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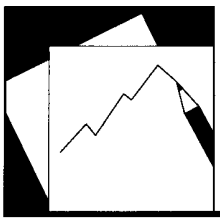

# IMF Working Paper

# Private-Sector Financial Liabilities in Advanced Economies: Is More Better?

*Man-Keung Tang*

INTERNATIONAL MONETARY FUND

 WP/07/118

**IMF Working Paper**

European Department

# Private-Sector Financial Liabilities in Advanced Economies: Is More Better? [1]

**Prepared by Man-Keung Tang**

Authorized for distribution by Luc Everaert

May 2007

## Abstract



Advanced economies have been experiencing diverse developments in accumulation of financial liabilities by their household and corporate sectors since around 1995. Cross-country-industry evidence indicates that the type of the financial system and the degree of labor market flexibility matter for the economic impact of expanded borrowings. Especially in countries with a more arm's length-based financial system and less rigid labor market, faster creation of corporate liabilities in recent years appears to have spurred growth of industries more reliant on external finance, and strengthened the development of growing industries. The findings suggest an association of recent increases in corporate borrowings with a reduction in costs of external finance and improvement in resource allocation—two supposed channels through which finance facilitates growth.

JEL Classification Numbers: G21, G28, O40, J21

Keywords: Financial development, financial system, labor market, economic growth

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[1] The project was first suggested by Julio Escolano and subsequently benefited from his stimulating discussion and valuable advice, for which I am very grateful. I would also like to thank Luc Everaert, Subir Lall, Ilia Rainer, Philip Schellekens, Edda Zoli, and seminar participants at the IMF for their useful comments at various stages of the project. All errors are mine.

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## I. INTRODUCTION

In many advanced economies, the private sector has recently accumulated financial liabilities at a very rapid pace, starting from an already high level.[2] The average level of private sector liabilities increased from 114 percent of GDP in 1995 to 143 percent of GDP in 2004 for a group of 18 advanced economies.[3] In other words, the rate of buildup in private sector liabilities outpaced real GDP growth by more than 2.5 percentage points on average every year during the period. In contrast, between 1986 and 1995, the average private-credits-to-GDP ratio of these countries increased by a mere 0.8 percentage points per year in the nine years between 1986 and 1995.[4]

As interestingly, behind this average lies a high degree of heterogeneity across countries since around 1995 (Figure 1).[5] Prior to 1995, countries exhibited rather uniform, and relatively small, changes in their credit-to-GDP ratios. However, cross-country variation in the speed of credit accumulation became much more pronounced after 1995. In particular, the cross-country standard deviation of changes in this ratio doubled between the pre- and post 1995 periods (from 0.13 to 0.27). Measured by the private sector liabilities as a share of GDP (Figure 2), Portugal has shown the most drastic increase, by 90 percentage points between 1995 and 2004. At the other end of the spectrum, Japan and Canada experienced a decline in the ratio, while Finland and France saw a small increase of 9 and 15 percentage points, respectively.[6]

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[2] Private sector financial liabilities, the main measure in this paper, is defined as all loans and securities liabilities (including derivatives but excluding shares) incurred by households and nonfinancial corporations. The data, which are consolidated, are taken from the national accounts dataset of OECD and the financial accounts dataset of Eurostat. By definition, this measure includes all credits created by off-balance-sheet financial transactions (e.g., loans securitized by the lending institutions). Credits or liabilities mentioned in the following all refer to those accumulated in the (nonfinancial) private sector only, unless specified otherwise.

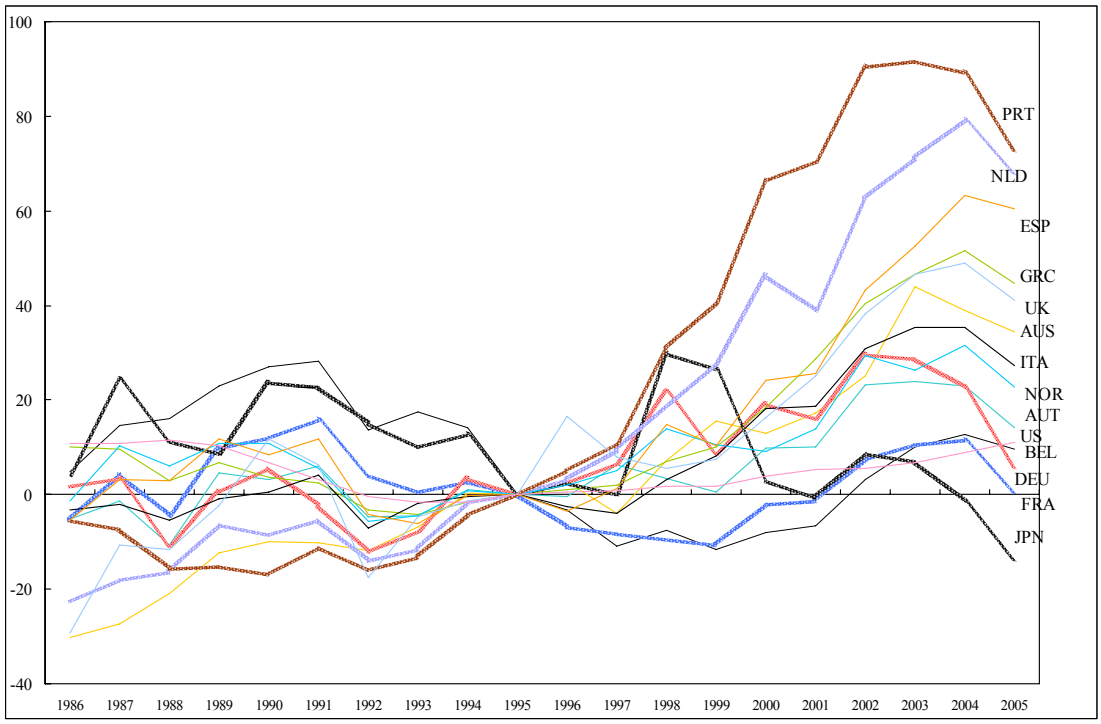
[3] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States.

[4] This number is based on data on bank credits to the private sector (from IFS, line 22d), instead of private sector liabilities due to limitation of data on the latter measure for years before 1995. It is useful to note, however, that changes in bank credits closely track changes in private sector liabilities for 1995-2004.

[5] Figure 1 is derived from data on bank credit to the private sector. See the previous footnote for definitions.

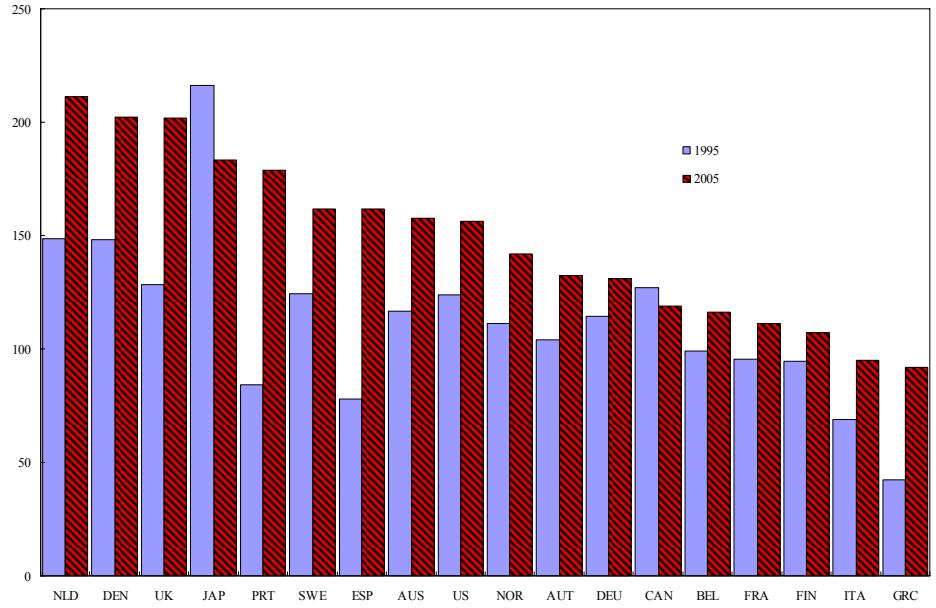
[6] The recent development of a variety of financial derivatives that do not directly fall into firms' liabilities is not explicitly considered here. Many derivatives enable creditors to better diversify risks or pursue credit instruments that cater to their specific needs, which in turn encourages more issuance of liabilities. Therefore, the extent of development of those derivatives should be reflected in countries' buildups in liabilities, which this paper considers.

Figure 1. Credit-to-GDP Ratio, 1996-2005 (normalized to zero at 1995)
(in percent)




Source: IMF IFS

Figure 2. Household and Nonfinancial Corporation Liabilities, 1995 and 2005 1/
(in percent of GDP)




Source: Eurostat and OECD
Note: 1/ Data are up to 2004 for AUS, CAN, FIN, FRA, DEU, SWE and US, and 2003 for JPN.

While many previous studies have examined the long-term effects of financial deepening, economic inferences directly drawn from those studies may be misleading given the relatively uncommon (both time-series- and cross-country- wise) nature of the recent developments.[7] In many countries, the recent increases in liabilities not only are much more rapid relative to the historical standard, but they also are unaccompanied by comparable increases in similarly developed countries. The pointed differences raise concerns about whether the recent rise in indebtedness in the countries studied simply represents a beneficial continuation of, or a potentially disruptive deviation from, the countries' long-term financial development.

Against this background, this paper has a two-fold purpose. First, it documents the basic facts about the pattern of accumulation of private sector liabilities in advanced economies during 1995-2005. Second, drawing on the countries' varied experiences, it examines the economic implications of the recent buildups in liabilities at the industry level. Particular focus is placed on the assessment of the financial sector's effectiveness in intermediating credits and the conditions under which it could be enhanced.

This paper contributes to the literature by exploiting the cross-country variation in analyzing the effects of the recent developments of private-sector indebtedness in advanced economies. Many previous cross-country studies on credit growth have focused on emerging market economies, with emphases on financial sector stability.[8] For advanced economies, on the other hand, the topic of recent credit growth has been discussed mostly on individual-country basis.[9]

On investigating the relationship between finance and economic outcomes, this paper extends the existing industry-level studies (e.g., Rajan and Zingales, 1998, and Beck and Levine, 2002) by analyzing the impacts of changes—rather than level—of credits on industry performance, thus explicitly controlling for the effects of unobserved country fixed factors (e.g., geography-driven comparative advantage) on industry structure. Moreover, studying the ongoing evolution of liabilities accumulation instead of the "steady state" allows this paper to yield more focused policy implications.

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[7] King and Levine (1993), DeGregorio and Guidotti (1995), among many other cross-country studies, show a strong positive association between financial development and growth for a wide set of countries. Panel analyses by Levine, Loayza and Beck (2000) reaffirm the association. For the small group of OECD countries, Bassanini, Scarpetta and Hemmings (2001), and Leahy, Schich, Wehinger, Pelgrin and Thorgeirsson (2001) find significant long-run relationships between financial development and, respectively, growth and investment, although Favara (2003) raises skepticism about the causality of the results.

[8] See, for example, Cottarelli, Dell'Ariccia, and Vladkova-Hollar (2003), Hilbers, Otker-Robe, Pazarbasioglu and Johnsen (2005), and the references therein.

[9] For example, Brzoza-Brzezina (2005), Fernandez de Lis, Pages, and Saunrina (2000). An exception is Moreno-Badia (2007). Her cross-country study examines the effects of recent credit growth on banks' vulnerability in advanced (Euro-area) economies.

This paper's findings from cross-country-industry analyses suggest that elements that supposedly relate finance to economic benefits are present in the sample, especially in countries with a more arm's length-based financial system—one in which transactions are typically based on publicly available information rather than long-standing relationships—and a less rigid labor market. Particularly in those countries, faster creation of corporate liabilities in recent years appears to spur growth of industries more reliant on external finance, and strengthen the developments of growing industries. The results thus suggest association of recent increases in corporate borrowings with a reduction in the costs of external finance and an improvement in resource allocation—two supposed channels through which finance facilitates growth. The association is stronger where the financial system has a greater arm's length content and the labor market is more flexible.[10]

Since the main focus of this paper is to study the economic effects of the recent rise in the availability of finance, equity finance—which, in terms of both level and trend, has been dwarfed by debt finance as a source of funds for firms—is not explicitly examined here. Although new issuances of shares have been frequent, they often serve the purpose of mergers and acquisitions: acquirers exchange their newly issued shares for targets' existing shares, thus resulting in only a shift in ownerships but not an increase in capital at firms' disposal. Moreover, prevalence of such activities as share buybacks and leveraged buyouts implies that *net* equity finance in fact constitutes a much smaller amount than *gross* equity finance. For the sample countries, net equity finance (through issuance of both quoted and unquoted shares) has drifted up by only about 1.5 percent of GDP over the last 10 years, while corporate borrowings have leapt by 20 percent of GDP during the same period.[11] [12]

The rest of the paper is organized as follows. Section II briefly describes some basic facts about the recent developments in accumulation of private sector liabilities in advanced economies. Section III infers the economic implications of such developments from cross-country-industry-level evidence. Section IV concludes.

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[10] This paper abstracts from the effects of credit growth on financial stability. Some previous studies based on a large group of countries have found that rapid credit growth often precedes balance-of-payments and/or banking crises (see, e.g., Demirguc-Kunt and Detragiache, 1998, Kaminsky, Lizondo, and Reinhart, 1998, and Gourinchas, Valdes, and Landerretche, 2000); but Moreno-Badia (2007) finds no direct adverse effects of credit growth on banking-sector stability across the euro area in recent years, although the possible sharp credit contraction that could follow poses risks to banks.

[11] Information on net equity finance is based on countries' flow of funds accounts.

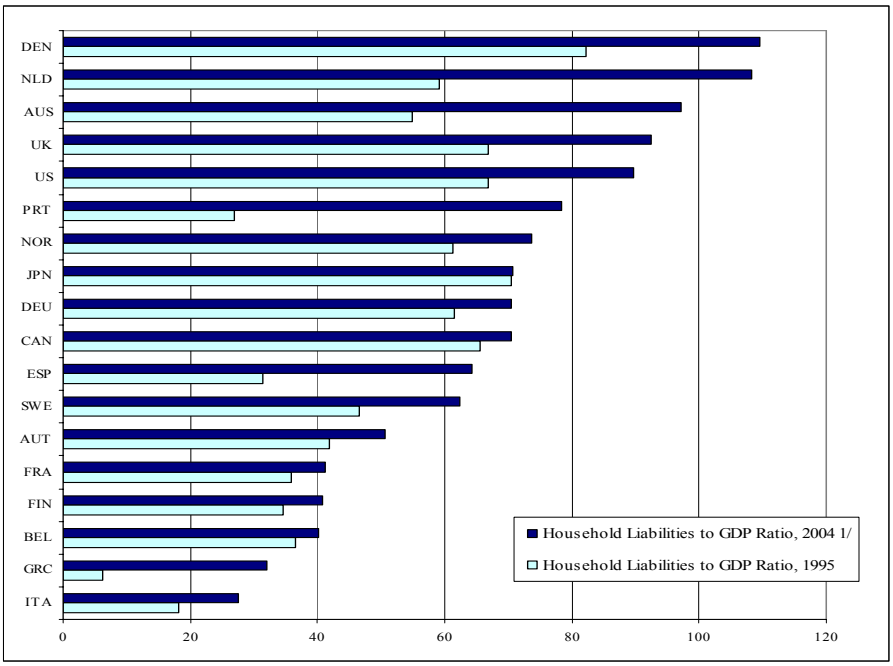
[12] Qualitatively, corporate borrowing is also arguably superior to equity financing as a measure of availability of finance. Corporate finance theories suggest that due to agency problems, equity finance is lower on the pecking order than borrowing (i.e., firms prefer raising capital through borrowing to through issuing equity, ceteris paribus). Thus, increases in net equity financing might indeed be a result of tightening finance conditions as firms have to rely more on the less preferred source of funds. Empirically, the coefficient estimates on net equity finance are insignificant if included in this paper's regressions.

## II. Recent Developments in Financial Liabilities

### A. Households Set the Pace and Continue to Display Large Cross-Country Variation

Households have been accumulating liabilities at a faster speed than corporations. On average, they accounted for more than half (53.7 percent) of the overall increase in private sector liabilities. This is in spite of the fact that, on average, only 41.7 percent of the total liabilities is composed of household liabilities in 1995. Over the period, therefore, household liabilities as a share of total private sector liabilities have jumped to 46.2 percent. For 12 of the 18 countries, there has been an increase in the percentage of total liabilities going to the household sector.[13]

Figure 3. Household Liabilities to GDP Ratio, 1995 and 2004
(in percent)




Source: Eurostat and OECD
Note: 1/ Data for Japan re up to 2003

As a share of GDP, average household liabilities increased from 48 percent in 1995 to 68 percent in 2005. All the countries in the sample experienced a rise in household liabilities as a share of GDP, even Japan and Canada where total liabilities grew at a slower pace than GDP (Figure 3). Portugal, the Netherlands, Australia and Spain showed the sharpest increases, with household liabilities going up by more than 30 percent of GDP. Households in Japan, Belgium and Canada became only marginally more indebted, with their liabilities rising by less than 5% of GDP.

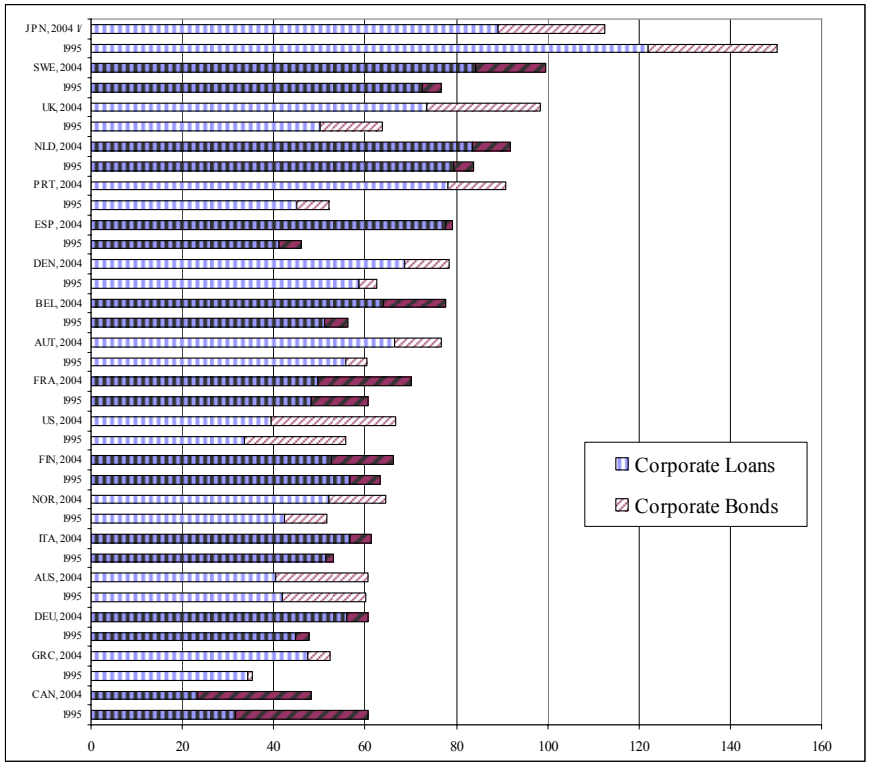
[13] The 12 countries whose household liabilities show an increase in share are DNK, US, AUS, NLD, ESP, SWE, FIN, PRT, ITA, and GRC, JPN and CAN.

There is virtually no cross-country correlation between the initial level of household indebtedness and the subsequent change. The level of household indebtedness varies a lot across countries (ranging from 110 percent of GDP in Denmark to 28 percent of GDP in Italy in 2005). This disparity seems to have neither significantly widened nor narrowed over the last 10 years.

## B. Corporate Sector Debt Expands Strongly From a High Base and Loans Remain Dominant

On average, corporate liabilities as a share of GDP have increased from 63 percent in 1995 to 75 percent in 2005. However, excluding Japan, the increase is appreciably stronger, from 58 percent to 73 percent of GDP. The corporate sectors in Portugal, the UK and Spain have shown the largest increase in borrowings as a share of GDP, by more than 30 percentage points of GDP (Figure 4). In Japan and Canada, growth in corporate liabilities was slower than GDP, while in Australia and Finland corporate indebtedness rose by less than 5 percentage points of GDP.

Figure 4. Corporate Liabilities to GDP Ratio, 1995 and 2004
(in percent)




Source: Eurostat and OECD
Note: 1/ Data for Japan are up to 2003

The cross-country variation in the level of corporate liabilities is, excluding outlying Japan, much smaller than that in the household liabilities, though it has also increased. Excluding Japan, the standard deviation in corporate liabilities is 11 percentage points in 1995 and

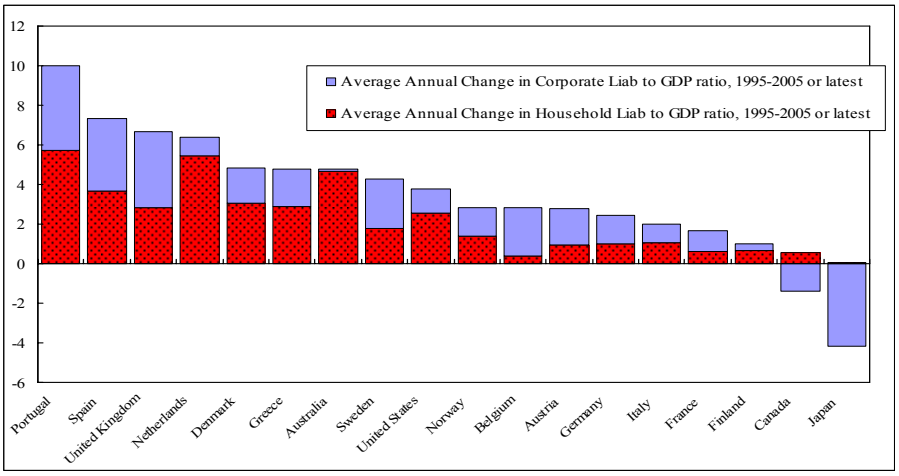
15 percentage points in 2004 across countries, while the corresponding figures for household indebtedness are higher at 20 percentage points and 25 percentage points, respectively, even though the average level of household indebtedness is lower.

Despite considerable expansion of corporate bond markets, loans remain corporations' core source of borrowed funds. Loans accounted for 81 percent of total corporate liabilities in 2004, down from 85 percent in 1995. The corporate sectors in Finland and Sweden have experienced the largest shift away from loans, with loans as a share of corporate liabilities declining by 10 percentage points. Companies in France and the Anglo-Saxon countries, however, remained relatively the most likely to raise borrowed funds through bond markets. In each of these countries securities account for more than 25 percent of the total corporate borrowings.

## C. Household and Corporate Liabilities Expand in Sync

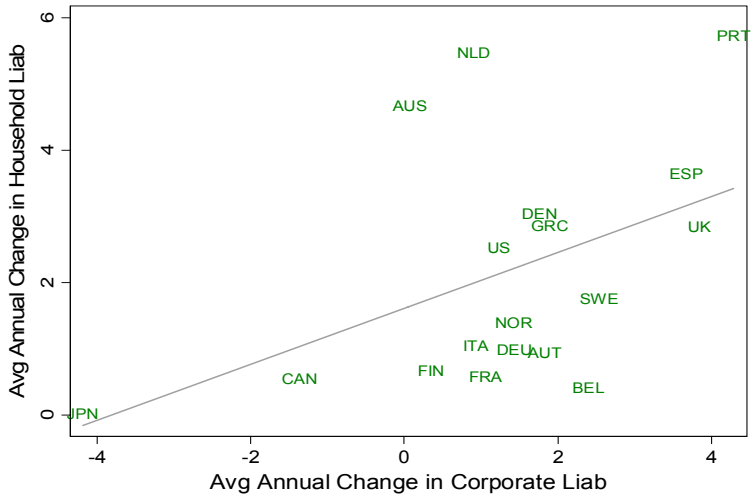
Another feature of the data that stands out, besides the considerable average increase in liabilities during the period, is the large variation in this increase across countries. The cross-country mean of the average annual change in the total liabilities to GDP ratio is 3.7 percentage points, which is almost matched by the standard deviation (3.3 percentage points). Three mechanical forces contribute to the large cross-country variation: the large differences in changes in liabilities in the household and corporate sectors, and the cross-country concurrence between changes in liabilities in the two sectors.

Figure 5. Composition of Change in Total Private-Sector Liabilities, 1995-2005 (or latest)
(in percent of GDP)




Source: Eurostat and OECD

Figure 6. Change in Household Liabilities vs. Change in Corporate Liabilities, 1995-2005
(in percent of GDP)




Source: Eurostat and OECD

Not only do increases in liabilities as a share of GDP have generally occurred in both the household and corporate sectors (with the only exceptions of Canada and Japan) (Figure 5), increases in one sector are associated with increases in the other. Countries that have more rapid expansion in corporate liabilities tend to also have a larger increase in household liabilities (Figure 6). Overall, corporate liabilities account for 37 percent of the cross-country variation (variance) in changes in total liabilities, household liabilities account for 29 percent, and the concurrence between changes in liabilities in the two sectors contributes the rest.[14]

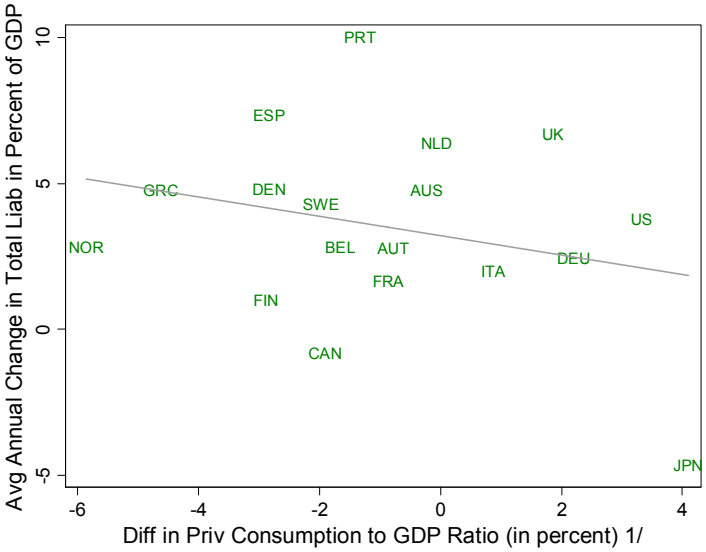
## III. Economic Implications of the Rise in Liabilities: Industry-Level Evidence

Are the recent diverse and rapid buildups of private financial liabilities across advanced economies associated with positive economic effects similar to those resulting from long-term financial development? In particular, do increases in borrowing continue to be identified with economically beneficial financial development amidst the rapid transformation of local and global financial conditions in recent years? The a priori need for separation between the two is highlighted by the observation that recent rises in liabilities in many countries have been much faster relative to the historical standard, and that they have not been accompanied by comparable rises in other similarly developed countries.

[14] Excluding Japan, which has experienced a very sharp decline in corporate liabilities as a share of GDP, corporate liabilities would have contributed 28 percent, and household liabilities 41 percent, of the overall variance.

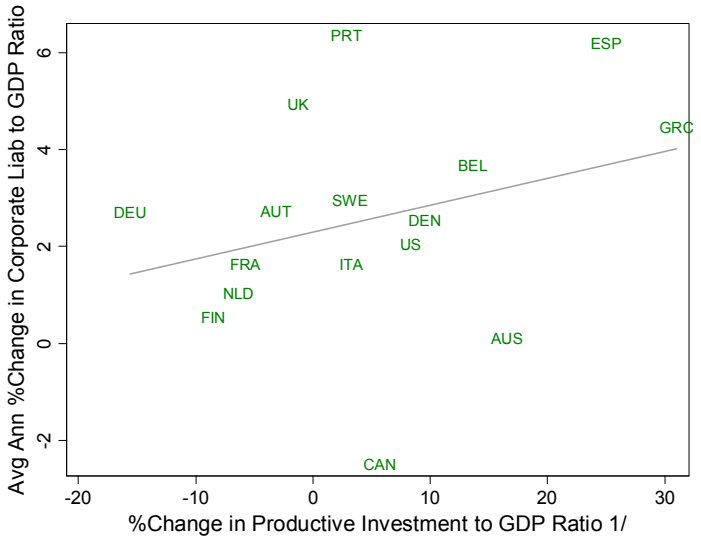
Figure 7. Change in Composition of Expenditure Share

A. Change in Private Consumption as a Share of GDP



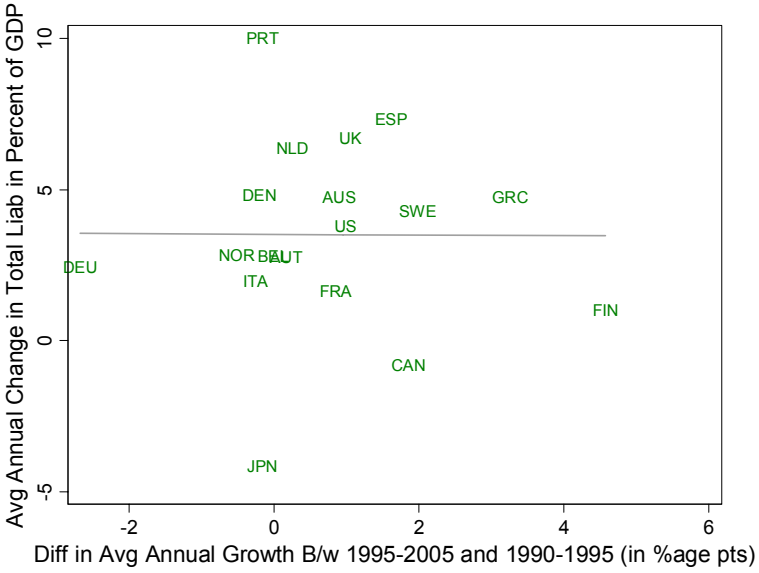

Source: WEO
Note: 1/ Difference in private consumption-to-GDP ratio between 2001-2005 and 1990-1994

B. Change in Productive Investment as a Share of GDP




Source: Eurostat and OECD
Note: 1/ Percentage change in the non-housing component of gross fixed capital formation as a share of GDP between 1990-1995 and 1996-2005

Figure 8. Change in Growth Between 1990-1995 and 1995-2005




Source: WEO

A simple glance at its relationships with some select macro variables does not immediately suggest a strong economic impact of increase in liabilities. Buildups in total liabilities do not seem to raise the expenditure share of private consumption—in apparent contradiction to what a typical boom-bust-cycles view would suggest (Figure 7A). And increases in corporate liabilities seem associated with rises in the expenditure share of productive investment—the non-housing component of gross fixed capital formation—that should benefit the economy in the long-run (Figure 7B). Overall, however, no relationship between increases in liabilities and economic growth appears (Figure 8).[15]

To be sure, possible relationships between increases in borrowings and growth on the macroeconomic level may be masked by other factors. There could be unobserved time-varying country-level factors affecting growth and being correlated with (though not caused by) the country's buildups in liabilities. Analyses at the macroeconomic level are also more easily susceptible to reverse causality: macroeconomic developments might also affect the economy's private sector indebtedness.[16]

One way to reduce the possible biases arising from omitted variables and reverse causality is to focus the analysis on the mechanisms through which financial development supposedly

[15] Simple growth regressions (not reported here) explicitly taking care of effects of economic convergence also fail to find any significant relationships between buildups in liabilities and economic growth.

[16] For example, faster growth might lower the measures of private sector indebtedness since GDP enters as a denominator in those measures. Moreover, temporary increases in cash flows or income as a result of higher growth might reduce corporations' and households' needs for borrowings. Such biases may obscure any positive effects of borrowings on growth.

affects growth. This calls for the use of more disaggregated data, and examination of the differential effects of finance on industries with different characteristics.

## A. Costs of External Finance

Owing to agency issues such as information asymmetry and moral hazard, firms tend to face a much higher cost of raising funds from outsiders than of making use of internal funds. To the extent that internal funds are typically insufficient to fully support firms' needs for investment, firms' growth is often inhibited by the difficulty in raising external finance.[17] Financial development could promote firms' growth by better shielding creditors from the agency problems and thus lowering costs of external finance.

In practice, different industries display different degrees of "dependence" on external finance. How much external finance a firm would need for investment would depend on, among other things, industry-specific technological factors, e.g., the capital intensity of the industry, and the amount of cash flow a typical firm in the industry can generate. Industries that need to incur larger capital expenditures and generate smaller cash flows are likely to be more financially challenged, and their development is likely to be more heavily determined by the external financial environment. A reduction in costs of external finance should therefore have relatively greater positive impacts on those industries' growth than on other industries'. This reasoning, articulated by Rajan and Zingales (1998), suggests a simple test on the nature of the recent buildups in liabilities across countries. If the buildups are associated with a general reduction in costs of external finance and relaxation of firms' financial constraints, then one should find that increases in relative growth of industries that are more reliant on external finance are higher in countries with a faster buildup in liabilities.

### Basic test

The basic specification of this test takes the following form, which is a variant of the model used in Rajan and Zingales (1998):

$$g_{ci95-03} = \alpha g_{ci87-95} + \beta_1 (E_i * \Delta L_c) + \beta_2 (E_i * X_c) + \gamma_i D_i + \delta_c D_c + \varepsilon_{ci} \qquad \text{---- 1)}$$

where

- $g_{ci95-03}$ and $g_{ci87-95}$ are the average annual real growth in value-added of industry *i* in country *c* during 1995-2003 and 1987-1995, respectively.
- $E_i$ is a country-invariant measure of dependence on external finance of industry *i* (to be discussed below).

[17] Some theories suggest that firms' borrowing from external sources could be driven by agency considerations. For instance, creditors are more strongly committed than shareholders to liquidating a firm if it has failed to perform, thus providing better incentives to managers (e.g., Dewatripont and Tirole, 1994).

- $\Delta L_c$ is the average annual change in liabilities as a share of GDP during 1995-2003 of country *c*.

- $X_c$ is a set of other country characteristics that might have differential effects across industries. In this paper's benchmark regressions, $X_c$ includes a measure of the nature of a country's financial system, its labor market flexibility, and the changes in the real short-term and long-term interest rates between 2003-2005 and 1995-1997. Measures of the financial system and labor market flexibility are intended to capture the effects of the manner in which capital is intermediated and the ease with which labor can be redeployed (see below), while the changes in interest rates are included to control for the evolution in the general financial and economic conditions that are not reflected in the private sector's actual borrowings.

- $\{D_c\}_c$ and $\{D_i\}_i$ are full sets of country and industry dummies, respectively.

If the hypothesis that buildups in liabilities are associated with a general reduction in costs of external finance is indeed true, $\hat{\beta}_1$ should be positively signed.

As with many macroeconomic analyses, a panel setting is used for this test. The main difference is that this test uses the cross-industry dimension instead of the time-series dimension of the data to supplement the cross-country information. The elimination of the time-series dimension from the analysis allows key estimates ($\hat{\beta}$'s) to be unbiased by any unobserved time-varying country-specific factors.[18]

**Measure of dependence on external finance**

The measure of an industry's dependence on external finance is taken from de Serres, Kobayakawa, Slok and Vartia (2006), who construct the measure in the same spirit as Rajan and Zingales (1998). Assuming that the technological factors governing how industries differ in their reliance on external finance persist across countries, and that the publicly listed firms in the US face relatively small costs of external finance so that their natural demands for external finance are largely satisfied, the authors take an industry's dependence on external finance (defined as capital expenditures minus cash flows from operations, divided by capital expenditures) identified from data on the US listed firms as the measure of its dependence in all other countries.[19] While Rajan and Zingales (1998) focus only on the manufacturing industries, de Serres et al.'s (2006) measure is based on 2-digit level data and covers also the services industries. Also, more suited for the purpose and sample of this paper, de Serres et

[18] Moreover, focusing on the disaggregate data enables us to control for variables that are endogeneous to country-level growth (e.g., real interest rates).

[19] See Rajan and Zingales (1998) for more discussions on the advantages of having the measure constructed based only on US data.

al.'s (2006) measure is constructed with more recent data (1990-2003), whereas Rajan and Zingales (1998) use data from the 1980s. [20]

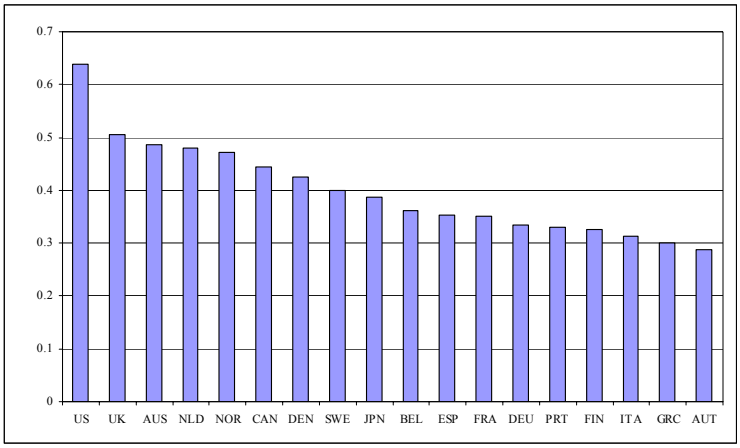
**Different types of financial systems**

The type of financial system a country has matters for how economic profits are shared between creditors and borrowers, and the way financial claims are engineered and distributed. These in turn have important implications for how much and where resources are directed, and what these resources are used for. It is thus important to control for the way financial capital is intermediated.

Quite generally, financial systems can be classified by the relative volume of transactions conducted at arm's length. A more arm's length-based financial system is one in which transactions are less driven by long-standing relationships, information tends to be diffusely distributed but effectively aggregated by markets, financial claims are priced competitively, risks are more widely spread, and contracts are more easily enforced through the judicial system.

The specific measure of financial systems used in this paper is the 1995 financial index described in the 2006 September edition of World Economic Outlook (IMF, 2006). The comprehensive index is an aggregate of three subindices that summarize the degree of traditional banking intermediation, the level of development of new financial intermediation, and the importance of the capital markets. Among other things, a higher score on the index means a more competitive banking sector, more extensive use of financial innovations, and more developed capital markets.[21]

Figure 9. Financial Index, 1995




Source: IMF (2006)

[20] See de Serres, Kobayakawa, Slok and Vartia (2006) for details of their measure construction. See Table A1 for list of industries most and least dependent on external finance.

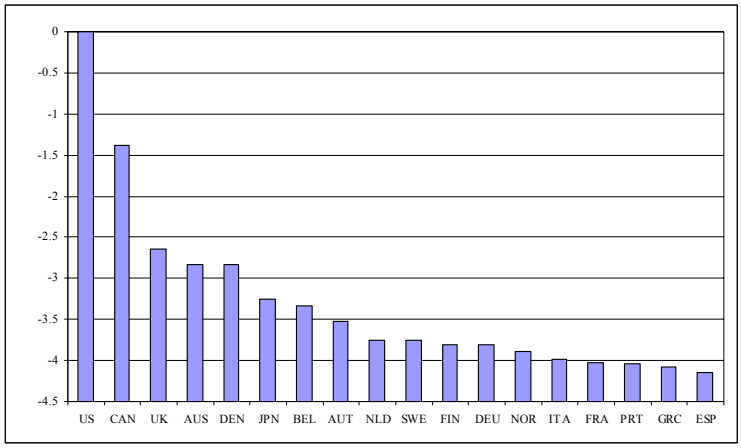
[21] See IMF (2006) for a more detailed discussion on the construction of the index.

**Labor market flexibility**

An industry's development critically depends on the flexibility of the labor market. In a rigid labor market, growth of industries facing strengthened demand and reduced costs in finance may be stunted by the high costs of hiring additional workers. Likewise, difficulty of firing existing workers might artificially prop up the output and slow the decline of industries hurt by increasingly unfavorable market factors. Moreover, to the extent that the marginal returns of financial capital in an industry depends on the amount of labor employed there, immobile labor may distort the destination and use of financial capital away from what would be otherwise optimal. Both the direct and "complementarity" effects suggest that labor market flexibility should augment the impacts of changes in the financial conditions on industries' development.

The measure of labor market flexibility adopted here is the negative of the log of the employment rigidity index taken from the earliest edition (2003) of the "Doing Business" survey published by the World Bank. The index is an average of three subindices quantifying the difficulties faced by employers of hiring workers, firing workers, and lengthening/shortening workers' work hours.[22] Since the measure is the negative of log of the index, a higher score on the measure refers to a more flexible labor market.

Figure 10. Labor Market Flexibility 1/




Source: Doing Business (2003)
Note: 1/ Index refers to –ln(1+x), where x is the employment rigidity index from "Doing Business."

[22] See http://www.doingbusiness.org/MethodologySurveys/EmployingWorkers.aspx for detailed discussion on the survey questions and the construction of the index.

## Results[23]

*The key findings emerging from the regression exercise conditionally affirm the hypothesis: increased availability of credit is associated with a general reduction in costs of external finance, but mostly only in countries with a more arm's length-based financial system and a more flexible labor market.*

On average, there is no significant evidence that increases in total liabilities are associated with a general reduction in costs of finance (Table 1, regression 1), although the coefficient estimate—on the interaction of dependence with change in total liabilities—is positive. Also, note that an increase in the real short-term interest rate disproportionately hurts industries that rely more on external finance, as one might expect. On the other hand, an increase in the real long-term interest rate, which possibly reflects a rise in the long-term expected economic health and return on business capital (Orr, Edey and Kennedy, 1995), seems associated with a general decline in the difficulty of raising external capital.

Table 1. Dependence on External Finance and Financial Systems

**Dependent Variable: Industry Growth in 1995-2003**

| | 1 | | | 2 | | | 3 | | | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Liabilities Measure*** | Total Priv Sector Liabilities | | | Total Priv Sector Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | |
| | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | |
| Dependence on External Finance * Change in Liab to GDP | 0.04 | 0.98 | | -0.49 | -3.42 | *** | 0.05 | 0.67 | | -0.88 | -3.45 | *** |
| Dependence on External Finance * Financial Index | 0.02 | 1.60 | | -0.03 | -2.36 | ** | 0.02 | 1.95 | * | -0.01 | -0.98 | |
| Dependence on External Finance * Financial Index* Change in Liab to GDP | | | | 1.35 | 4.04 | *** | | | | 2.24 | 3.93 | *** |
| Dependence on External Finance * Change in Real Short-term Interest Rate | -0.29 | -2.07 | * | -0.27 | -2.20 | ** | -0.29 | -2.07 | * | -0.28 | -2.58 | ** |
| Dependence on External Finance * Change in Real Long-term Interest Rate | 0.32 | 2.74 | ** | 0.23 | 2.13 | ** | 0.29 | 2.90 | ** | 0.23 | 2.72 | ** |
| Growth in 1987-1995 | 0.03 | 0.28 | | 0.02 | 0.24 | | 0.03 | 0.27 | | 0.02 | 0.19 | |
| Country fixed effects | Y | | | Y | | | Y | | | Y | | |
| Industry fixed effects | Y | | | Y | | | Y | | | Y | | |
| # Observations | 355 | | | 355 | | | 355 | | | 355 | | |
| R-sq. | 0.63 | | | 0.63 | | | 0.63 | | | 0.63 | | |

The t-statistcs are based on robust standard errors clustered by country
*, **, *** denote statistical significance at 10%, 5% and 1% level, respectively

[23] All industry-level data, except for the measure of industry dependence, are taken from the sectoral database maintained by Groningen Growth and Development Center. In all regressions, Japan is excluded to gain precision. Observations of industry *i* in country *c* are also excluded if industry *i* shows abnormal growth behaviors in country *c*, namely if the average annual growth of industry *i* in country *c* is greater than 20% or smaller than -20% during 1987-1995 or 1995-2003.

However, once the relationship between increases in total liabilities and costs of external finance is allowed to differ across types of financial systems, much clearer inferences can be drawn. In financial systems which are more arm's length-based, increases in total liabilities are more strongly associated with general reductions in the costs of external finance (Table 1, regression 2). The magnitude of this association is considerable in economic terms. Let's take as example a financial system that would rank at the 75$^{th}$ percentile among the sample countries on the financial index. For every percentage point by which total liabilities outgrow GDP per year on average during 1995-2003, the increase in average annual growth of an industry ranking at the 75$^{th}$ percentile in terms of dependence on external finance would be 0.1 percentage points higher than an industry ranking at the 25$^{th}$ percentile. In this context, note that during 1995-2003 the median average annual change in total liabilities to GDP ratio was 3.8 percentage points, and the median average annual growth of all industries in the sample 2 percent.

Focusing on corporate rather than total liabilities offers a further test of the posited relationship between borrowings and costs of external finance. Specifically, under this relationship, while total private liabilities should more precisely aggregate information on the common components (e.g., general tightness of the financial environment) that affect both the households and corporate sectors, corporate liabilities should much more accurately reflect the credit conditions specifically faced by firms. In econometric terms, using the measure of total liabilities might have raised the estimates' *precision*, but using corporate liabilities should improve their *accuracy*.

Indeed, dependent industries' relative growth performance is more sizably associated with changes in corporate liabilities than with changes in total liabilities (Table 1, regression 3), though using the latter produces estimates with smaller standard errors. Echoing the previous results, the association between changes in corporate liabilities and changes in relative growth of dependent industries is much stronger and more statistically significant in countries with a more arm's length based financial system (Table 1, regression 4). In a financial system that would rank at the 75$^{th}$ percentile on the financial index, for every percentage point by which corporate liabilities outgrow GDP per year on average during 1995-2003, the increase in average annual growth of an industry ranking at the 75$^{th}$ percentile in terms of dependence would be 0.12 percentage points higher than an industry ranking at the 25$^{th}$ percentile. Note also that in this arguably more accurate specification, the type of financial system itself does not significantly affect the changes in industries' growth.

The association between increases in liabilities and reductions in costs of external finance is also significantly affected by labor market flexibility. While neither labor market flexibility nor changes in total liabilities is individually related to the relative growth of dependent industries (Table 2, regression 1), their interaction is (Table 2, regression 2). In countries with a more flexible labor market, more total private sector borrowings are strongly (at 1 percent significance level) associated with faster relative growth of industries reliant on external funding sources. In line with the previous results, dependent industries' relative growth is much more sizably associated with increases in corporate liabilities than total liabilities when the association is allowed to vary across countries with differently flexible

labor markets (Table 2, regression 4). Note that the type of financial system and labor market flexibility are both likely to matter for the implications of increased liabilities for costs of external finance. In regressions including both variables (Table 2, regressions 5 and 6), each variable's effects on the association between increased liabilities and the relative growth of dependent industries are similar to (but smaller than) those shown in the regressions excluding the other variable. However, concerns about collinearity might preclude meaningful simultaneous inferences of the two variables' effects from regressions including both variables (their correlation is 0.78).

Table 2. Dependence on External Finance and Labor Market Flexibility

**Dependent Variable: Industry Growth in 1995-2003**

| | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Liabilities Measure*** | Total Priv Sector Liabilities | | | Total Priv Sector Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | | Total Priv Sector Liabilities | | | Corporate Liabilities | | |
| | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | |
| Dependence on External Finance * Change in Liab to GDP | 0.05 | 1.40 | | 0.33 | 3.48 | *** | 0.05 | 0.72 | | 0.60 | 3.82 | *** | -0.38 | -1.45 | | -0.17 | -0.45 | |
| Dependence on External Finace * Labor Market Flexibility | 0.00 | -1.17 | | 0.00 | 1.35 | | 0.00 | 1.04 | | 0.00 | 0.58 | | 0.00 | -0.47 | | 0.00 | 0.34 | |
| Dependence on External Finance * Labor Mkt Flexibility* Change in Liab to GDP | | | | 0.08 | 2.98 | *** | | | | 0.18 | 3.54 | *** | 0.02 | 0.75 | | 0.10 | 1.67 | |
| Dependence on External Finance * Financial Index | | | | | | | | | | | | | -0.04 | -1.49 | | 0.00 | -0.21 | |
| Dependence on External Finance * Financial Index* Change in Liab to GDP | | | | | | | | | | | | | 1.29 | 2.58 | ** | 1.29 | 2.09 | * |
| Dependence on External Finance * Change in Real Short-term Interest Rate | -0.29 | -1.92 | * | -0.31 | -2.83 | ** | -0.26 | -1.78 | * | -0.29 | -2.91 | *** | -0.29 | -2.54 | ** | -0.29 | -2.95 | *** |
| Dependence on External Finance * Change in Real Long-term Interest Rate | 0.34 | 2.78 | ** | 0.30 | 2.96 | *** | 0.29 | 2.95 | *** | 0.25 | 3.24 | *** | 0.24 | 2.23 | ** | 0.23 | 2.87 | ** |
| Growth in 1987-1995 | 0.03 | 0.27 | | 0.03 | 0.27 | | 0.03 | 0.28 | | 0.02 | 0.24 | | 0.02 | 0.26 | | 0.02 | 0.21 | |
| Country fixed effects | Y | | | Y | | | Y | | | Y | | | Y | | | Y | | |
| Industry fixed effects | Y | | | Y | | | Y | | | Y | | | Y | | | Y | | |
| # Observations | 355 | | | 355 | | | 355 | | | 355 | | | 355 | | | 355 | | |
| R-sq. | 0.63 | | | 0.63 | | | 0.63 | | | 0.63 | | | 0.63 | | | 0.63 | | |

Labor Market Flexibility is -ln(rigidity+1), where rigidity is the employment rigidity index from "Doing Business"
The t-statistcs are based on robust standard errors clustered by country
*, **, *** denote statistical significance at 10%, 5% and 1% level, respectively

Overall, the analysis suggests that in countries with more arm's length-based financial systems and more flexible labor markets, the recent increases in corporate liabilities are (partly) a reflection of general reductions in the costs of external finance, which disproportionately benefit more dependent industries.[24] However, there is no evidence of this being the case in countries with a more relationship-based financial system and more rigid labor markets. In fact, in these countries, the opposite relationship seems to exist, i.e., recent increases in corporate liabilities might have even led to slower relative growth of dependent industries.

[24] One might be concerned about the potential endogenous problem. In particular, a possible causality behind the results could run as follows. Countries where high dependence industries are fast growing tend to accumulate more corporate liabilities (since by definition growth in high dependence industries requires much external finance), and it is easier for firms to borrow in arm's length-based financial systems. However, the negative correlation (-0.17) between the recent increases in corporate liabilities and the financial index suggests that this possibility is not plausible.

## B. Resource Allocation

In addition to a general reduction in costs of external finance, financial development might also benefit the economy through more efficient allocation of resources. There has been extensive theoretical work on how a more developed financial sector can better direct resources to more productive use. For instance, a lowering in the costs of risks brought about by improved sophistication of the financial sector might encourage investors to finance more projects with higher mean returns even if they are also riskier. Moreover, competition in the banking sector might reduce banks' vested interests in incumbent firms and drive them to finance more productive entrants (Cestone and White, 2003).

On the empirical side, the positive relationship between financial development and allocative efficiency has been documented or hinted at in several cross-country studies. For example, Beck, Levine and Loayza (2000) find that financial development is more robustly related to increased productivity rather than to the level of capital accumulation. Wurgler (2000), on the other hand, shows that industry-level investment sensitivity (i.e., the elasticity of investment with respect to a measure of Tobin's Q) tends to be higher in more financially developed countries.

Between 1970 and the early 1990s, all countries considered in this paper invariably ranked among the top half of the 65 most advanced economies in terms of Wurgler's (2000) investment sensitivity measure, but the recent rapid and diverse pace of liabilities buildups countries has raised considerable concerns on the economic value of newly generated financial transactions. Are the increases in liabilities in fact a consequence of the financial sectors' improved breadth and capacity to facilitate the flows of resources to the most productive use? Or are they signs of the financial sectors' loss of effectiveness to help concentrate resources where they create most value?

### Basic test

One way to assess these concerns is to test if increases in liabilities strengthen the developments of growing industries (and hasten the decline of the waning ones). The rationale is as follows. With improved allocative efficiency, resources should more freely flow to "where there is most to be made of [them], as water runs to find its level" (Bagehot, 1873, quoted by Levine, 1997, and Wurgler, 2000), and get drawn to the rising industries with better business opportunities, facilitating them to capitalize on the favorable technological and market factors and to develop.[25] Wurgler (2000), and Almeida and Wolfenson (2005) employ a similar argument to show, respectively, that financial development and an economy's need for external finance tend to improve resource allocation across a wide set of countries.

[25] Note that even if increases in corporate liabilities are associated with faster relative growth of industries more reliant on external finance, it does not immediately indicate improved allocative efficiency since dependent industries are not necessarily the rising industries (and vice versa).

A basic test of resource allocation thus takes the following specification.

$$g_{ci95-03} = \alpha g_{ci87-95} + \lambda G_{ci} + \beta_1 (G_{ci} * \Delta L_c) + \beta_2 (G_{ci} * X_c) + \gamma_i D_i + \delta_c D_c + \varepsilon_{ci} \qquad \text{---- (2)}$$

where $G_{ci}$ is industry *i*'s underlying growth trend in country *c*. All other variables are as defined before. $\hat{\beta}_1$ is expected to be positive if increased borrowing is indeed related to better resource allocation.

**Defining growing industries**

In this paper, an industry's underlying growth trend, which is driven by its business opportunities, is measured by the industry's actual value-added growth during the prior period (1987-1995, in this case).[26] This measure is similar to the one used in Wurgler (2000), except that Wurgler uses contemporaneous value-added growth given his focus on investment as the dependent variable.

A growth-based measure of an industry's growth trend is more appropriate for the purpose of this paper than a market-based measure (e.g., market-to-book value, price-to-earnings ratio) for two major reasons. First, market-based measures already reflect information on the industries' future developments that are *expected* to be realized. In particular, in efficient capital markets, market-based measures of an industry's growth trend in the current period already take into account the expected amount of resources available to it and its expected growth in the next period. In other words, growth trends proxied by forward-looking, market-based measures may "over-explain" the future growth behaviors and thus bias the effects of increased borrowings toward zero. Second, a measure based on the industries' growth in the immediately preceding period should better capture the most current market factors (e.g., taste shocks) that affect the industries' business opportunities in the impending period, while in market-based measures such information may get diluted by long-term factors that are yet to fully materialize during the sample period.[27]

[26] See Table A2 for the list of three fastest- and three slowest- growing industries for each country during 1987-1995.

[27] Furthermore, stock market data are likely to be noisy as the listed firms might not be representative of their respective industries, especially for smaller industries in smaller countries. Applying the market-based measures computed from listed firms in a large and financially well-developed countries (e.g., the US) to all the other countries, on the other hand, would omit important country-specific market factors (e.g., pattern of specialization).

**Results**[28]

*The main results from the test suggest that increased availability of credit is related to improved resource allocation. And echoing the findings from the previous test (on costs of external finance), the relationship between finance and economic outcomes is stronger where the financial system has a greater arm's length content and the labor market is more flexible.*

Expansion in private-sector liabilities seems to be associated with improved resource allocation. Increases in the relative growth of industries with a higher underlying growth trend are greater in countries with a faster recent buildup in total liabilities (Table 3, regression 1).

Confirming that the result is driven by the posited effect of financial development, both the magnitude and statistical significance of the coefficient estimate are raised when the measure of liabilities is restricted to corporate liabilities—which by definition should be more closely related to resource allocation across industries. The coefficient estimate, which is statistically significant at the 1 percent level, indicates that for every percentage point by which corporate liabilities outgrow GDP each year on average during 1995-2003, the relative underlying growth trend of industries is enhanced by about 11 percent (Table 3, regression 2): for example, the increase in growth of an industry that grew by 2$x$% in the earlier period would be 0.11$x$ percentage points higher than that of an industry that previously grew by $x$%. Note also that the interaction of the underlying growth trend and the financial index enters significantly, implying that growing industries are more likely to subsequently grow faster in countries with more arm's length-based financial systems.[29]

Similar to the results on costs of external finance, the association between increases in liabilities and improved resource allocation is much stronger in countries with a more arm's length-based financial system. While the differential degree of such an association is not apparent using the measure of total liabilities (Table 3, regression 3), it is obvious and statistically significant when the measure is narrowed to only corporate borrowings (Table 3, regression 4). For instance, in a financial system that would rank at the 75$^{th}$ percentile among the sample on the financial index, for every percentage point by which corporate liabilities outgrew GDP each year on average during 1995-2003, the relative underlying growth trend of industries is enhanced by about 17 percent. In contrast, for a financial system that would rank at the 25$^{th}$ percentile on the financial index, the corresponding figure is only 3 percent.

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[28] Similar to before, outlying Japan is excluded from estimations, so are observations associated with abnormal real value-added or productivity growth (more than 20% or less than -20% per year on average). In addition, the financial sector, the public sector, industries heavily reliant on natural resources, and private household businesses are dropped. Any industry whose average value-added accounts for less than 0.5% (vs. cross-industry mean of 1.8%) of the country's total value-added is also excluded to prevent the results from being biased by economically unimportant industries.

[29] This result echoes a finding in IMF (2006), which suggests that in arm's length financial systems, resources are more flexibly reallocated from low-growth industries to faster-growth ones.

## Table 3. Underlying Growth Trend and Financial Systems

| ***Dependent Variable*** | Industry Value-added Growth, 1995-2003 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | 2 | | | 3 | | | 4 | | | |
| ***Liabilities Measure*** | Total Priv Sector Liabilities | | | Corporate Liabilities | | | Total Priv Sector Liabilities | | | Corporate Liabilities | | | |
| | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | |
| Growth in 1987-1995 * Change in Liab to GDP | 5.14 | 2.17 | ** | 10.86 | 3.50 | *** | -1.18 | -0.08 | | -27.84 | -1.79 | * | |
| Growth in 1987-1995 * Financial Index | 1.05 | 1.50 | | 1.73 | 2.43 | ** | 0.41 | 0.27 | | 0.37 | 0.55 | | |
| Growth in 1987-1995 * Financial Index* Change in Liab to GDP | | | | | | | 16.29 | 0.41 | | 93.39 | 2.46 | ** | |
| Growth in 1987-1995 * Change in Real Short-term Interest Rate | -11.02 | -1.59 | | -9.57 | -1.49 | | -10.71 | -1.55 | | -7.90 | -1.39 | | |
| Growth in 1987-1995 * Change in Real Long-term Interest Rate | 8.93 | 1.74 | * | 4.54 | 1.14 | | 7.96 | 1.55 | | 0.85 | 0.20 | | |
| Growth in 1987-1995 | -0.67 | -1.74 | * | -0.99 | -2.45 | ** | -0.44 | -0.77 | | -0.44 | -1.21 | | |
| Country fixed effects | Y | | | Y | | | Y | | | Y | | | |
| Industry fixed effects | Y | | | Y | | | Y | | | Y | | | |
| # Observations | 471 | | | 471 | | | 471 | | | 471 | | | |
| R-sq. | 0.74 | | | 0.75 | | | 0.74 | | | 0.75 | | | |

| ***Dependent Variable*** | Industry Productivity Growth, 1995-2003 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | | | 6 | | | 7 | | | 8 | | | |
| ***Liabilities Measure*** | Total Priv Sector Liabilities | | | Corporate Liabilities | | | Total Priv Sector Liabilities | | | Corporate Liabilities | | | |
| | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | |
| Growth in 1987-1995 * Change in Liab to GDP | 1.95 | 0.76 | | 7.77 | 2.29 | ** | -1.74 | -0.11 | | -46.36 | -3.03 | *** | |
| Growth in 1987-1995 * Financial Index | 1.59 | 2.65 | ** | 1.98 | 3.89 | *** | 1.22 | 0.72 | | 0.06 | 0.10 | | |
| Growth in 1987-1995 * Financial Index* Change in Liab to GDP | | | | | | | 9.52 | 0.22 | | 130.61 | 3.51 | *** | |
| Growth in 1987-1995 * Change in Real Short-term Interest Rate | -12.54 | -2.13 | ** | -11.83 | -2.34 | ** | -12.35 | -2.07 | * | -9.51 | -2.32 | ** | |
| Growth in 1987-1995 * Change in Real Long-term Interest Rate | 3.54 | 0.76 | | 1.96 | 0.53 | | 2.98 | 0.60 | | -3.20 | -1.11 | | |
| Growth in 1987-1995 | -1.06 | -3.73 | *** | -1.29 | -4.71 | *** | -0.92 | -1.52 | | -0.52 | -1.74 | | |
| Productivity Growth in 1987-1995 | 0.10 | 0.97 | | 0.11 | 1.03 | | 0.10 | 0.96 | | 0.11 | 1.06 | | |
| Country fixed effects | Y | | | Y | | | Y | | | Y | | | |
| Industry fixed effects | Y | | | Y | | | Y | | | Y | | | |
| # Observations | 471 | | | 471 | | | 471 | | | 471 | | | |
| R-sq. | 0.61 | | | 0.62 | | | 0.61 | | | 0.62 | | | |

The t-statistcs are based on robust standard errors clustered by country
*, **, *** denote statistical significance at 10%, 5% and 1% level, respectively

Increases in corporate liabilities not only promote the relative growth of growing industries, they also seem to improve the (labor) productivity of those industries.[30] For every percentage point by which corporate liabilities outgrew GDP each year on average during 1995-2003,

[30] In the regressions with productivity growth during 1995-2003 as the dependent variable (Table 3 regressions 5-8), productivity growth in the earlier period (1987-1995) is also included as a control variable on the right hand side.

one percentage point higher average annual growth during 1987-1995 would translate into 0.08 percentage points difference in the increase in productivity growth (Table 3, regression 6). In this context, note that the median average annual change in the corporate liabilities to GDP ratio is 1.4 percentage point, the median difference in underlying growth trend between an industry ranking at the 75$^{th}$ percentile on underlying growth trend and one ranking at the 25$^{th}$ percentile is 3.1 percentage points, and the median annual productivity growth of all the sample industries is 1.91 percent during 1995-2003.

The positive association between increases in corporate liabilities and the productivity of growing industries is significantly more pronounced in countries with a more arm's length-based financial system (Table 3, regression 8). In a financial system at the 75$^{th}$ percentile in terms of level of arm's length content, for every percentage point rise in the corporate liabilities to GDP ratio each year on average during 1995-2003, one percentage point difference in average annual growth during 1987-1995 would translate into 0.16 percentage points difference in the increase in productivity growth.

Table 4. Underlying Growth Trend and Labor Market Flexibility

| ***Dependent Variable*** | Industry Value-added Growth, 1995-2003 | | | | | | | | | Industry Productivity Growth, 1995-2003 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | |
| ***Liabilities Measure*** | Corporate Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | | Corporate Liabilities | | |
| | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | | *Coef est.* | *t-stat.* | |
| Growth in 1987-1995 * Change in Liab to GDP | 11.90 | 3.13 | *** | 45.09 | 5.60 | *** | 27.74 | 0.79 | | 8.47 | 2.16 | ** | 39.78 | 5.36 | *** | -25.00 | -0.88 | |
| Growth in 1987-1995 * Labor Mkt Flexibility | 0.14 | 2.60 | ** | 0.03 | 0.51 | | 0.02 | 0.25 | | 0.14 | 2.73 | ** | 0.03 | 0.58 | | 0.04 | 0.52 | |
| Growth in 1987-1995 * Labor Mkt Flexiblity* Change in Liab to GDP | | | | 10.57 | 4.07 | *** | 8.55 | 2.06 | * | | | | 9.98 | 3.81 | *** | 3.49 | 1.07 | |
| Growth in 1987-1995 * Financial Index | | | | | | | 0.21 | 0.24 | | | | | | | | -0.32 | -0.34 | |
| Growth in 1987-1995 * Financial Index* Change in Liab to GDP | | | | | | | 26.57 | 0.47 | | | | | | | | 107.52 | 2.20 | ** |
| Growth in 1987-1995 * Change in Real Short-term Interest Rate | -7.37 | -1.22 | | -6.72 | -1.59 | | -7.36 | -1.61 | | -13.76 | -2.73 | ** | -0.85 | -2.04 | * | -9.07 | -2.39 | ** |
| Growth in 1987-1995 * Change in Real Long-term Interest Rate | 3.78 | 0.92 | | 0.40 | 0.12 | | 0.20 | 0.05 | | 1.20 | 0.28 | | -1.97 | -0.54 | | -3.77 | -1.17 | |
| Growth in 1987-1995 | 0.21 | 1.49 | | -0.16 | -1.26 | | -0.31 | -0.59 | | 0.03 | 0.20 | | -0.32 | -2.89 | ** | -0.22 | -0.36 | |
| Productivity Growth in 1987-1995 | | | | | | | | | | 0.10 | 1.02 | | 0.10 | 1.01 | | 0.10 | 1.03 | |
| Country fixed effects | Y | | | Y | | | Y | | | Y | | | Y | | | Y | | |
| Industry fixed effects | Y | | | Y | | | Y | | | Y | | | Y | | | Y | | |
| # Observations | 471 | | | 471 | | | 471 | | | 471 | | | 471 | | | 471 | | |
| R-sq. | 0.75 | | | 0.75 | | | 0.76 | | | 0.61 | | | 0.62 | | | 0.63 | | |

Labor Market Flexibility is -ln(rigidity+1), where rigidity is the employment rigidity index from "Doing Business," 2003 edition
The t-statistcs are based on robust standard errors clustered by country
*, **, *** denote statistical significance at 10%, 5% and 1% level, respectively

The effect of a flexible labor market on augmenting the association between increases in liabilities and improved resource allocation is similar to that of an arm's length-based financial system. On average, labor market flexibility facilitates the growing industries to grow faster (Table 4, regression 1), probably resulting from a more fluid redeployment of labor from the waning industries to the booming ones in a country with less rigid labor market. But the relative growth of growing industries is the strongest in countries with *both* large increases in corporate borrowing *and* high flexibility of labor market (Table 4, regression 2). Likewise, labor market flexibility seems to strengthen the association between increases in corporate liabilities and the growing industries' relative productivity growth (Table 4, regressions 5). The high correlation between measures of financial system and labor market rigidity does not permit meaningful inferences of both of their effects at the

same time, but both variables seem to play separate, important roles in determining how much increases in corporate borrowing drive allocative efficiency. When both variables enter together (Table 4, regressions 3 and 6), each variable's enhancement effects on the association between increased liabilities and the relative performance of growing industries are similar to (but weaker than) those shown in regressions excluding the other variable.

On the whole, the results on value-added growth and productivity growth suggest that increases in corporate liabilities appear to be associated with improved resource allocation, but mostly only in countries with a more arm's length-based financial system and a flexible labor market. In countries with a more relationship-based financial system and a rigid labor market, however, there is little evidence that the recent buildups in corporate liabilities coincide with increased allocative efficiency.[31]

## IV. CONCLUSION

Since around 1995, private-sector financial liabilities as a share of GDP among a group of 18 advanced economies have jumped on average by over 40 percentage points. On top of the considerable average increase, there is a large degree of variation in countries' experiences. While Portugal has more than doubled its liabilities to GDP ratio, for instance, some other countries such as Japan, Canada and Finland have shown very small increases or even a decline.

Possibly confounded by effects of omitted variables, analysis at the aggregate macroeconomic level reveals no clear relationships between the accumulation of private sector liabilities and economic growth in the last 10 years. However, evidence at the industry level identifies significant association of the recent increases in corporate borrowings with working of the supposed channels through which financial development benefits the real economy. In particular, especially in countries with a more arm's length-based financial system and flexible labor market, recent buildups in corporate liabilities are associated with general reductions in costs of external finance, and improved resource allocation that strengthens the development—value-added growth and productivity growth—of growing industries.

The findings of this paper suggest that for the advanced economies in this era marked by rapid evolutions of financial environments, financial deepening (increases in private-sector financial liabilities) alone is unlikely to be sufficient to bring forth the full benefits traditionally associated with financial development. How financial capital is intermediated and the ease with which labor can be redeployed have important implications for the economic value of the newly created credits. Conversely, having a financial system adept at putting new credits to valuable use and a mobile labor force do not themselves guarantee continued improvement in the financial sector's effectiveness.

[31] Results on resource allocation are robust to exclusion of industry fixed effects.

Looking forward, although factors that boost the corporate liabilities often coincide with those that raise the arm's length content of the financial system (e.g., increased banking sector competition, more liquid markets for derivatives), simultaneous developments on both fronts are by no means automatic.[32] Similarly, labor market reforms are often not explicitly considered in the context of their potential complementarity with financial development. Broad-based policies that help deepen firms' borrowing capacity while hastening the transition toward a more arm's length financial system and relaxing labor market regulations are likely to garner greater economic contributions from the financial sector.[33]

[32] Increases in the arm's length content of a financial system are not automatically accompanied by increases in private sector liabilities. Excluding outlying Japan, correlations of increases in the arm's length content of a financial system with increases in total private sector liabilities and increases in corporate liabilities are -0.32 and -0.43, respectively.

[33] To the extent that a more arm's length-based ffinancial system seems associated with a higher degree of vulnerabilities of the private sector to cyclical changes (IMF 2006), quickened transition to a more arm's length-based financial system should be accompanied by appropriate prudential measures and reforms in the labor and product markets aimed at mitigating the adverse effects of cyclicality.

Table A1. Dependence on External Finance

| Industry | ISIC Code | Score on Dependence on External Finance |
|---|---|---|
| *Most dependent industries* | | |
| Chemicals and chemical products | 24 | 6.2 |
| Real Estate, Renting and business activities, computer, R&D services | 70-74 | 3.35 |
| Post and telecommunications | 64 | 1.67 |
| Electrical and optimal equipment | 30-33 | 1.62 |
| Coke refined petroleum products and nuclear fuel | 23 | 0.78 |
| | | |
| *Least dependent industries* | | |
| Wood and products of wood and cork | 20 | -0.45 |
| Fabricated metal products except machinery and equipment | 28 | -0.25 |
| Construction | 45 | -0.19 |
| Other non-metallic mineral products | 26 | 0 |
| Pulp paper, paper products, printing and publishing | 21-22 | 0.09 |

Source: de Sorres et al. (2006)

# Table A2. Fastest- and Slowest- Growing Industries, 1987-1995

| Country | Growing industries, 1987-1995 | (ISIC) | Declining industries, 1987-1995 | (ISIC) |
|---|---|---|---|---|
| ***AUS*** | Computer and related activities | 72 | Supporting and auxiliary transport activities | 63 |
| | Communications | 64 | Furniture, miscellaneous manufacturing; recycling | 36-37 |
| | Air transport | 62 | Wood & products of wood and cork | 20 |
| ***AUT*** | Renting of machinery and equipment | 71 | Textiles | 17 |
| | Computer and related activities | 72 | Sale, maintenance and repair of motor vehicles and motorcycles | 50 |
| | Pulp, paper & paper products | 21 | Non-metallic mineral products | 26 |
| ***BEL*** | Renting of machinery and equipment | 71 | Research and development | 73 |
| | Rubber & plastics | 25 | Retail trade, except of motor vehicles and motorcycles | 52 |
| | Real estate activities | 70 | Mechanical engineering | 29 |
| ***CAN*** | Computer and related activities | 72 | Printing & publishing | 22 |
| | Motor vehicles | 34 | Construction | 45 |
| | Communications | 64 | Wood & products of wood and cork | 20 |
| ***DEN*** | Water transport | 61 | Printing & publishing | 22 |
| | Computer and related activities | 72 | Construction | 45 |
| | Chemicals | 24 | Non-metallic mineral products | 26 |
| ***FIN*** | Air transport | 62 | Construction | 45 |
| | Water transport | 61 | Non-metallic mineral products | 26 |
| | Basic metals | 27 | Wholesale trade and commission trade | 51 |
| ***FRA*** | Rubber & plastics | 25 | Furniture, miscellaneous manufacturing; recycling | 36-37 |
| | Chemicals | 24 | Hotels & catering | 55 |
| | Wholesale trade and commission trade | 51 | Sale, maintenance and repair of motor vehicles and motorcycles | 50 |
| ***DEU*** | Renting of machinery and equipment | 71 | Furniture, miscellaneous manufacturing; recycling | 36-37 |
| | Legal, technical and advertising | 741-3 | Scientific instruments | 331 |
| | Supporting and auxiliary transport activities | 63 | Food, drink & tobacco | 15-16 |
| ***GRC*** | Food, drink & tobacco | 15-16 | Textiles | 17 |
| | Inland transport | 60 | Clothing | 18 |
| | Supporting and auxiliary transport activities | 63 | Basic metals | 27 |
| ***ITA*** | Communications | 64 | Motor vehicles | 34 |
| | Furniture, miscellaneous manufacturing; recycling | 36-37 | Health and social work | 85 |
| | Supporting and auxiliary transport activities | 63 | Construction | 45 |
| ***NLD*** | Air transport | 62 | Radio and television receivers | 323 |
| | Renting of machinery and equipment | 71 | Electricity, gas and water supply | 40-41 |
| | Computer and related activities | 72 | Construction | 45 |
| ***NOR*** | Communications | 64 | Wood & products of wood and cork | 20 |
| | Retail trade, except of motor vehicles and motorcycles | 52 | Sale, maintenance and repair of motor vehicles and motorcycles | 50 |
| | Water transport | 61 | Basic metals | 27 |
| ***PRT*** | Communications | 64 | Rubber & plastics | 25 |
| | Other electrical machinery and apparatus nec | 31-313 | Textiles | 17 |
| | Motor vehicles | 34 | Chemicals | 24 |
| ***ESP*** | Communications | 64 | Textiles | 17 |
| | Pulp, paper & paper products | 21 | Printing & publishing | 22 |
| | Basic metals | 27 | Motor vehicles | 34 |
| ***SWE*** | Scientific instruments | 331 | Pulp, paper & paper products | 21 |
| | Communications | 64 | Non-metallic mineral products | 26 |
| | Computer and related activities | 72 | Hotels & catering | 55 |
| ***UK*** | Computer and related activities | 72 | Textiles | 17 |
| | Air transport | 62 | Non-metallic mineral products | 26 |
| | Communications | 64 | Hotels & catering | 55 |
| ***US*** | Computer and related activities | 72 | Aircraft and spacecraft | 353 |
| | Air transport | 62 | Printing & publishing | 22 |
| | Rubber & plastics | 25 | Scientific instruments | 331 |

Source: Groningen Growth and Development Center

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