	**0.49**	**0.50**	**0.21**	**0.45**	**0.53**	**0.23**	**0.47**	**0.68**	**0.24**
	(5.50)	(8.05)	(2.52)	(8.97)	(5.40)	(2.90)	(5.27)	(6.91)	(6.76)
$[0, 75\%]$	**0.30**	**0.62**	**0.29**	**0.69**	**0.63**	-0.06	**0.55**	**0.83**	**0.16**
	(3.58)	(4.72)	(4.37)	(12.91)	(10.06)	(-1.40)	(13.77)	(16.34)	(3.42)
$[0, 99\%]$	**0.28**	**0.79**	**0.18**	**0.68**	**0.46**	**-0.38**	**0.32**	**0.93**	-0.12
	(3.93)	(8.61)	(2.88)	(14.08)	(5.50)	(-6.13)	(4.15)	(37.93)	(-1.20)
$[90, 95\%]$	0.08	**0.63**	0.03	**0.32**	**0.68**	**-0.28**	**0.21**	**0.95**	**0.09**
	(1.16)	(4.77)	(0.30)	(2.90)	(16.06)	(-6.87)	(2.75)	(83.28)	(1.85)
$[95, 99\%]$	0.09	**0.37**	-0.09	**0.52**	**0.33**	**-0.39**	-0.05	**0.95**	**-0.41**
	(0.45)	(3.31)	(-0.39)	(5.78)	(4.07)	(-2.34)	(-0.34)	(46.13)	(-5.68)
$[99, 100\%]$	0.12	**0.70**	-0.13	**0.12**	**0.50**	**-0.29**	-0.00	**0.98**	-0.19
	(0.69)	(9.16)	(-0.61)	(2.05)	(7.96)	(-5.63)	(-0.02)	(222.21)	(-0.77)
All firms	**0.28**	**0.79**	0.11	**0.56**	**0.51**	**-0.40**	**0.25**	**0.96**	**-0.12**
	(5.50)	(12.54)	(0.86)	(28.50)	(7.38)	(-7.40)	(3.72)	(193.91)	(-1.79)

Notes: Real GDP is logged and HP filtered. All other series are HP filtered only. Change in bank debt is the change in bank indebtness (bankin) between year t and $t-1$. Net long-term debt is increase in debt/advances (incdbt) minus reduction in debt/advances (reddbt). Change in liabilities is the change in total liabilities (totlia) between year t and $t-1$. The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Table 6: Co-movement of equity and debt

Level Approach

Size classes	Sale of stock and Δ in bank debt			Net sale of stock and Net LT debt			Δ in Equity and Δ in Liabilities		
	ΔB_{t-1}	ΔB_t	ΔB_{t+1}	ΔD_{t-1}	ΔD_t	ΔD_{t+1}	ΔL_{t-1}	ΔL_t	ΔL_{t+1}
$[0, 25\%]$	-0.22	0.10	**0.32**	0.15	**0.58**	**0.45**	-0.05	**0.43**	**0.41**
	(-0.82)	(0.48)	(2.96)	(0.66)	(2.52)	(6.55)	(-0.19)	(1.80)	(2.85)
$[0, 50\%]$	**0.33**	**0.60**	**0.58**	**0.28**	**0.59**	**0.52**	**0.36**	**0.68**	0.49
	(6.23)	(12.67)	(2.68)	(5.59)	(7.42)	(4.05)	(7.34)	(20.88)	(1.60)
$[0, 75\%]$	**0.18**	**0.60**	**0.75**	**-0.20**	**0.30**	**0.67**	0.05	**0.62**	**0.70**
	(2.20)	(3.44)	(5.20)	(-5.05)	(4.13)	(8.44)	(0.62)	(11.56)	(6.75)
$[0, 99\%]$	**-0.34**	0.03	0.47	**-0.34**	**-0.37**	**-0.44**	**-0.31**	0.04	0.22
	(-3.39)	(0.15)	(1.43)	(-2.63)	(-2.01)	(-3.50)	(-2.26)	(0.39)	(1.17)
$[90, 95\%]$	**-0.14**	-0.06	0.18	0.00	0.01	**-0.31**	-0.01	**0.10**	-0.04
	(-2.63)	(-1.04)	(0.82)	(0.02)	(0.10)	(-5.50)	(-0.11)	(1.66)	(-0.21)
$[95, 99\%]$	-0.17	0.03	**0.50**	**-0.29**	**-0.53**	**-0.74**	**-0.32**	-0.02	0.22
	(-1.10)	(0.14)	(2.85)	(-5.91)	(-4.75)	(-11.04)	(-1.85)	(-0.23)	(1.55)
$[99, 100\%]$	**0.35**	0.20	0.17	0.05	-0.06	-0.34	**0.70**	**0.77**	**0.57**
	(3.58)	(1.72)	(0.76)	(0.60)	(-0.48)	(-1.48)	(6.43)	(13.46)	(15.30)
All firms	**-0.24**	0.05	**0.48**	**-0.33**	**-0.44**	**-0.55**	0.14	**0.39**	**0.53**
	(-3.27)	(0.82)	(5.07)	(-3.66)	(-3.31)	(-3.75)	(0.75)	(2.68)	(4.77)

Flow Approach

Size classes	Sale of stock and Δ in bank debt			Net sale of stock and Net LT debt			Δ in Equity and Δ in Liabilities		
	ΔB_{t-1}	ΔB_t	ΔB_{t+1}	ΔD_{t-1}	ΔD_t	ΔD_{t+1}	ΔL_{t-1}	ΔL_t	ΔL_{t+1}
$[0, 25\%]$	0.13	**0.36**	**0.21**	0.15	**0.48**	0.09	0.02	**0.51**	0.16
	(0.92)	(2.16)	(2.18)	(1.51)	(2.67)	(1.10)	(0.24)	(4.59)	(1.30)
$[0, 50\%]$	**0.24**	**0.31**	0.28	**0.26**	**0.36**	**0.23**	**0.24**	**0.42**	0.21
	(3.14)	(4.77)	(1.45)	(3.37)	(3.03)	(3.57)	(1.54)	(2.72)	(1.00)
$[0, 75\%]$	**0.10**	**0.25**	0.29	**-0.11**	**0.29**	**0.42**	0.01	**0.45**	**0.36**
	(2.40)	(1.73)	(0.49)	(-3.25)	(4.42)	(2.75)	(0.17)	(4.05)	(2.68)
$[0, 99\%]$	-0.09	-0.06	**0.52**	**-0.44**	**-0.33**	0.01	**-0.46**	**0.06**	**0.39**
	(-0.88)	(-0.60)	(4.26)	(-5.12)	(-1.41)	(0.12)	(-3.57)	(0.39)	(8.90)
$[90, 95\%]$	**-0.12**	**-0.13**	0.07	**-0.13**	0.01	**-0.26**	0.02	-0.03	0.07
	(-1.16)	(-2.84)	(0.73)	(-1.91)	(0.30)	(-2.74)	(0.11)	(-0.39)	(0.55)
$[95, 99\%]$	0.11	-0.15	**0.30**	**-0.34**	**-0.37**	-0.01	**-0.30**	-0.02	**0.43**
	(0.40)	(-0.94)	(3.01)	(-3.42)	(-2.11)	(-0.04)	(-1.73)	(-0.48)	(4.63)
$[99, 100\%]$	**0.13**	-0.19	0.19	**-0.11**	-0.20	0.23	-0.13	**0.41**	0.07
	(2.03)	(-1.21)	(0.67)	(-1.93)	(-1.03)	(1.05)	(-0.57)	(2.26)	(0.36)
All firms	**-0.26**	**-0.11**	**0.53**	**-0.47**	**-0.40**	-0.04	**-0.44**	0.12	**0.25**
	(-2.87)	(-2.48)	(10.44)	(-5.49)	(-3.61)	(-0.39)	(-3.39)	(0.64)	(2.72)

Table 7: Cyclical behavior of retained earnings, profits and dividends: flow approach

Size classes	**Retained earnings and**			**Profits and**			**Dividends and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	-0.12	0.09	0.02	-0.05	-0.01	0.13	**0.27**	**0.42**	**0.25**
	(-1.71)	(0.72)	(0.11)	(-0.53)	(-0.07)	(0.87)	(2.81)	(13.37)	(2.33)
$[0, 50\%]$	-0.13	**0.37**	**0.34**	-0.16	**0.25**	**0.27**	**0.23**	0.29	0.02
	(-0.84)	(1.83)	(2.48)	(-0.94)	(1.75)	(1.76)	(3.82)	(1.26)	(0.11)
$[0, 75\%]$	-0.23	**0.25**	0.34	-0.28	0.20	0.27	**-0.11**	0.24	**0.32**
	(-1.03)	(1.72)	(1.38)	(-1.22)	(1.14)	(1.50)	(-2.03)	(1.31)	(1.67)
$[0, 99\%]$	**-0.23**	**0.56**	**0.67**	-0.07	**0.71**	**0.71**	**0.22**	**0.51**	**0.41**
	(-2.57)	(6.87)	(5.12)	(-0.95)	(8.39)	(6.00)	(5.36)	(3.08)	(3.90)
$[90, 95\%]$	-0.09	**0.67**	**0.58**	0.04	**0.75**	**0.60**	**0.37**	**0.58**	0.29
	(-1.29)	(9.83)	(8.24)	(0.58)	(3.67)	(8.27)	(5.42)	(4.58)	(1.53)
$[95, 99\%]$	-0.08	**0.59**	**0.55**	**-0.03**	**0.67**	**0.71**	**0.19**	**0.42**	**0.36**
	(-0.59)	(6.24)	(4.58)	(-0.19)	(8.41)	(5.12)	(3.99)	(2.28)	(3.25)
$[99, 100\%]$	0.02	**0.61**	**0.52**	-0.00	**0.61**	**0.52**	**0.16**	0.21	**0.33**
	(0.33)	(3.78)	(4.55)	(-0.02)	(3.58)	(4.97)	(1.75)	(1.60)	(1.90)
All firms	**-0.16**	**0.60**	**0.64**	-0.06	**0.68**	**0.66**	**0.23**	**0.52**	**0.43**
	(-1.89)	(4.90)	(4.21)	(-0.80)	(5.85)	(5.17)	(4.83)	(3.06)	(3.79)

Size classes	**Retained earnings and**			**Profits and**			**Dividends and**		
	ΔA_{t-1}	Δ A_t	Δ A_{t+1}	Δ A_{t-1}	Δ A_t	Δ A_{t+1}	Δ A_{t-1}	Δ A_t	Δ A_{t+1}
$[0, 25\%]$	-0.11	**0.30**	0.31	**-0.18**	**0.38**	**0.63**	**0.30**	**0.38**	-0.03
	(-1.51)	(2.00)	(1.56)	(-2.04)	(4.56)	(5.31)	(2.32)	(2.87)	(-0.12)
$[0, 50\%]$	0.05	**0.43**	**0.60**	-0.10	**0.39**	**0.71**	-0.16	0.05	0.33
	(0.50)	(2.70)	(5.61)	(-1.53)	(2.17)	(9.06)	(-1.51)	(0.24)	(1.49)
$[0, 75\%]$	0.10	0.58	**0.66**	**0.10**	**0.68**	**0.67**	-0.22	0.21	0.29
	(1.38)	(0.80)	(4.22)	(2.16)	(6.38)	(3.91)	(-1.14)	(1.43)	(1.14)
$[0, 99\%]$	-0.07	**0.60**	**0.54**	0.09	**0.72**	**0.48**	**0.38**	**0.42**	0.03
	(-0.46)	(7.97)	(5.11)	(0.63)	(14.15)	(4.29)	(2.40)	(5.00)	(0.26)
$[90, 95\%]$	0.13	**0.63**	**0.34**	**0.33**	**0.67**	**0.32**	**0.38**	**0.56**	0.03
	(0.79)	(10.45)	(5.97)	(2.58)	(14.00)	(5.79)	(6.70)	(2.91)	(0.31)
$[95, 99\%]$	-0.26	**0.47**	**0.38**	-0.08	**0.55**	**0.40**	**0.25**	**0.40**	**-0.18**
	(-1.16)	(4.17)	(2.04)	(-0.42)	(7.29)	(2.28)	(1.97)	(5.23)	(-2.41)
$[99, 100\%]$	**-0.27**	**0.63**	**0.47**	-0.19	**0.58**	**0.55**	0.15	**0.27**	0.22
	(-2.18)	(8.65)	(3.72)	(-1.44)	(12.80)	(4.75)	(1.02)	(3.85)	(1.35)
All firms	-0.18	**0.67**	**0.63**	-0.04	**0.74**	**0.63**	**0.31**	**0.49**	**0.19**
	(-1.57)	(16.00)	(7.24)	(-0.34)	(26.38)	(6.20)	(3.19)	(7.53)	(2.16)

Notes: Real GDP is logged and HP filtered. All other series are HP filtered only. Assets is total assets (totlas). Profits is income before extraordinary items (incbei). Retained earnings includes appropriated and unappropriated retained earnings (retear). Dividends is total dividends (divtot). The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Table 8: Cyclical behavior of leverage: level approach

Size classes	**Liabilities/A and**			**Debt/A and**			**LT Debt/A and**		
	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}	GDP_{t-1}	GDP_t	GDP_{t+1}
$[0, 25\%]$	**0.45**	0.14	-0.01	**0.42**	0.09	-0.02	**0.42**	**0.19**	0.01
	(2.53)	(1.50)	(-0.05)	(2.24)	(0.65)	(-0.12)	(3.31)	(2.40)	(0.05)
$[0, 50\%]$	**0.21**	0.01	-0.30	**0.29**	-0.06	**-0.42**	0.17	-0.24	**-0.37**
	(1.80)	(0.03)	(-1.17)	(3.69)	(-0.44)	(-2.43)	(1.49)	(-1.60)	(-3.42)
$[0, 75\%]$	0.13	-0.04	**-0.39**	**0.38**	**0.22**	**-0.46**	**0.15**	0.10	**-0.48**
	(1.26)	(-0.20)	(-1.79)	(3.77)	(2.77)	(-2.50)	(2.08)	(1.09)	(-2.01)
$[0, 99\%]$	-0.00	-0.36	**-0.47**	-0.02	**-0.39**	**-0.48**	-0.16	**-0.48**	**-0.47**
	(-0.03)	(-1.53)	(-3.16)	(-0.10)	(-4.15)	(-2.49)	(-0.77)	(-6.12)	(-2.34)
$[90, 95\%]$	0.14	**-0.34**	**-0.53**	0.10	**-0.41**	**-0.76**	-0.05	**-0.48**	**-0.70**
	(1.46)	(-3.16)	(-7.93)	(1.04)	(-3.61)	(-14.17)	(-0.50)	(-5.64)	(-11.62)
$[95, 99\%]$	-0.21	**-0.33**	**-0.29**	-0.25	**-0.31**	-0.12	**-0.29**	**-0.33**	-0.15
	(-1.37)	(-1.79)	(-1.82)	(-1.41)	(-3.19)	(-0.79)	(-1.69)	(-4.12)	(-0.98)
$[99, 100\%]$	0.08	**-0.36**	**-0.73**	**0.49**	-0.10	**-0.47**	**0.43**	-0.14	**-0.47**
	(0.51)	(-6.17)	(-9.91)	(2.32)	(-1.10)	(-3.79)	(1.86)	(-1.52)	(-3.84)
All firms	0.06	**-0.43**	**-0.72**	**0.39**	**-0.21**	**-0.51**	**0.28**	**-0.30**	**-0.51**
	(0.37)	(-2.67)	(-8.11)	(3.85)	(-2.78)	(-2.20)	(2.93)	(-3.55)	(-2.04)

Size classes	**Liabilities/A and**			**Debt/A and**			**LT Debt/A and**		
	ΔA_{t-1}	Δ A_t	Δ A_{t+1}	Δ A_{t-1}	Δ A_t	Δ A_{t+1}	Δ A_{t-1}	Δ A_t	Δ A_{t+1}
$[0, 25\%]$	0.12	-0.17	-0.25	0.14	-0.01	-0.18	0.06	0.03	-0.10
	(1.07)	(-0.72)	(-0.93)	(0.69)	(-0.05)	(-0.59)	(0.28)	(0.15)	(-0.37)
$[0, 50\%]$	**-0.35**	**-0.64**	**-0.47**	-0.11	**-0.39**	**-0.44**	**-0.12**	**-0.32**	**-0.44**
	(-2.77)	(-2.68)	(-3.04)	(-0.82)	(-5.19)	(-3.08)	(-4.69)	(-3.18)	(-3.30)
$[0, 75\%]$	-0.17	**-0.49**	**-0.63**	0.24	-0.00	**-0.44**	0.15	-0.07	**-0.49**
	(-1.00)	(-4.81)	(-8.59)	(1.36)	(-0.03)	(-11.27)	(1.28)	(-0.47)	(-3.19)
$[0, 99\%]$	**0.32**	**0.26**	**-0.47**	**0.27**	0.15	**-0.44**	**0.20**	-0.00	**-0.54**
	(2.32)	(1.87)	(-5.11)	(3.19)	(0.89)	(-5.94)	(2.11)	(-0.01)	(-7.04)
$[90, 95\%]$	0.16	**0.29**	-0.10	0.10	0.32	**-0.48**	0.06	0.14	**-0.56**
	(0.94)	(2.06)	(-0.46)	(0.69)	(1.46)	(-2.28)	(0.42)	(0.65)	(-3.20)
$[95, 99\%]$	**0.34**	**0.39**	**-0.31**	**0.48**	-0.04	**-0.39**	**0.48**	-0.07	**-0.40**
	(2.24)	(5.20)	(-2.76)	(9.22)	(-0.39)	(-5.94)	(8.15)	(-0.64)	(-5.11)
$[99, 100\%]$	-0.14	-0.24	**-0.64**	**0.50**	**0.58**	**0.36**	**0.49**	**0.55**	0.33
	(-1.46)	(-1.54)	(-15.21)	(6.55)	(3.40)	(1.74)	(6.15)	(3.16)	(1.54)
All firms	**0.25**	0.04	**-0.68**	**0.57**	**0.50**	-0.01	**0.54**	**0.41**	-0.11
	(2.43)	(0.32)	(-8.67)	(3.46)	(2.81)	(-0.13)	(3.66)	(2.47)	(-0.99)

Notes: Real GDP and assets are logged and HP filtered. The various definitions of leverage are HP filtered only. Liabilities is total liabilities (totlia). Assets is total assets (totlas). Debt is bank indebtness (bankin) plus debt and advances (dbtadv). Long-term debt is debt and advances (dbtadv). The standard errors are computed using the VARHAC procedure in den Haan and Levin (1997) and t-statistics are in parenthesis. The correlation coefficients statistically different from zero at the 5 per cent significance level are highlighted in bold.

Figure 1: Sale of stock, net sale of stock and change in equity

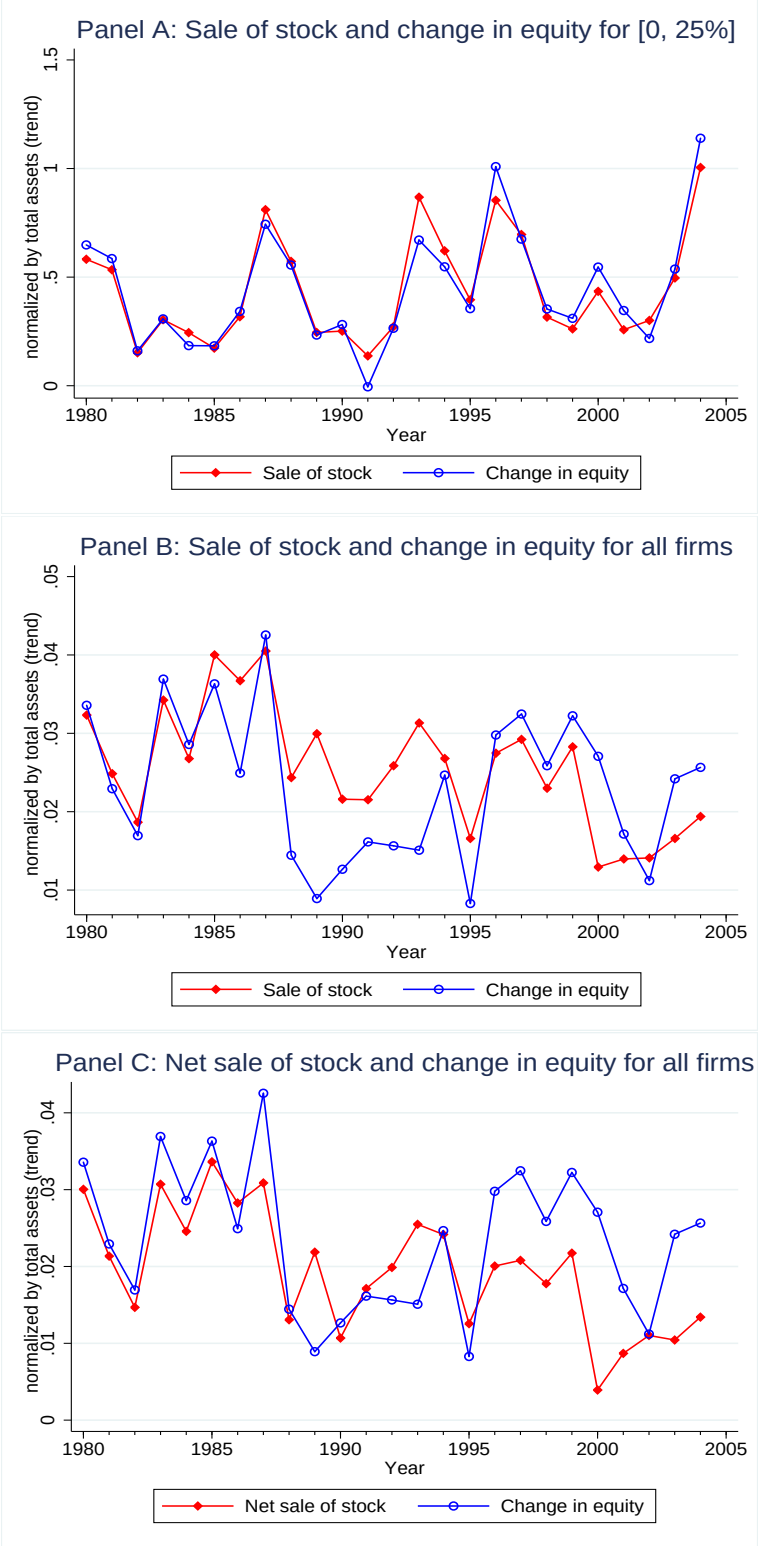
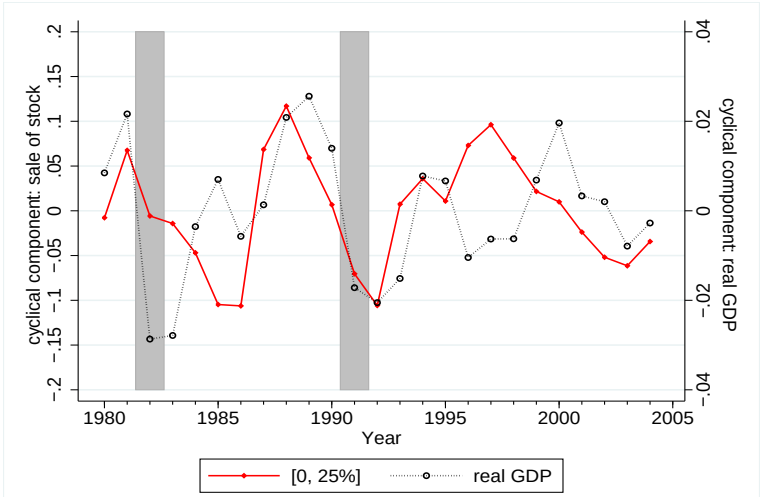
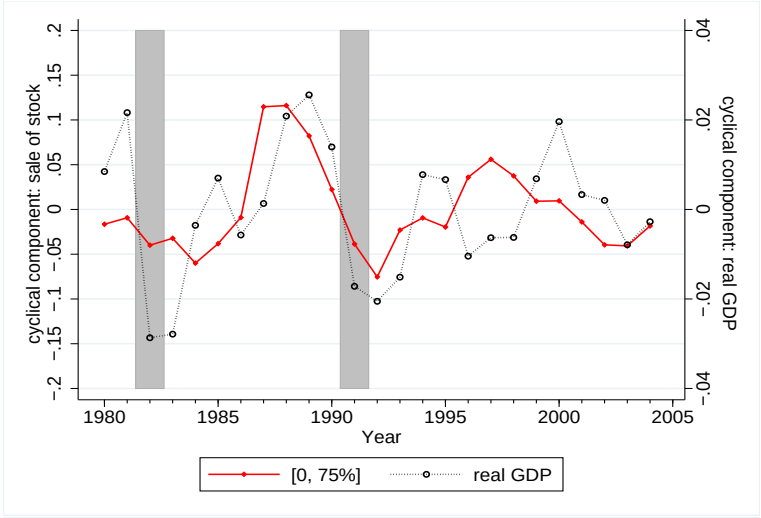


Figure 2: Cyclical behavior of sale of stock: level approach





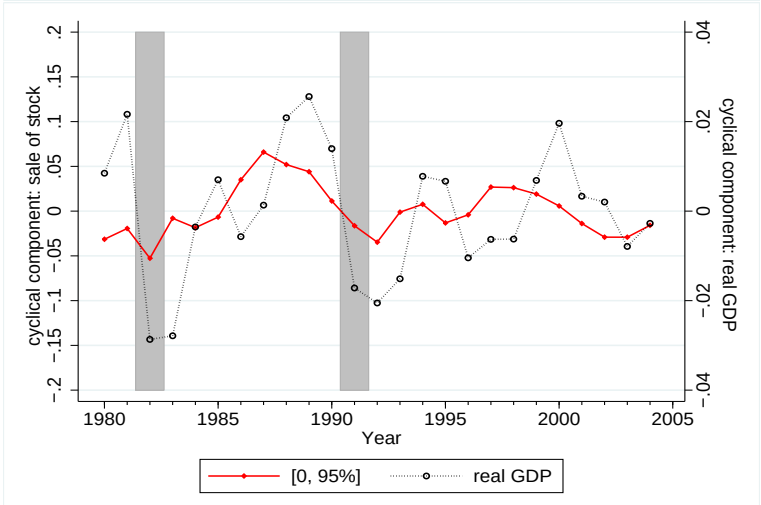
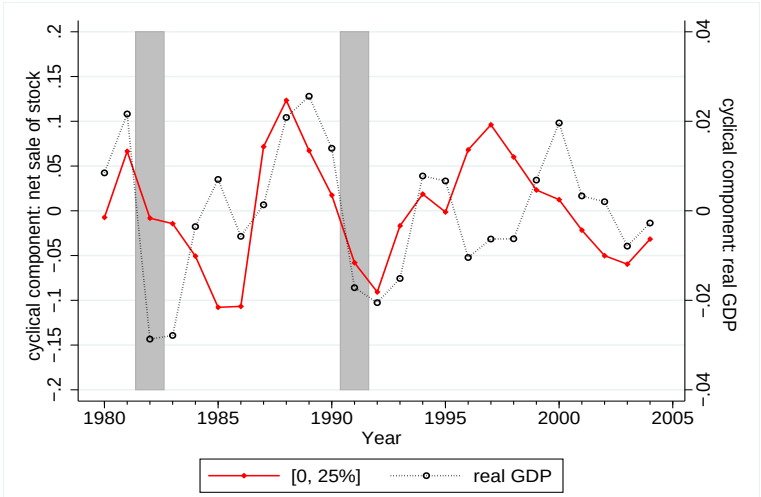
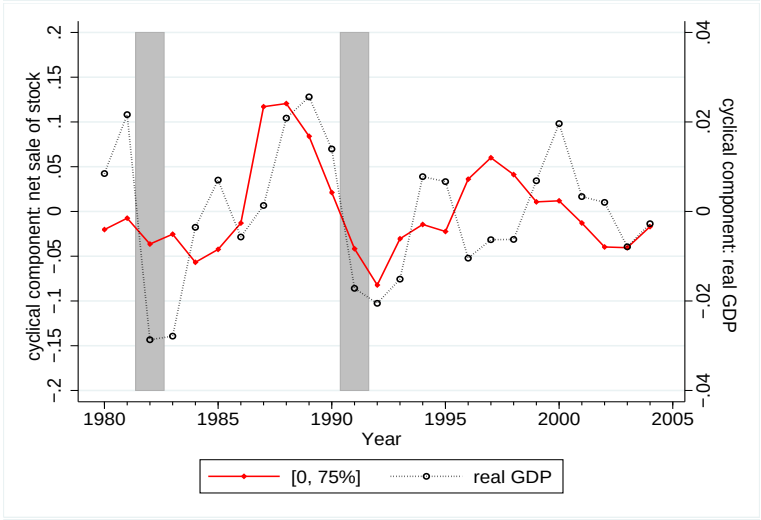


Figure 3: Cyclical behavior of net sale of stock: level approach





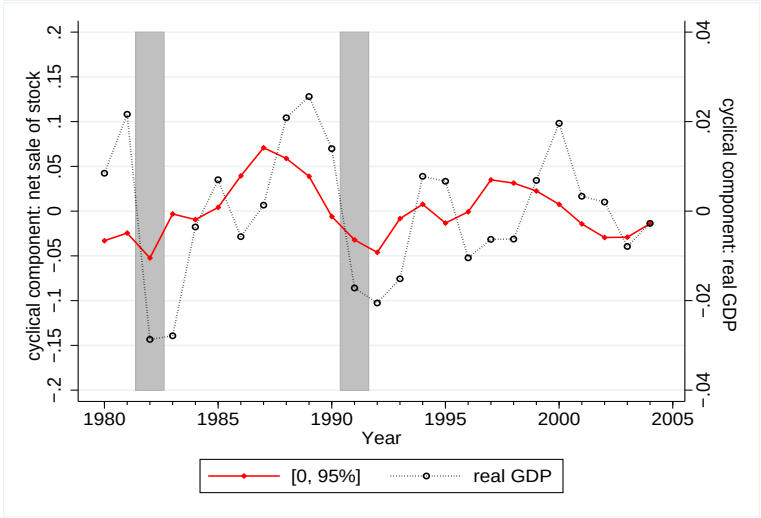


Figure 4: Cyclical behavior of change in equity: level approach

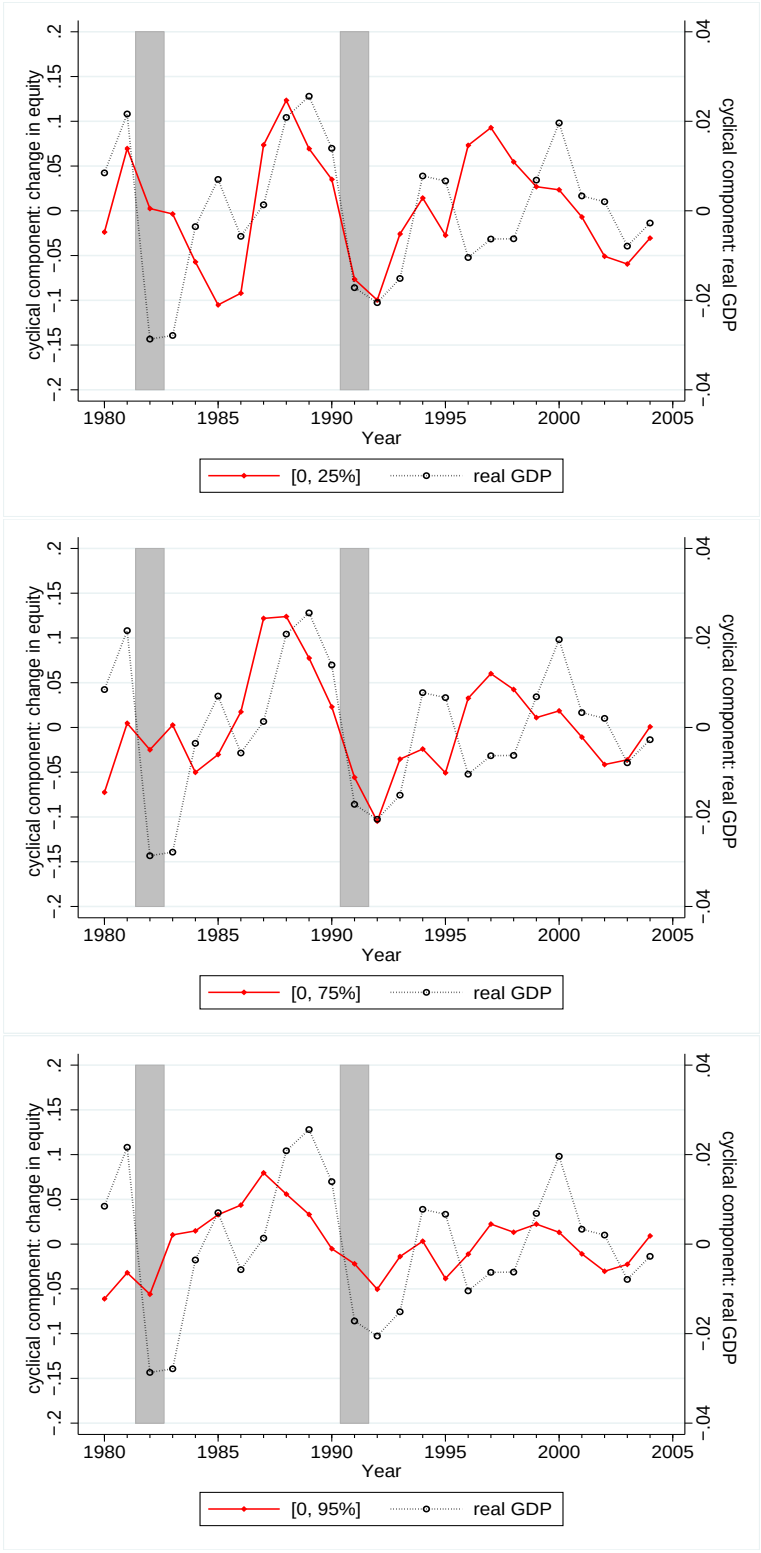
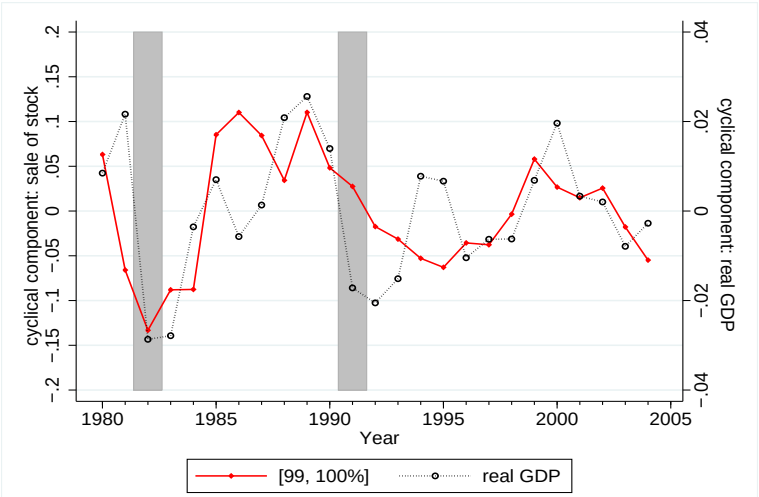
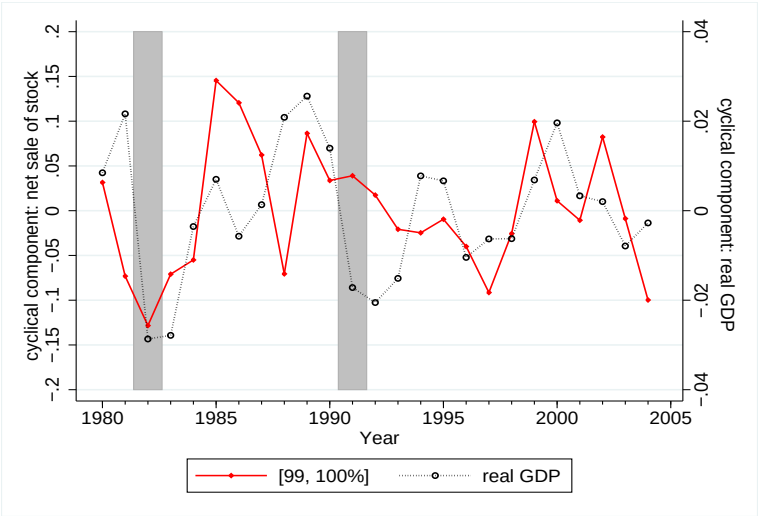


Figure 5: Cyclical behavior of equity issues: $[99, 100\%]$, level approach





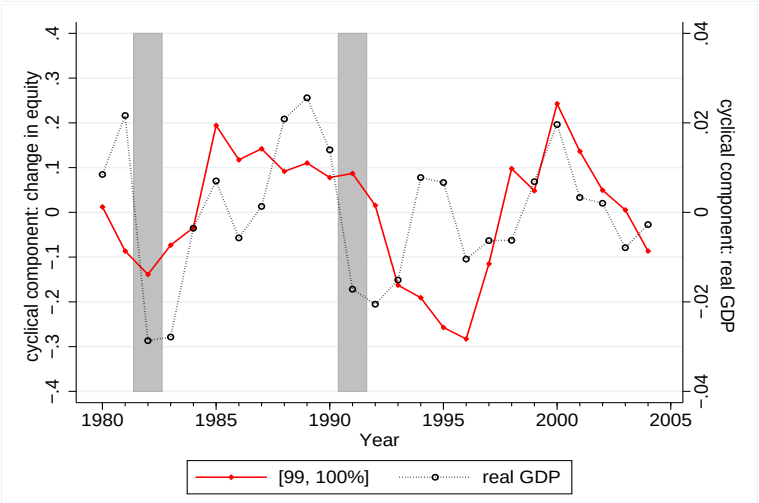
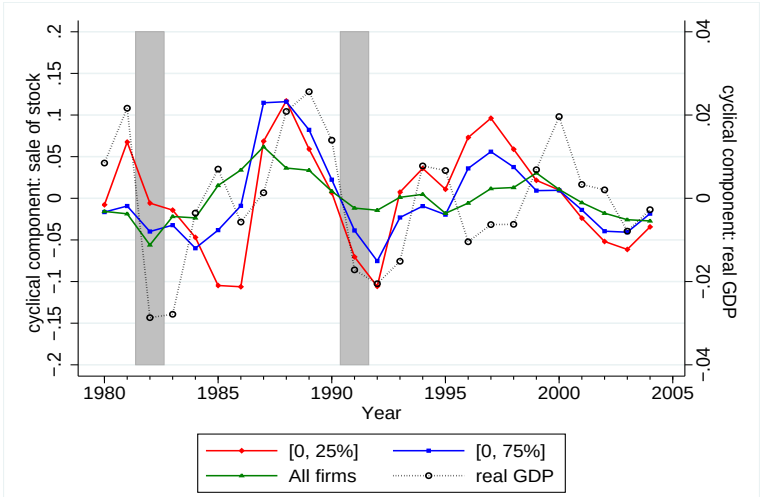
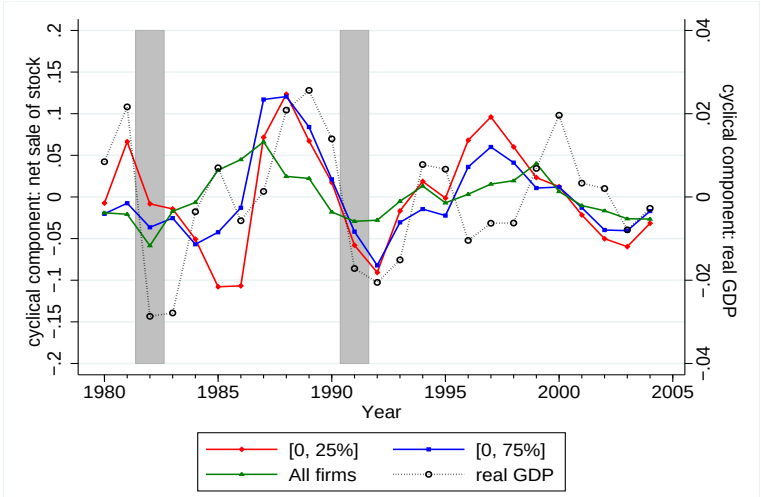


Figure 6: Cyclical behavior of equity issues for different size classes





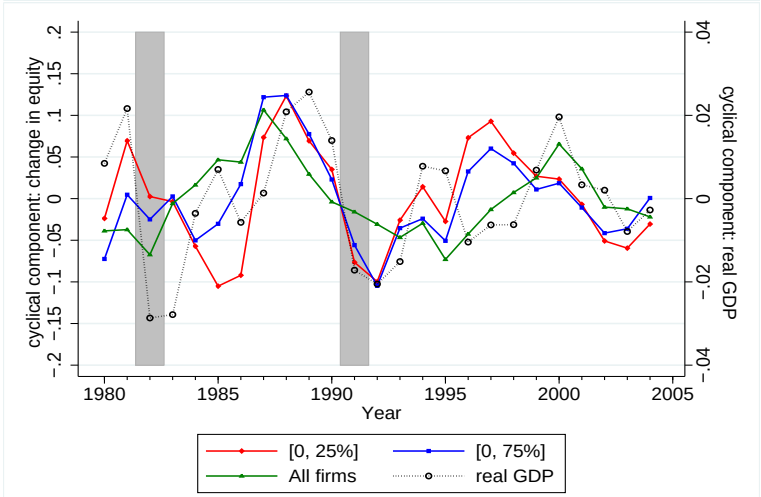


Figure 7: Cyclical behavior of net-change in bank debt for different size classes: level approach

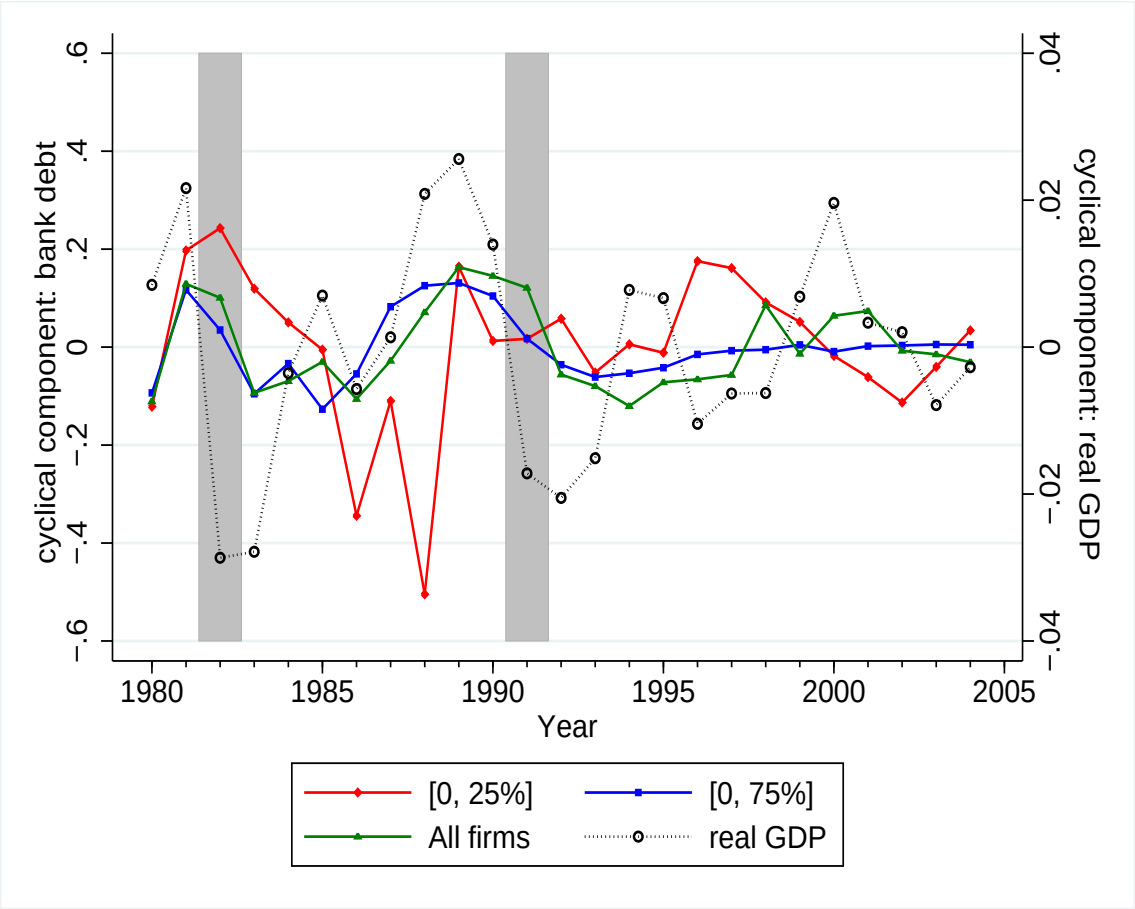


Figure 8: Cyclical behavior of net issuance of long-term debt for different size classes: level approach

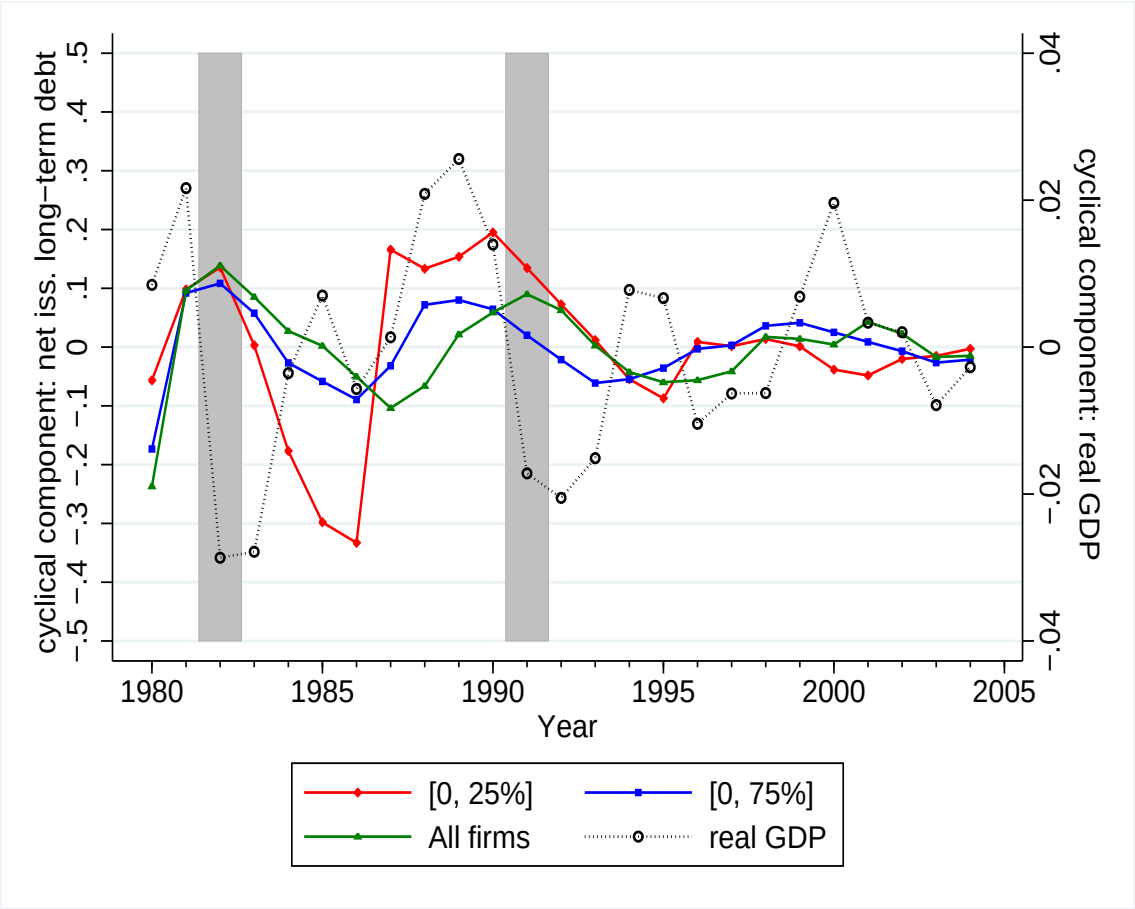


Figure 9: Cyclical behavior of net-change in liabilities for different size classes: level approach

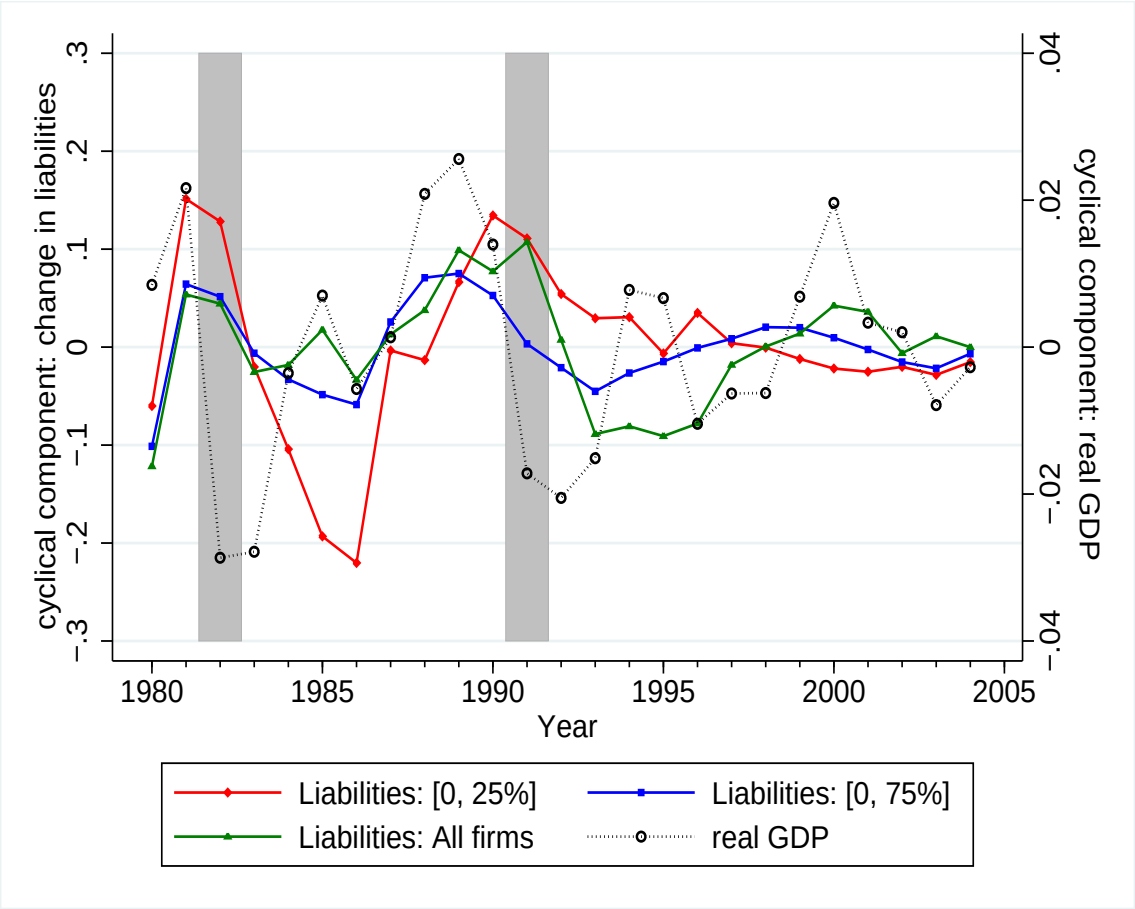


Figure 10: Co-movement between change in equity and change in liabilities: level approach

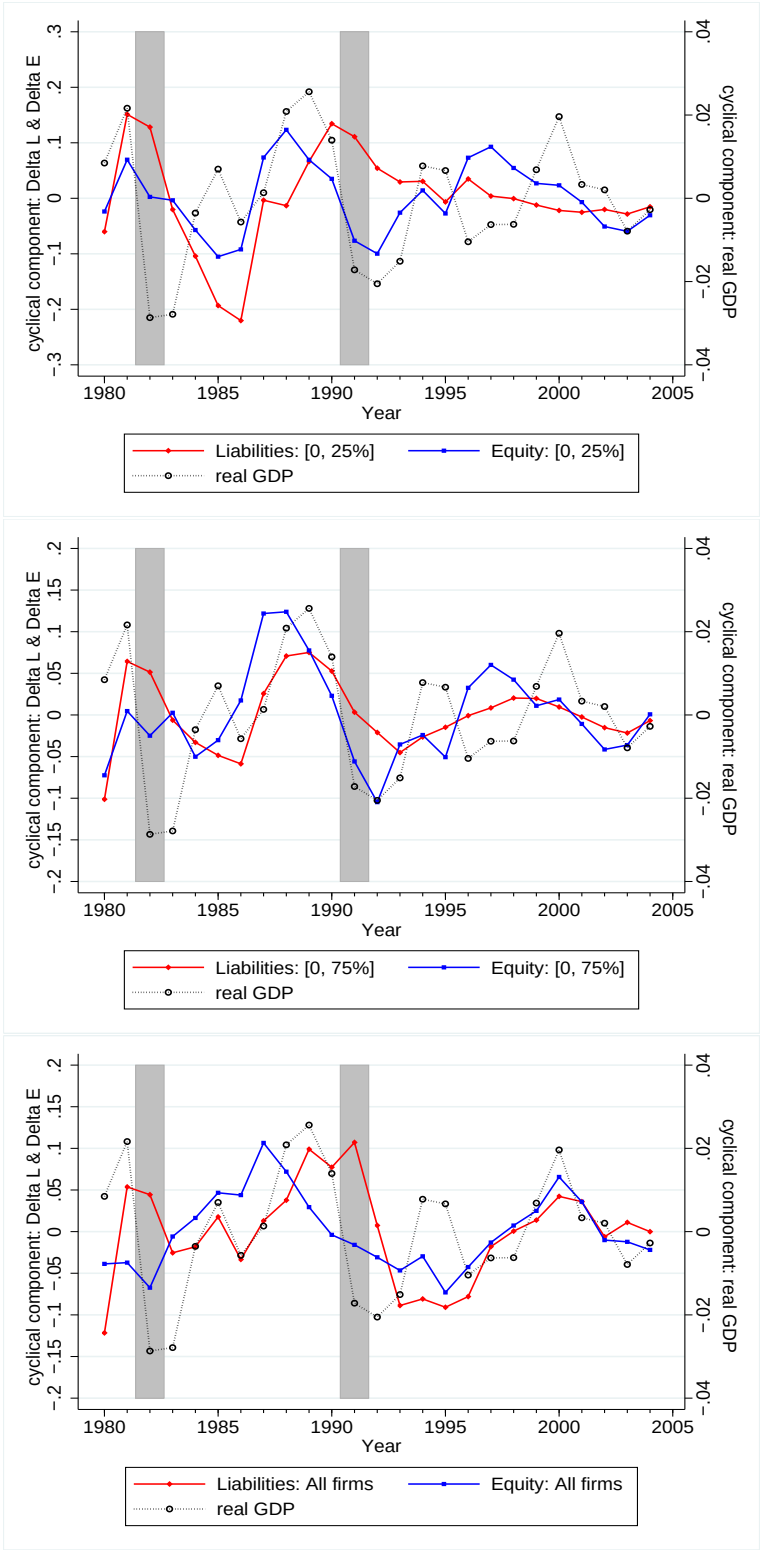
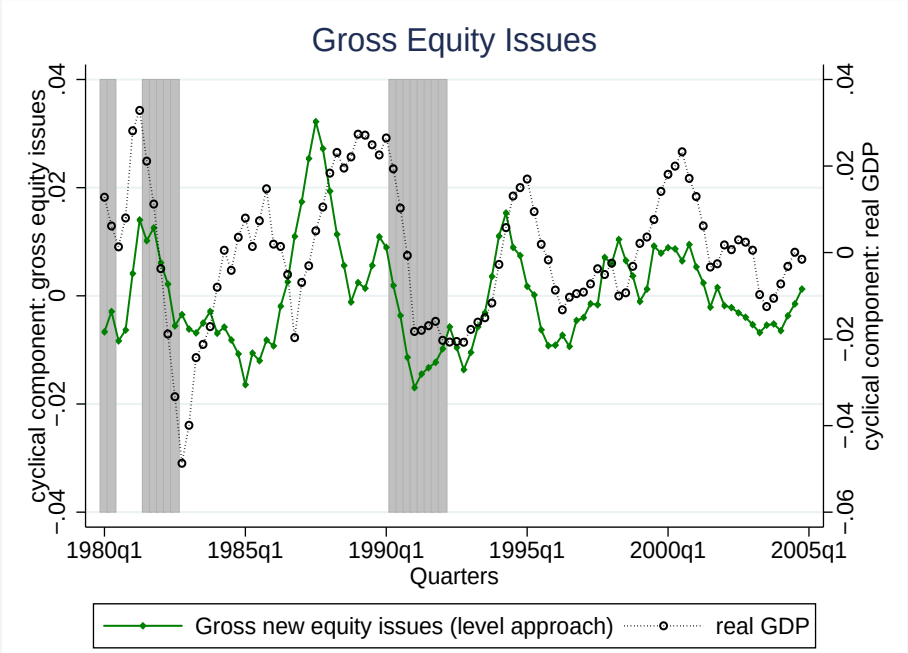


Figure 11: Cyclical behavior of gross and net sale of stock: level approach



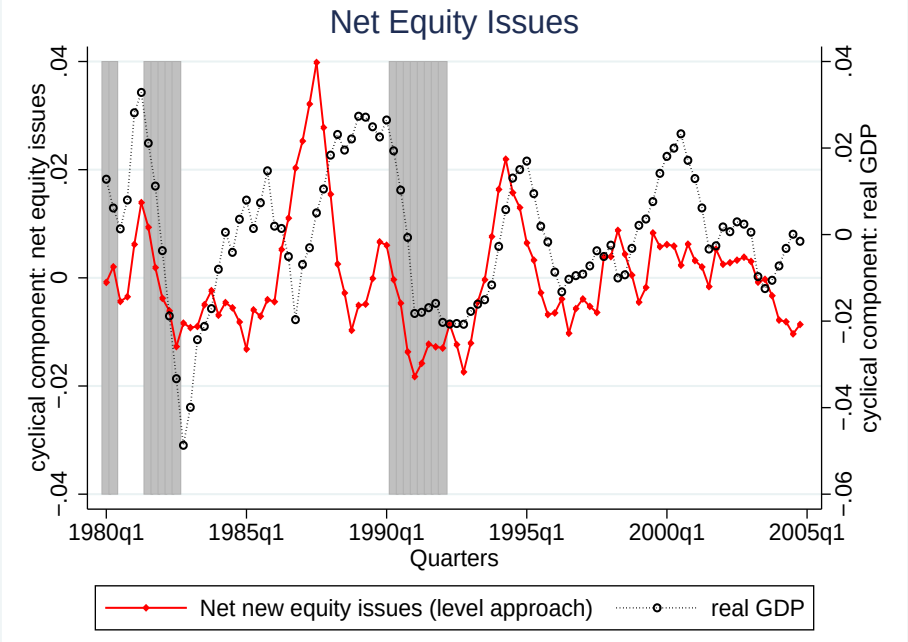


Figure 12: Cyclical behavior of gross and net issuance of corporate bonds: level approach