CAPITAL MARKETS, FINANCIAL INTERMEDIARIES AND FINANCING OF NEW TECHNOLOGIES: INTERNATIONAL EVIDENCE FROM INDUSTRY DATA

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Abstract

Using a sample of 18 industries from 18 OECD countries, I perform an industry-level analysis of the influence of the country's financial-system orientation, i.e., bank- or market-oriented, on R&D intensity. Using OLS, GMM, and VAR methods, my results show a positive relation between capital market development and the importance of the most R&D-intensive sectors. Nevertheless, there are some exceptions to this pattern, which may be related to the legal and institutional framework of each country.

JEL classification code: O16; G21; O32.

Keywords: capital markets, financial intermediaries, R&D, VAR.

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1. Introduction

The relation between financial development and economic growth has come under close scrutiny by financial economists (Al-Awad and Harb, 2005; Levine, 1997; Chang and Caudill, 2005; Tang, 2006). Thus, the financial system is no longer considered to be solely an outcome of the economic system. Knowledge of the mutual interaction between financial and economic development has increased and there is now a widespread conviction that the development of financial institutions usually promotes economic growth (Levine, 1998; Levine et al., 2000; Loayza and Rancière, 2006; Rajan and Zingales, 1998a).

If a country's financial and economic systems interact, then one of the main questions is: what is the best profile for the financial system to achieve the highest and most balanced rates of economic growth. There is a passionate debate about whether the continental model of bank-industry relations, which is based on the prominent role played by financial intermediaries with respect to capital markets (Allen, 1995; Allen and Gale, 2001), is more or less suitable for promoting economic growth than is its Anglo-Saxon counterpart (Allen, 1993; Miller, 1998; Arestis et al., 2001; Ndikumana, 2005).

This debate has been widened to deal with the effect of the financial system on the structure of the economic system (Allen and Gale, 1999; Beck and Levine, 2002; Carlin and Mayer, 2003; Gande et al., 2008; Wurgler, 2000). Capital markets and financial intermediaries perform functions that partially overlap, but with different characteristics (Beck et al., 2006; Dellas and Hess, 2005; Qian et al., 2004). Both markets and intermediaries have different ties with firms, depending on the latter's capital structure, age, or size. Consequently, the growth of some industries can be asymmetrically affected by the orientation of the financial system (Rajan and Zingales, 1998b; Stulz, 2000; Cetorelli and Gambera, 2001).

In this paper, I study the extent to which the characteristics of the financial system enhance the development of the most research and development (R&D) intensive industries. R&D expenditure and the most R&D-intensive firms have specific financial characteristics (Bah and Dumondier, 2001; Hall, 2002; Carpenter and Petersen, 2002), so I study whether the characteristics of the financial system may affect R&D activities at industry level.

My results, based on the bank vs. market orientation of the financial system in 18 developed countries between 1980 and 2002, show that there is relation between the financial profile of the country and how firms finance new technologies. I find a positive relation between capital markets and the importance of the most R&D-intensive industries. However, this relation does not hold for all the countries, but whether it does or not may depend on the particular characteristics of some countries.

The paper is divided into five sections. Section 2 analyzes previous research and presents the theoretical foundations for financial systems, economic growth, and R&D investment. Section 3 poses some issues on methods, along with a description of the sample and variables used. Section 4 presents my results. Section 5 concludes.

2. Theoretical background

Many researchers show that the legal and institutional framework may affect investment and promote economic growth (Beck et al., 2005; Claessens and Laeven, 2003; Falk, 2006; Lothian, 2006). Thus, there are far fewer doubts about the close cause and effect connection between financial and economic development[1]. However, there are many other reasons for more in-depth research to determine whether the characteristics of the financial system specifically affect some kinds of firms and, consequently, a country's economic and industrial structure (Masten et al., 2008). This idea is consistent with country-specific factors (Braun and Raddatz, 2007; Claessens and Schmukler, 2007) and with the view that the financial system's orientation (bank-oriented compared to market-oriented) can influence the development of firms and industries according to their financial structure (Rajan and Zingales, 1998a and b; Demirgüc-Kunt and Maksimovic, 2002; Semenov, 2006).

An important means by which the financial system shapes both the economic structure of a country and the growth of its industries is the financing of R&D (Carlin and Mayer, 2003). As these authors show, banks and markets have different ways of collecting information about firms and of forming opinions concerning the profitability of investment projects. This diversity of opinion is a key element, because, when considering new industries and new technologies, there is no uniformity of initial beliefs among investors.

Financial markets aggregate many diverse opinions (Baier et al., 2004; Gilchrist et al., 2005) and hence are superior mechanisms for banks for providing information about optimal decision rules. Allen and Gale (1999) note that markets have advantages in such situations, because so many people take part directly in the investment decision. From this point of view, it could be said that the bank provides a single control, as opposed to the multiple controls of the financial markets through market prices, trading volume, takeover attempts, etc. Although it is more expensive, capital markets allow investors to make their own decisions, conditional on their information and their own preferences. Consequently, this ability to agree or disagree allows innovative projects to be more efficiently financed in market-oriented systems than in bank-oriented ones.

Therefore, R&D expenditure is one of the firm's decisions that is most likely to be affected by the characteristics of the financial system. Since the information about R&D is usually scarce, dispersed, and affected by diversity of opinion, financing through stock markets might be preferable. On the other hand, going through financial intermediaries might be positively related to the less innovative industries, where beliefs among investors are more homogeneous.

I do not focus on the relation between economic growth and the type of financial system, but on how the characteristics of the latter may influence one of the factors of the former, i.e., R&D expenditure. Hence, I do not try to test the superiority of any model of financial organization, but instead test whether some characteristics of the financial system may help to develop the industries with the highest R&D rates. My research does not study the reliance of the industrial sectors on alternative sources of financial funding. Instead, I test whether the different weight of the most and least R&D-intensive industries can be explained by the characteristics of the financial system.

3. Issues on method

This paper empirically assesses the influence of the financial system on the importance of the most R&D-intensive industries. Since the information about the orientation of financial systems and on R&D activities is disperse and segmented, I have had to gather data from different sources and to harmonize this information across countries and

[1] For a more complete revision, see Levine (1997), Levine (1998), Rousseau and Wachtel (1998), Levine et al. (2000), Beck et al. (2000), Xu (2000), Rajan and Zingales (2003), Rioja and Valev (2004), Guiso et al. (2004).

industries. We use three different methods of econometric analysis to provide evidence on the link between financial development and economic structure. The rest of this section explains (a) the sample and variables and (b) the methods of analysis.

3.1. Sample and variables

I use three different data sources: information on the industrial structure of each country, the R&D intensity of each sector and the features of each financial system.

For the first data group, I calculate the proportion of each industry in the economy as a whole by using the *OECD STAN Database for Industrial Analysis* for each industry. This database provides information for between 41 and 78 industries and subindustries from 29 countries from 1980 onwards. Nevertheless, the information is not homogeneous across countries, since the description of the first, second, and third level industries does not coincide for all the countries. Thus, I need to harmonize across countries. I define 18 industries, as reported in Table 1.

(Insert Table 1)

To calculate the R&D intensity for each industry and country, as in Carlin and Mayer (2003), I use information from *R&D expenditure from OECD, Analytical Business Enterprise Research and Development (ANBERD).* Table 1 reports the mean values of the R&D expenditure for gross production ratio for the whole sample. The table shows that despite the differences across industries, the whole mean value (1.87%) is similar to other equivalent studies and statistics. According to this table, the most R&D-intensive industries are *Mining and quarrying*, *Electrical equipment* and *Chemicals and chemical products*, and the least R&D-intensive industries are *Hotels and restaurants* and *Wholesale, retail trade and repairs*.

In spite of the appeal of a firm-level study, there are two reasons that favor industry-level data rather than firm-level data. First, R&D expenditure has an outstanding strategic role in many firms, so most of the information about R&D is not widely available. Further, firms meet different requirements and standards of information in each country. Second, industry-level research allows my results to be compared with related previous studies.

Although the information about R&D is also provided by the OECD, the structure of industries and countries is not the same as the information about industrial structure: data is available from a range of industries (between 37 and 59). Since I need information for each industry and each country, I harmonize both databases by defining 18 industries for the 18 countries, and report my results in Table 2.

(Insert Table 2)

I note that in spite of the fact that my sample includes a number of countries with comparable levels of economic development, these countries show large differences in terms of legal and institutional setting (La Porta et al., 1997, 1998 and 2000). Therefore, my results cannot be biased by the different stages of economic development across countries. At the same time, I leave open the possibility that my results are at least partially explained by the different legal traditions of each country.

I calculate the proportion of each industry in the GDP for each country and year. Since there might be international trends towards the development of some industries in a multinational context, and to achieve my purpose of measuring the relative orientation of a country's industrial structure, I scale each proportion to the average international proportion.

Defining the characteristics of each financial system causes some problems. If I take for granted that financial systems can be classified according to the markets vs. intermediaries dichotomy, then I should introduce measures of both market and bank development. Ideally, these variables should measure how well both banks and capital markets identify profitable activities, exert corporate governance, mobilize resources, manage risk, and facilitate transactions.

For the various stock markets, I define CAPIT as the stock market capitalization to GDP. I obtain stock market capitalization up to 1997 from the *Emerging Stock Markets Factbook* published by the International Finance Corporation. I obtain the data on stock market capitalization after 1997 either by downloading from the stock market's website or by requesting it from the corresponding Securities Commission. Data about Gross Domestic Product is from *International Financial Statistics* (line 99b). The Appendix provides a detailed description of the data sources.

I divide the information on the development of financial intermediaries into four variables, as follows. Although these variables are commonly used *(*King and Levine, 1993; Levine, 1997; Levine and Zervos, 1998; Levine et al., 2000*)*, they are not free of shortcomings, and for this reason I combine them.

The first variable is LIQUID. This variable equals the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP.

The second measure is COMM, which measures the degree to which commercial banks allocate credit vs. the central bank. COMM equals the ratio of commercial bank assets divided by commercial bank plus central bank assets. Although it does not directly measure the effectiveness of

banks in researching firms, the underlying intuition is that commercial banks are more likely to identify profitable investments than central banks.

The third variable, CREDIT, equals the value of credits by financial intermediaries to the private sector divided by GDP. I assume that financial systems that allocate more credit to private firms are used more by innovative firms than are financial systems that only funnel credit to the Government or State owned enterprises.

The fourth variable, ASSETS, is also a measure of the overall size of financial intermediaries, and equals total banking assets to GDP ratio. Although this variable is a measure of financial depth, it is also a complement of stock market indicators. It is informative on the extent to which banks channel alternative funds to capital markets.

(Insert Tables 3 and 4)

Table 3 presents the basic statistics and Table 4 provides a detailed list of the countries I examine. The statistics show that the importance of capital markets across countries is quite different: Australia, Canada, USA and UK are the most market-oriented countries while Finland, Austria, Norway and Poland are the least market-oriented ones.

Although not reported, we have calculated the correlation between the development of stock markets and that of financial intermediaries. In most of the cases, we have not found statistically significant correlation. This lack of correlation could mean that markets and banks are both suitable channels to fund firms and industries. Also, the different measures of financial intermediaries are not broadly correlated, so they could incorporate different aspects of the financial intermediaries. The results are available from the author on request.

3.2. Method

Since I am analyzing the relation between the profile of the financial system and R&D activities, conditional on its R&D intensity, I relate each sector to the characteristics of the financial system. Nevertheless, due to the excessively high number of industries and variables under consideration, an analysis of the 18 sectors would not lead to useful, clear results. Consequently, to test whether the characteristics of the financial system affect the importance of those four industries, I focus on the three most R&D-intensive and the least R&D-intensive industry. These industries are *Mining and quarrying*, *Electrical equipment*, *Chemicals and chemical products* and *Wholesale, retail trade and repairs*.

The equation I test is as follows:

$$INDX_{it} = \beta_0 + \beta_1 CAPIT_{it} + \beta_2 LIQUID_{it} + \beta_3 COMM_{it} + \beta_4 CREDIT + \beta_5 ASSETS_{it} + \eta_i + \eta_t + \varepsilon_{it}$$

where $INDX_{it}$ stands for the relative weight of the four industries, η_i is the individual effect, η_t is the time effect and ε_{it} is the random error. The individual effect includes several effects that are specific to each industry and constant through time. The time effect comprises the macroeconomic factors that affect all the industries at the same time. The random error term includes the possible errors in measuring any variable and the omission of explanatory variables.

My method combines generalized method of moments (GMM) and ordinary least squares (OLS) estimations with vector autoregression (VAR) estimations. The GMM for panel data has several advantages in this kind of research and has been implemented through the system estimator (Arellano and Bond, 1998; Arellano, 2003). The consistency of GMM coefficients depends on the lack of second-order serial correlation of the regression error term and on the validity of the instruments. This is why, in Tables 6-9, I report some specification tests: I test the validity of the instruments by using Hansen's test of overidentifying restrictions. I also show a test for the possible first- and second-order serial correlations, because, although a first-order correlation may exist, my concern must be the second-order correlation (Arellano and Bond, 1991 and 1998).

Unfortunately, GMM is only feasible for the estimation of the whole sample. When I run separate estimations for each country, I find no fixed individual effects. Therefore, the panel data method does not make any sense. The most efficient estimation is achieved through the ordinary least squares method. In these cases, I assess the goodness of fit through the adjusted R^2 coefficient and test the joint significance of all the coefficients with the F test.

I complement GMM and OLS estimations with VAR estimations (Shan, 2005). The VAR method has three advantages: it allows for different economic and institutional arrangements in each country and even for country-specific shocks (Kano, 2008); it can deal with the simultaneity problem between financial variables, thus avoiding the difficult task of determining which variables are truly exogenous; and it permits the interaction between variables, including both the contemporaneous correlation and the dynamic feedback.

A concern in VAR estimations is whether first differences should be taken. In a VAR model, the asymptotic distribution that characterizes the

estimates will be the same whether the model is estimated in levels or in differences. Nevertheless, innovations in financial systems generally appear as periodic episodes, although what is important in this paper are those policies with long-lasting effects on R&D. Changes in R&D rates can capture permanent changes in the features of the financial system. First-differencing translates the levels into growth rates and thus allows me to examine the effects of changes in the features of the financial system on the development of industries. Therefore, I use the first-difference of the log of levels for each series in the estimation.

Another question concerns the specification of the VAR model (i.e., the appropriate order of the lags that I use), because arbitrarily chosen specifications are likely to produce unreliable results. Among the various model selection criteria, the one proposed by Schwarz (1978), known as Schwarz's Bayesian information criterion, has been shown to outperform other alternatives (Mills and Prasad, 1992). Therefore, I base my specifications of the VAR model for each country on Schwarz's BIC.

I am also interested in inferring the effects of the financial system on R&D, based on the results of the VAR impulse-response analysis. The impulse-response function shows the effects on sector weight of an exogenous once-and-for-all change in the financial system in the initial period, and no changes to any variables in the future. Nevertheless, due to so many repetitions in our calculations, I do not report the impulse-response functions. Generally, these functions confirm the reported results, showing that the effects last a maximum of four to five years. The results are available from the author on request too.

4. Results

I begin the presentation of my results with the GMM and OLS estimations. Tables 5-7 show the results for the three most R&D-intensive industries, and Table 8 displays the results for the least R&D-intensive sector. I consider many sectors, countries, and variables, which leads to a large number of regressions that can obscure any inference. Consequently, I present a broad view of the results that shows a largely positive relation between the importance of stock markets and R&D intensity. Nonetheless, this relation does not hold for all the countries and industries, so some clarification is needed.

The influence of capital markets becomes weaker as R&D intensity decreases. For the *Mining and quarrying* industry (Table 5), CAPIT has a positive and statistically significant influence in ten countries, but it does not have a negative influence for any countries. For the *Electrical equipment* sector (Table 6), CAPIT shows a positive relation in six countries and a negative relation in one country. For the *Chemicals and chemical products* sector, there are seven countries with a positive relation and three countries with a negative relation (Table 7). On the other hand, Table 8 shows that CAPIT is negatively related to the development of the least R&D-intensive industry in ten countries and positively in only three countries. Although not completely conclusive, these results underline the positive impact of stock markets on the financing and development of new technologies.

Where the role of financial intermediaries is concerned, the results are unclear, due to the profusion of variables and estimations. Regardless of the variable under consideration, there is no common pattern across sectors and countries. Each variable seems to have a heterogeneous and sometimes contradictory influence. Consequently, as with the effect of capital markets, I cannot infer a clear link between the financing of new technologies and the role of financial intermediaries.

The Hansen test of overidentifying restrictions allows the validity of instruments to be accepted, while there is no second-order serial correlation among the errors in the GMM estimations. Nearly all the OLS estimations have a high-enough adjusted-R^2 coefficient, and in most of them the F-test allows me to reject the null hypothesis of nonsignificance for all the coefficients.

Although the regressions so far have simultaneously included all the financial system variables, my results remained unaffected when I include only one variable, or a group of variables. Consequently, the results are robust to different model specifications.

In addition, I stress the divergence between the results for the whole sample (first row in Tables 5-8) and the results for single-country estimations. This fact suggests the possibility that a joint estimation hides countries' specific characteristics and the need to take these characteristics into account, since each country could have a specific pattern for financing new technologies. In fact, a broad view of the results in Tables 5-8 allows me to form three groups of countries.

The biggest group comprises the countries in which there is a positive relation between capital markets and R&D intensity: Australia, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Norway, the UK, and the USA. The second group is the countries in which there seems to be no significant link between these two elements: Holland, Sweden, Austria, and Poland. The third, and the smallest group, includes the countries in which capital markets affect R&D in a rather contradictory way across industries: Spain and Belgium.

I wish to determine if there are any specific characteristics for each group. Thus, I have run several mean comparison tests across groups, and find no significant differences. In other words, consistent with previous studies, neither the national financial system nor the country's industrial structure seem to be significantly related either to the distribution of groups or the way in which the financial system influences innovative sectors.

I wish to examine the common characteristics of the countries where the more general positive relation between both elements does not hold. Perhaps the legal and institutional framework could provide some answers. This notion is supported by the fact that all countries from the common-law tradition in my sample (Canada, Australia, the UK, and the USA) show a positive, significant relation between R&D and capital markets development, but the countries in which that relation does not hold belong to one of the three civil-law traditions: French origin (Spain, Belgium, and the Netherlands), German origin (Austria), or Scandinavian origin (Sweden). This finding could have something to do with the stricter legal protection that R&D expenditure requires, so the different legal systems may affect the way in which new technologies are financed.

My impression, always conditional on the absence of complete uniformity across countries, is that the development of capital markets in most countries improves the financing of new technologies. Nevertheless, the exceptions suggest that each country can have its specific financial characteristics. Thus, the most suitable means of financing new technologies may be connected with some country-specific characteristics.

The possibility of country-specific characteristics leads me to a second analysis by the VAR method. This second method allows me to test causal relations and to forecast the impact on the different industries of a change in the financial system.

Tables 9-12 show the results of the VAR estimations for the same sectors as the previous regressions. In addition to the estimated coefficients, I report the Granger causality test in these tables in order to test whether CAPIT Granger-causes each industry's importance. I note that although I could repeat this analysis for the other endogenous variables, since my main interest in this paper is the link between capital markets and the financing of R&D activities, I focus on CAPIT.

As with GMM estimations, such a large number of estimations can obscure the main results, so I comment only briefly on the most outstanding ones. Again, despite some exceptions, the common feature is the positive relation between capital markets and the most R&D-intensive sectors. For instance, in Table 9 for the *Mining and quarrying* industry, there is only one country with a negative and statistically significant coefficient for CAPIT, but there are seven countries whose coefficients are positive. For the *Electrical equipment* sector in Table 10, there are five countries with positive coefficients and two countries with negative coefficients; but in Table 11, for the *Chemicals and chemical products* there are no countries in which the relation is negative and six countries with a positive relation. On the other hand, in Table 12, which shows the least R&D-intensive sector (*Wholesale, retail trade and repairs*), there are seven countries with a negative relation and four countries with a positive one. In turn, and despite the lack of unanimity in my results, there again seems to be a positive link between capital markets and the financing of new technologies.

At the same time, I identify the countries that do not fit this general pattern. There is a first group, the biggest one, of those countries for which the positive relation between capital markets and R&D holds. Although the positive relation does not hold for all the industries, it is a group for which the most R&D-intensive industries are never negatively related to capital markets. Further, the least-intensive sector is never positively related to capital markets: Australia, Austria, Canada, Denmark, France, Italy, the Netherlands, Norway, the UK, and the USA. There is a second group of countries without any significant relation between these two elements, Korea and Sweden. In the third group of countries, the results clearly conflict with the dominant ones (Belgium, Finland, Japan, and Spain). For these countries I find a conflicting, heterogeneous relation between the profile of the financial system (both in terms of capital markets and financial intermediaries) and the development of new technologies.

Again, as with GMM estimations, I can analyze whether there are factors that explain the composition of the groups. Although for the sake of brevity I do not report the results, I do not find that the financial system or the industrial structure are noticeably different across groups. Therefore, the VAR analysis also suggests the need for further research to identify the country-specific factors that affect the link between the financial system and the financing of new technologies. The legal traditions and the institutional and legal frameworks can also be helpful, since for all the common-law countries, there is a clear and positive relation between capital markets and R&D. The countries for which the positive relation does not hold belong to the three traditions of civil law: the French (Belgium and Spain), German (Japan and Korea), and the Scandinavian (Finland and Sweden). Again, the better legal protection in common-law countries and the stronger legal protection required by R&D investment could explain why it is that where investors' rights are better protected, capital

markets enhance the development of new technologies.

The simultaneous use of four measurements of financial intermediaries might reduce the clarity of the results, especially since ASSETS, COMM, CREDIT, and LIQUID are not often referred to. Two comments are pertinent here: first, the main focus of my paper is the impact of capital markets on the financing of R&D, so most of my comments focus on CAPIT. The four variables of financial intermediaries are not so synthetic as CAPIT, and are mutually complementary. In fact, they take opposite signs in the estimations, since each of the dimensions of the intermediaries can have a different influence. Second, these variables can function as control variables to introduce some characteristics of the financial system whose absence could lead to spurious and unreliable results.

5. Conclusion

The link between the financial and real aspects of the economy has, in recent years, been a much-researched topic that has led to a relative consensus about the positive influence of financial development on economic growth. Nevertheless, there is no such consensus about the role played by the markets and institutions that make up the financial system.

Using the dichotomy between capital markets and banks as my basis, I analyze whether the theoretical assumption that new technologies are more easily financed when capital markets are more developed can receive empirical support. I invoke the more intense exchange of opinions concerning the assessment of the innovative industries that are not well known, and the stricter control and monitoring of a number of investors, as theoretical reasons, although they have not been empirically proven to a satisfactory degree.

I calculate the importance of 18 industries for a sample of 18 OECD countries. Using the ratio of R&D expenditures to production, I identify the three most R&D-intensive sectors and the least intensive sector and analyze the relation between the characteristics of the financial system (oriented to stock markets or banks) and the development of the most and least innovative sectors.

Although not completely generalized for all the countries, my results show that capital markets are positively related to the financing of new technologies. Nevertheless, there seems to be some country-specific characteristics, perhaps those that are connected to the legal and institutional framework, that modify this relation. This observation is supported by the special legal protection that R&D expenditure requires.

These findings could be useful to policymakers. If banks facilitate the development of basic industries, they are likely to play a key role in the first stages of economic development. Capital markets would seem to work efficiently once a certain degree of economic development has been achieved. Consequently, perhaps bank development could be prioritized in the early stages of economic development and, later on, capital markets could promote the most technologically developed industries.

Appendix

1. Data on industries:
   The OECD STAN database for Industrial Analysis.
2. Data on R&D:
   R&D expenditure. OECD Analytical Business Enterprise Research and Development (ANBERD).
3. Data on financial systems:
   Gross Domestic Product:
   International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Line 99b.
   Credits by financial intermediaries to the private sector:
   CREDIT: International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Line 32d.
   Liquid liabilities of the financial system:
   International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Line 55l.
   Bank assets:
   International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Lines 22a-22d.
   Commercial-central bank:
   International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Lines 22a-22d and 12a-12d.
4. Data on capital markets:
   Data until 1997:
   International Finance Corporation (1998, Emerging stock markets factbook. Washington, CD. International Finance Corporation.
   Data from 1998:
   Information available on the website or provided to the author upon request from the following stock markets:
   Australia: Australian Stock Exchange
   Austria: Vienna Stock Exchange
   Belgium: Brussels Stock Exchange and Euronext

Canada. Toronto Stock Exchange
Denmark: Copenhagen Stock Exchange
Finland: Helsinki Stock Exchange
France: Paris Stock Exchange and Euronext
Germany: Deutsche Börse AG
Holland: Amsterdam Stock Exchange and Euronext
Italy: Italian Stock Exchange Council
Japan: Combined Japanese Stock Exchange (Tokyo, Nagoya, and Osaka)
South Korea: Korea Stock Exchange
Norway: Oslo Stock Exchange
Poland: Warsaw Stock Exchange
Spain: Madrid Stock Exchange
Sweden: Stockholm Stock Exchange
United Kingdom: London Stock Exchange
United States: Nasdaq, New York Stock Exchange, and American Stock Exchange

5. Other data:
Exchange rate:
International Monetary Fund (2004, International Financial Statistics (CD version). Washington, DC. International Monetary Fund. Line ae.

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Table 1. Sample composition and R&D proportion over production by industry

Electricity, gas and water supply	0.56%
Mining and quarrying	9.55%
Chemicals and chemical products	5.70%
Rubber, plastic and non-metallic	1.16%
Manufacturing metal articles	0.75%
Electrical equipment	7.92%
Transport equipment	1.51%
Food products, beverages and tobacco	0.56%
Textiles, textile products, leather and footwear	0.49%
Wood, paper and printing	0.35%
Other manufacturing	0.49%
Construction	0.18%
Wholesale and retail trade, repairs	0.12%
Hotels and restaurants	0.05%
Transport and communications	0.28%
Financial intermediation	0.14%
Real state	0.67%
Computer and related activities	1.51%
Total sample	**1.87%**

Table 2. Sample composition

Country	First year	Last year	Observations
Australia	1981	1999	228
Austria	1981	2002	285
Belgium	1980	2002	266
Canada	1980	2000	190
Denmark	1980	2002	342
Finland	1980	2002	285
France	1980	2002	266
Germany	1991	2002	228
Holland	1980	2001	247
Italy	1980	2002	285
Japan	1980	2002	285
Korea	1980	2001	266
Norway	1980	2002	285
Poland	1992	2002	209
Spain	1980	2000	247
Sweden	1980	2001	266
UK	1980	2000	247
USA	1980	2001	266

Table 3. Sample main descriptive statistics

	Mean	Median	Minimum	Maximum	Std. dev.
CAPIT	0.391	0.360	0.001	2.029	0.360
LIQUID	0.360	0.227	0.003	1.275	0.227
COMM	0.227	0.856	0.112	1.581	0.309
CREDIT	0.381	0.314	0.000	1.802	0.936
ASSETS	0.936	0.477	0.004	1.402	0.270

Table 4. Mean values by country

CAPIT is the stock market capitalization to GDP, LIQUID is liquid liabilities of the financial system divided by GDP, COMM the ratio of commercial bank assets divided by commercial bank plus central bank assets, CREDIT is value of credits by financial intermediaries to the private sector divided by GDP, and ASSETS is total banking assets to GDP ratio

	CAPIT	LIQUID	COMM	CREDIT	ASSETS
Australia	0.586	0.293	0.917	0.376	0.337
Austria	0.118	0.500	0.885	0.461	0.663
Belgium	0.290	0.707	0.809	1.053	0.839
Canada	0.657	0.348	0.881	0.386	0.419
Denmark	0.137	0.361	0.817	0.330	0.469
Finland	0.077	0.231	0.932	0.373	0.377
France	0.293	0.536	0.873	0.591	0.777
Germany	0.208	0.339	0.931	0.601	0.712
Holland	0.521	0.559	0.876	0.001	0.714
Italy	0.217	0.344	0.812	0.000	0.440
Japan	0.528	0.596	0.903	0.710	0.692
Korea	0.501	0.243	0.815	0.361	0.336
Norway	0.160	0.240	0.730	0.000	0.402
Poland	0.169	0.199	0.801	0.157	0.206
Spain	0.371	0.408	0.809	0.475	0.570
Sweden	0.320	0.087	0.320	0.276	0.312
UK	1.281	0.903	0.938	0.604	1.048
USA	1.031	0.179	0.939	0.246	0.256

Table 5. GMM and OLS results for *Mining and quarrying* industry

Estimated coefficients and (standard errors) of the generalized method of moments and ordinary least squares estimations. The Hansen test allows me to test the validity of the instruments and follows a chi-squared distribution. AR(1) and AR(2) respectively test the first and second order serial correlation in errors and are normally distributed. The Hansen test, AR(1), and AR(2) are only for the total sample. Adjusted-R^2 and F-statistics are for each country. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. To avoid multicollineality I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	CREDIT	COMM	Hansen test and adj.R^2	AR(1);AR(2) and F-stat
Total	0.004	-0.012	-0.020 **	0.044 ***	0.011	3.11	-1.14
	(0.006)	(0.012)	(0.010)	(0.007)	(0.016)		0.48
Australia	0.007 ***	-0.001	0.043	-0.061	-0.087 *	0.4349	2.69
	(0.001)	(0.024)	(0.048)	(0.044)	(0.047)		
Austria	-0.037	-0.054 **	0.008	-0.011	0.710 ***	0.6601	6.05 **
	(0.027)	(0.024)	(0.005)	(0.019)	(0.234)		
Belgium	0.019 ***	-0.019	0.018 *	-0.056 **	0.026 ***	0.6388	5.60 **
	(0.008)	(0.015)	(0.010)	(0.025)	(0.007)		
Canada	-0.007	0.001	-0.020 **	0.040	0.596 ***	0.8027	7.43 **
	(0.009)	(0.035)	(0.008)	(0.044)	(0.113)		
Denmark	0.029 *	0.008	-0.005	0.007	0.004	0.3343	2.71 *
	(0.016)	(0.008)	(0.010)	(0.009)	(0.018)		
Finland	0.066 ***	-0.002	-0.020	0.037 **	0.052	0.7839	11.16 ***
	(0.011)	(0.019)	(0.020)	(0.016)	(0.035)		
France	0.021 ***	0.007	-0.015 **	-0.006	0.080 **	0.8803	20.12 ***
	(0.004)	(0.012)	(0.017)	(0.007)	(0.017)		
Germany	0.039 ***	-0.101 ***	-0.045 **	0.093 ***	0.181 ***	0.8134	24.20 ***
	(0.007)	(0.033)	(0.022)	(0.033)	(0.052)		
Italy	0.034 ***	0.022	-0.011	-0.458	0.059	0.6623	6.49 ***
	(0.008)	(0.023)	(0.011)	(0.506)	(0.042)		
Japan	0.008 **	-0.005	-0.038 *	-0.004	0.050 *	0.6705	6.70 ***
	(0.003)	(0.009)	(0.022)	(0.011)	(0.028)		
Korea	0.005 **	0.013	-0.001	-0.073 ***	0.081 ***	0.8433	14.99 ***
	(0.002)	(0.020)	(0.020)	(0.026)	(0.017)		
Holland	0.001	0.001	0.004	1.186 **	0.021	0.5324	7.57 ***
	(0.004)	(0.029)	(0.026)	(0.537)	(0.021)		
Norway	0.014	0.259	-0.459 ***		0.245 ***	0.8760	25.72 ***
	(0.051)	(0.161)	(0.114)		(0.051)		
Poland	-0.020	0.111	0.141 ***	-0.147	0.147 ***	0.7139	22.22 ***
	(0.016)	(0.083)	(0.060)	(0.104)	(0.046)		
Spain	0.022 **	-0.025	0.046	-0.019	-0.061	0.3182	1.32
	(0.010)	(0.026)	(0.033)	(0.018)	(0.073)		
Sweden	0.004	-0.010	-0.027 ***	-0.028 ***	-0.046 ***	0.7890	9.23 ***
	(0.005)	(0.012)	(0.005)	(0.006)	(0.016)		
UK	-0.008	-0.011	-0.016	0.130 ***	-0.017	0.4088	2.66
	(0.006)	(0.011)	(0.013)	(0.028)	(0.136)		
USA	-0.008	-0.092	0.091	-0.100	-1.044	0.1641	9.42 ***
	(0.006)	(0.123)	(0.175)	(0.175)	(0.240) ***		

Table 6. GMM and OLS results for *Electrical equipment* industry

Estimated coefficients and (standard errors) of the generalized method of moments and ordinary least squares estimations. The Hansen test allows me to test the validity of the instruments and follows a chi-squared distribution. AR(1) and AR(2) respectively test the first and second order serial correlation in errors and are normally distributed. The Hansen test, AR(1), and AR(2) are only for the total sample. Adjusted-R^2 and F-statistics are for each country. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. To avoid multicollineality I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	CREDIT	COMM	Hansen test and adj.R^2	AR(1);AR(2) and F-stat
Total	0.007	-0.006	-0.013	0.025***	0.014**	3.95	0.28;
	(0.014)	(0.007)	(0.016)	(0.004)	(0.003)		-0.09
Australia	0.017***	0.130***	0.178*	-0.338***	-0.412**	0.4823	3.05*
	(0.003)	(0.039)	(0.105)	(0.113)	(0.124)		
Austria	0.085	-0.164*	0.001	-0.056	-1.116**	0.1964	3.20*
	(0.058)	(0.092)	(0.013)	(0.045)	(0.557)		
Belgium	0.228***	-0.079	0.089	0.114	-0.028	0.4738	1.44
	(0.066)	(0.052)	(0.079)	(0.135)	(0.037)		
Canada	0.020**	0.072**	-0.015*	-0.090	-0.321**	0.7071	3.60**
	(0.009)	(0.031)	(0.008)	(0.147)	(0.120)		
Denmark	0.001	-0.001	-0.001	0.007	0.082	0.3332	1.21
	(0.038)	(0.015)	(0.018)	(0.016)	(0.133)		
Finland	-0.088	-0.185***	0.141***	-0.259***	-0.028	0.7350	41.26***
	(0.142)	(0.068)	(0.036)	(0.030)	(-0.236)**		
France	0.080***	0.039	-0.073**	0.080***	0.024	0.6401	5.62**
	(0.017)	(0.046)	(0.028)	(0.026)	(0.062)**		
Germany	0.030	0.336	-0.326*	0.479*	0.027	0.5317	1.47
	(0.060)	(0.268)	(0.181)	(0.261)	(0.416)		
Italy	0.078***	0.074*	-0.076***	-1.278	-0.140*	0.7313	8.62***
	(0.015)	(0.041)	(0.021)	(0.901)	(0.074)		
Japan	0.007*	0.045**	0.012	0.050*	-0.100	0.5566	12.26***
	(0.004)	(0.020)	(0.063)	(0.026)	(0.064)		
Korea	0.004	0.144	0.077**	-0.037	-0.184**	0.6340	14.06***
	(0.004)	(0.141)	(0.043)	(0.035)	(0.054)		
Holland	-0.012	0.105**	-0.084**	2.153***	0.127**	0.7571	8.48***
	(0.016)	(0.043)	(0.037)	(0.836)	(0.047)		
Norway	0.001	-0.025	0.043		-0.040	0.2169	2.14
	(0.014)	(0.046)	(0.033)		(0.114)		
Poland	0.008	0.190	0.075***	-0.329	0.055	0.5418	3.37*
	(0.015)	(0.175)	(0.020)	(0.394)	(0.041)		
Spain	-0.151***	0.078	-0.221	0.113*	0.394*	0.5807	4.32**
	(0.033)	(0.084)	(0.208)	(0.058)	(0.236)		
Sweden	0.006	0.112	0.010	0.015	-0.018	0.3848	2.47
	(0.011)	(0.125)	(0.012)	(0.012)	(0.033)		
UK	0.054***	0.066***	-0.012	-0.283***	0.296	0.6624	7.56***
	(0.020)	(0.022)	(0.027)	(0.056)	(0.272)		
USA	-0.002	-0.009	-0.102	0.014	0.157	0.3278	10.39***
	(0.006)	(0.139)	(0.190)	(0.158)	(0.261)		

Table 7. GMM and OLS results for *Chemicals and chemical products* industry

Estimated coefficients and (standard errors) of the generalized method of moments and ordinary least squares estimations. The Hansen test allows me to test the validity of the instruments and follows a chi-squared distribution. AR(1) and AR(2) respectively test the first and second order serial correlation in errors and are normally distributed. The Hansen test, AR(1), and AR(2) are only for the total sample. Adjusted-R^2 and F-statistics are for each country. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. To avoid multicollineality I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	CREDIT	COMM	Hansen test and adj.R^2	AR(1);AR(2) and F-stat
Total	-0.008	-0.011	0.011	-0.002	0.025	19.48	0.13;
	(0.007)	(0.014)	(0.012)	(0.008)	(0.037)		-0.10
Australia	0.006	0.123 *	-0.242 **	0.116	-0.147	0.7124	23.91 ***
	(0.004)	(0.066)	(0.124)	(0.134)	(0.133)		
Austria	-0.129	-0.161	0.019	0.195	0.754	0.3827	2.23
	(0.106)	(0.168)	(0.024)	(0.182)	(1.019)		
Belgium	-0.160 ***	-0.009	0.056	-0.088	0.019	0.3478	3.11 *
	(0.023)	(0.027)	(0.041)	(0.071)	(0.019)		
Canada	-0.057	0.024	0.131 ***	0.142	0.261	0.5936	3.63 **
	(0.051)	(0.118)	(0.028)	(0.149)	(0.378)		
Denmark	0.098 ***	0.002	0.062 *	0.040	0.011	0.7228	16.78 ***
	(0.032)	(0.034)	(0.035)	(0.038)	(0.075)		
Finland	-0.246 ***	-0.109 **	0.450 ***	-0.584 ***	-0.155 ***	0.8422	9.75 ***
	(0.027)	(0.047)	(0.050)	(0.041)	(0.056)		
France	0.113 ***	-0.109 **	0.098 ***	0.075	-0.082 ***	0.7475	8.70 ***
	(0.020)	(0.055)	(0.034)	(0.074)	(0.032)		
Germany	0.222 ***	0.260 **	0.480	-0.179 **	-0.638 ***	0.6431	20.80 ***
	(0.056)	(0.104)	(0.439)	(0.088)	(0.177)		
Italy	0.065 **	0.308 ***	-0.186 ***	1.618 **	-0.292 ***	0.7438	9.13
	(0.024)	(0.064)	(0.033)	(0.653)	(0.100)		
Japan	0.012	0.066 ***	-0.146 ***	0.087 **	0.124 ***	0.5149	3.75 **
	(0.008)	(0.019)	(0.058)	(0.037)	(0.030)		
Korea	-0.001	-0.453 ***	0.228 **	0.228	-0.235 ***	0.6105	7.38 ***
	(0.010)	(0.097)	(0.100)	(0.328)	(0.083)		
Holland	0.015 *	-0.093 *	0.106 **	-0.862	0.149	0.6553	5.56 **
	(0.008)	(0.054)	(0.049)	(0.997)	(0.240)		
Norway	0.066 ***	0.319 ***	-0.307 ***		0.050	0.8145	16.37 ***
	(0.014)	(0.108)	(0.076)		(0.034)		
Poland	-0.008	-0.233 ***	-0.136 ***	0.165 *	0.085	0.5029	5.35 **
	(0.046)	(0.034)	(0.016)	0.08(5)	(0.126)		
Spain	-0.464 ***	-0.270	0.217	0.448 **	1.499 **	0.5708	14.19 ***
	(0.102)	(0.262)	(0.336)	(0.182)	(0.734)		
Sweden	-0.047	-0.024	-0.041	0.319	-0.155	0.3125	2.59
	(0.036)	(0.078)	(0.037)	(0.439)	(0.102)		
UK	0.043 **	-0.040	-0.077	-0.583 ***	0.451	0.4414	4.91
	(0.020)	(0.049)	(0.061)	(0.126)	(0.614)		
USA	0.030 ***	0.781 **	-1.016 **	0.858 **	-0.856	0.5913	4.76 **
	(0.006)	(0.329)	(0.468)	(0.388)	(0.642)		

Table 8. GMM and OLS results for *Wholesale, retail trade and repairs* industry

Estimated coefficients and (standard errors) of the generalized method of moments and ordinary least squares estimations. The Hansen test allows me to test the validity of the instruments and follows a chi-squared distribution. AR(1) and AR(2) respectively test the first and second order serial correlation in errors and are normally distributed. The Hansen test, AR(1), and AR(2) are only for the total sample. Adjusted-R^2 and F-statistics are for each country. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. To avoid multicollineality I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	CREDIT	COMM	Hansen test and adj.R^2	AR(1);AR(2) and F-stat
Total	0.001	-0.059	0.054	-0.041	0.022	9.11	-0.16;
	(0.008)	(0.116)	(0.043)	(0.209)	(0.078)		0.06
Australia	-0.063 ***	-0.153 *	0.097	0.147 **	0.707 **	0.6547	15.01 ***
	(0.017)	(0.091)	(0.075)	(0.069)	(0.290)		
Austria	-0.254 ***	-0.494 ***	-0.036 **	-0.132 **	3.281 ***	0.6790	6.51 ***
	(0.080)	(0.128)	(0.018)	(0.062)	(0.773)		
Belgium	0.127 ***	0.086	-0.036	0.022	0.064	0.5503	5.84 **
	(0.028)	(0.134)	(0.052)	(0.089)	(0.074)		
Canada	-0.055 ***	-0.089 **	-0.019	0.161	0.559 ***	0.8737	13.47 ***
	(0.011)	(0.045)	(0.080)	(0.357)	(0.143)		
Denmark	-0.222 ***	-0.021	0.034	-0.031	-0.101	0.3735	12.61 ***
	(0.058)	(0.028)	(0.034)	(0.031)	(0.461)		
Finland	0.226 ***	-0.001	-0.225 ***	-0.070 **	-0.276 ***	0.7276	36.86 ***
	(0.021)	(0.068)	(0.039)	(0.031)	(0.037)		
France	-0.098 ***	-0.074	-0.104 **	0.139 ***	0.180 **	0.6940	6.90 ***
	(0.026)	(0.072)	(0.044)	(0.041)	(0.083)		
Germany	-0.209	-1.136	0.684	-0.463	0.503	0.3106	0.78
	(0.194)	(0.860)	(0.583)	(0.840)	(1.335)		
Italy	0.081	0.152 ***	-0.100 ***	-0.196	-1.262 ***	0.8612	18.37 ***
	(0.219)	(0.051)	(0.026)	(1.121)	(0.330)		
Japan	0.021	-0.067 ***	0.162 **	0.053	-0.174 ***	0.5830	11.10 ***
	(0.207)	(0.017)	(0.074)	(0.054)	(0.042)		
Korea	-0.010 **	-0.014	0.183 ***	-0.001	0.214 ***	0.6990	7.04 ***
	(0.005)	(0.049)	(0.051)	(0.042)	(0.065)		
Holland	-0.040 ***	0.165 **	-0.168	0.797	0.273	0.5511	8.24 ***
	(0.012)	(0.081)	(0.275)	(1.506)	(0.261)		
Norway	-0.210 ***	-0.126 *	0.108 **		-0.052	0.8702	24.46 ***
	(0.036)	(0.076)	(0.054)		(0.064)		
Poland	-0.031	-1.434 **	0.333	1.931 **	0.159	0.5682	5.33 **
	(0.060)	(0.668)	(0.215)	(0.834)	(0.164)		
Spain	0.320 ***	-0.238	0.590	-0.278 **	-1.037 **	0.6002	4.60 **
	(0.070)	(0.179)	(0.630)	(0.125)	(0.503)		
Sweden	-0.075	-0.605 **	-0.021	-0.349 ***	-0.176	0.7241	27.77 ***
	(0.051)	(0.249)	(0.053)	(0.056)	(0.146)		
UK	-0.157 **	-0.084	-0.014	0.476 ***	-0.247	0.4258	4.15 **
	(0.062)	(0.142)	(0.052)	(0.108)	(0.526)		
USA	-0.055 ***	-0.566 *	0.590 ***	-0.705 **	-0.134 ***	0.7828	10.37 ***
	(0.007)	(0.299)	(0.171)	(0.353)	(0.584)		

Table 9. VAR results for *Mining and quarrying* industry

Estimated coefficients and (standard errors) of the vector autoregressions estimations. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. I do not include Germany and Poland, due to lack of data. To avoid multicollineality, I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	COMM	CREDIT	R^2	Granger
Australia	0.008 ***	-0.032 ***	0.014	-0.133	-0.058	0.7722	167.63***
	(0.001)	(0.005)	(0.019)	(0.112)	(0.217)		
Austria	0.032 ***	-0.053 ***	-0.007 ***	0.329	0.011 **	0.8874	19.596***
	(0.007)	(0.018)	(0.002)	(0.074)	(0.004)		
Belgium	-0.009	0.007	0.005	0.013	-0.013	0.1403	1.408
	(0.008)	(0.006)	(0.009)	(0.017)	(0.017)		
Canada	0.043 ***	-0.105 ***	-0.358 **	-0.001	-0.149	0.7881	43.287***
	(0.006)	(0.022)	(0.153)	(0.010)	(0.129)		
Denmark	0.861	0.006	-0.005	-0.001	0.017	0.1113	2.587
	(0.799)	(0.015)	(0.006)	(0.007)	(0.015)		
Finland	0.051 ***	0.007	-0.010	0.045 **	0.020 **	0.6125	14.808***
	(0.013)	(0.010)	(0.011)	(0.020)	(0.010)		
France	0.010	-0.020	0.002	0.010	-0.010 *	0.2590	1.471
	(0.015)	(0.027)	(0.005)	(0.018)	(0.086)		
Italy	0.013 **	-0.019	0.021	0.059	-0.610	0.2657	5.809**
	(0.005)	(0.028)	(0.034)	(0.067)	(0.589)		
Japan	-0.011 ***	0.021 ***	0.065	-0.038	-0.053	0.5495	26.293***
	(0.002)	(0.004)	(0.115)	(0.055)	(0.075)		
Korea	0.042	-0.041 ***	0.034	0.045	-0.028 **	0.6850	0.262
	(0.083)	(0.009)	(0.040)	(0.113)	(0.014)		
Holland	-0.031	-0.005	-0.029	0.036	1.192 ***	0.3773	0.697
	(0.441)	(0.007)	(0.036)	(0.032)	(0.380)		
Norway	0.003 ***	0.532 *	-0.588 ***	0.221		0.7407	10.368***
	(0.001)	(0.285)	(0.271)	(0.138)			
Spain	0.024 **	0.003	0.019	0.057	-0.035 ***	0.5795	4.995**
	(0.010)	(0.018)	(0.025)	(0.050)	(0.013)		
Sweden	-0.011 *	0.018	-0.004	0.002	0.004	0.2108	3.036*
	(0.007)	(0.027)	(0.011)	(0.025)	(0.017)		
UK	-0.022	-0.013 ***	-0.003	0.040	0.006 ***	0.4630	1.710***
	(0.017)	(0.003)	(0.004)	(0.041)	(0.012)		
USA	0.002 *	0.131 ***	-0.114 ***	0.159 ***	-0.051 ***	0.8773	16.224***
	(0.001)	(0.021)	(0.026)	(0.026)	(0.008)		

Table 10. VAR results for *Electrical equipment* industry

Estimated coefficients and (standard errors) of the vector autoregressions estimations. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. I do not include Germany and Poland, due to lack of data. To avoid multicollineality, I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	COMM	CREDIT	R^2	Granger
Australia	0.050	-0.010***	0.166*	-0.039	-0.156	0.3157	0.127
	(0.035)	(0.003)	(0.098)	(0.068)	(0.088)		
Austria	0.060	-0.422***	-0.177***	-1.223***	-0.051	0.7665	2.344
	(0.039)	(0.113)	(0.054)	(0.392)	(0.126)		
Belgium	0.230***	0.079	-0.004	-0.211	-0.087	0.3057	6.801***
	(0.067)	(0.057)	(0.023)	(0.269)	(0.060)		
Canada	0.026**	0.120***	0.136	-0.071***	-0.190***	0.8171	5.072**
	(0.011)	(0.030)	(0.140)	(0.019)	(0.066)		
Denmark	-0.019	-0.036**	0.015*	-0.011	-0.001	0.2618	1.180
	(0.018)	(0.016)	(0.008)	(0.018)	(0.008)		
Finland	-0.330***	-0.112*	0.113***	-0.199***	-0.227	0.7300	21.702***
	(0.112)	(0.064)	(0.041)	(0.063)	(0.039)		
France	0.092***	-0.004	-0.070***	0.061***	0.070***	0.7424	11.14***
	(0.027)	(0.030)	(0.020)	(0.016)	(0.019)		
Italy	0.083***	0.103***	-0.045***	-0.105	0.882***	0.8373	6.904***
	(0.031)	(0.020)	(0.011)	(0.105)	(0.187)		
Japan	0.008	0.095*	0.031	0.020	0.004	0.0996	1.501
	(0.006)	(0.051)	(0.050)	(0.024)	(0.017)		
Korea	0.011***	-0.049*	0.208***	-0.080***	-0.238***	0.8156	20.756***
	(0.002)	(0.030)	(0.031)	(0.020)	(0.046)		
Holland	-0.018	-0.023	0.029	0.092**	1.001	0.2301	2.139
	(0.012)	(0.079)	(0.068)	(0.037)	(0.501)		
Norway	-0.424	-0.083	0.079	-0.044		0.0716	2.479
	(0.666)	(0.065)	(0.054)	(0.039)			
Spain	-0.091***	-0.047	-0.030	-0.171***	0.191***	0.4983	46.938***
	(0.013)	(0.081)	(0.117)	(0.014)	(0.063)		
Sweden	-0.035	0.091	-0.038	-0.389	0.063	0.1118	0.418
	(0.054)	(0.121)	(0.055)	(0.244)	(0.311)		
UK	0.009***	-0.001	0.001	0.011	0.068**	0.4691	36.212***
	(0.001)	(0.003)	(0.003)	(0.013)	(0.034)		
USA	-0.022	-0.351	0.051	0.304	-0.431	0.0569	2.308
	(0.024)	(0.410)	(0.128)	(0.288)	(0.624)		

Table 11. VAR results for *Chemicals and chemical products* industry

Estimated coefficients and (standard errors) of the vector autoregressions estimations. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. I do not include Germany and Poland, due to lack of data. To avoid multicollineality, I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	COMM	CREDIT	R^2	Granger
Australia	0.056 ***	-0.384 ***	0.077	-0.435 ***	-0.108	0.6184	8.305***
	(0.016)	(0.141)	(0.049)	(0.124)	(0.087)		
Austria	-0.084	-0.437	0.131	1.540	0.130	0.0948	1.983
	(0.060)	(0.384)	(0.082)	(1.681)	(0.250)		
Belgium	-0.024	0.006	0.022	0.062	-0.020	0.1509	0.083
	(0.086)	(0.046)	(0.062)	(0.126)	(0.103)		
Canada	0.058 **	0.144	0.222 ***	-0.573	-0.131	0.4657	4.839**
	(0.026)	(0.347)	(0.083)	(0.426)	(0.111)		
Denmark	0.046 **	-0.042 ***	0.036	-0.090	-0.049	0.5988	5.449**
	(0.016)	(0.014)	(0.080)	(0.140)	(0.058)		
Finland	-0.244 ***	-0.043 ***	0.154 ***	-0.122	-0.056 **	0.4657	93.394***
	(0.024)	(0.015)	(0.024)	(0.108)	(0.022)		
France	0.096	-0.166 ***	0.254	0.053	-0.390	0.2442	1.443
	(0.080)	(0.039)	(0.205)	(0.042)	(0.245)		
Italy	0.035	0.017 ***	-0.055 ***	-0.095	-2.127 ***	0.5109	0.633
	(0.044)	(0.004)	(0.006)	(0.158)	(0.685)		
Japan	0.019 **	-0.038 *	-0.011	0.001	0.187 ***	0.3248	5.455**
	(0.008)	(0.021)	(0.053)	(0.021)	(0.055)		
Korea	-0.008	0.017	-0.025	-0.048	0.139	0.0410	2.284
	(0.005)	(0.017)	(0.065)	(0.055)	(2.247)		
Holland	0.258 ***	-0.212 **	0.200 ***	0.047	0.382 ***	0.7176	30.957***
	(0.083)	(0.083)	(0.070)	(0.069)	(0.090)		
Norway	0.045	0.022	-0.016	-0.028		0.1000	2.280
	(0.048)	(0.072)	(0.059)	(0.020)			
Spain	0.038	0.255	-0.087	0.702	0.550 **	0.2105	0.046
	(0.177)	(0.264)	(0.398)	(0.822)	(0.220)		
Sweden	0.252	0.553 *	0.113 *	-0.165	0.087	0.1235	2.194
	(0.353)	(0.306)	(0.067)	(0.169)	(0.151)		
UK	-0.104	-0.026	0.069 ***	-0.167	0.022 *	0.3014	1.247
	(0.080)	(0.022)	(0.017)	(0.221)	(0.012)		
USA	0.010	-0.127 *	0.030	-1.089	-0.245	0.0934	0.487
	(0.015)	(0.070)	(0.466)	(0.856)	(0.409)		

Table 12. VAR results for *Wholesale, retail trade and repairs* industry

Estimated coefficients and (standard errors) of the vector autoregressions estimations. *** stands for significant at a 99% confidence level, ** for a 95% confidence level and * for a 90% confidence level. Intercept is not reported. CAPIT is the stock market capitalization to GDP ratio. LIQUID is the liquid liabilities of the financial system to GDP ratio. ASSETS is the banking assets to GDP ratio. CREDIT is the credit to private sector to GDP ratio and COMM is the credit allocated by commercial banks relative to central and commercial banks assets. I do not include Germany and Poland, due to lack of data. To avoid multicollineality, I drop CREDIT for Norway.

	CAPIT	LIQUID	ASSSETS	COMM	CREDIT	R^2	Granger
Australia	0.331	0.128 *	-0.011 **	0.140	0.544 *	0.4912	1.270
	(0.258)	(0.076)	(0.005)	(0.156)	(0.233)		
Austria	-0.158 ***	1.622	0.230	0.537 **	0.056	0.5562	24.048
	(0.042)	(1.048)	(0.206)	(0.239)	(0.052)		
Belgium	0.665 ***	-0.116	0.270	0.086	-0.440	0.2708	15.987 **
	(0.233)	(0.159)	(0.194)	(0.079)	(0.317)		
Canada	-0.074 ***	0.325 ***	-0.090 ***	0.156	0.296	0.6963	33.685 ***
	(0.012)	(0.040)	(0.014)	(0.257)	(0.044)		
Denmark	-0.179 ***	0.131 ***	-0.137	0.106	-0.038	0.3384	40.308
	(0.045)	(0.037)	(0.034)	(0.119)	(0.026)		
Finland	0.391 ***	-0.139 **	0.042	0.205 ***	-0.248 ***	0.6735	6.702 ***
	(0.075)	(0.070)	(0.052)	(0.038)	(0.092)		
France	-0.089 ***	0.071 ***	-0.106 *	0.496 ***	0.137 **	0.8719	23.009 ***
	(0.032)	(0.027)	(0.058)	(0.113)	(0.061)		
Italy	0.015	0.247 *	-0.211 **	0.098	-2.438	0.0566	0.606
	(0.070)	(0.133)	(0.091)	(0.201)	(2.423)		
Japan	-0.009	0.093	0.088	-0.040	-0.042 *	0.0839	0.340
	(0.008)	(0.072)	(0.074)	(0.028)	(0.023)		
Korea	0.007	-0.089	0.002	0.117	-0.010	0.0983	0.094
	(0.006)	(0.066)	(0.122)	(0.099)	(0.107)		
Holland	-0.062 **	0.286 *	-0.245 *	1.957 **	1.741 ***	0.7796	4.876 **
	(0.030)	(0.158)	(0.151)	(0.841)	(0.319)		
Norway	-0.167 ***	-0.087	0.197 **	-0.146		0.5049	33.165 *
	(0.040)	(0.083)	(0.088)	(0.248)			
Spain	0.363 ***	0.092	0.054	-1.510 **	-0.546 ***	0.6938	20.001 ***
	(0.072)	(0.246)	(0.359)	(0.727)	(0.183)		
Sweden	0.379 **	-0.640 **	1.059 ***	0.195	-0.416	0.6179	4.695 ***
	(0.153)	(0.318)	(0.417)	(0.418)	(0.648)		
UK	-0.026 ***	0.031	-0.032	0.585 ***	-0.107 ***	0.7486	12.267 ***
	(0.004)	(0.077)	(0.098)	(0.091)	(0.031)		
USA	-0.068 ***	-0.387 ***	0.987 ***	-0.553 ***	0.728	0.7958	18.003 ***
	(0.008)	(0.119)	(0.164)	(0.134)	(0.643)		