

# Financial development, openness and competition in the Euro Area and the US<sup>1</sup>

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## Abstract

This paper investigates the relation between competition, financial development and trade openness. It uses the methodology developed by Roeger (1995) about estimating markups. It suggests that financial development lead to lower markups in the Eurozone and US over the period 1981-2004. Moreover, there is evidence that financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance. This relation is stronger over the period 1995-2004, perhaps due to the increased implementation of the EU Directives about the financial services industry and the adoption of the Euro. However, these results are not robust to the use of different measures for financial development or external dependence. Furthermore, there is strong evidence that the trade openness of countries is linked with higher competition and thus lower markups. This finding appears to be stronger for industries traditionally defined as tradable. Controlling simultaneously for trade openness and financial development shows that trade openness has greater explanatory power for the extent of competition compared to financial depth.

## 1 Introduction

Various factors have been suggested to influence the degree of competition in different industries across countries. Barriers to entry, product differentiation, the number of firms in a market and the degree of concentration are examples of industry specific determinants of competition. Government subsidies, the strictness and enforcement of competition policy, openness to trade and financial development are some of the potential country specific factors.

Since product market competition is a complex and multi-dimensional process, few broad and aggregate indicators can characterise the degree or intensity of competition in different markets, and no single indicator can do so. Thus, a

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broad range of indicators is required, each capturing one element of competition. This paper uses the mark-up of product prices over marginal costs as a measure of a possible manifestation of imperfect competition. A markup ratio bigger than one implies that prices exceed marginal costs and are, thus, evidence of market power in a sector.

The relation of markups to macroeconomic variables is interesting from the standpoint of competition regulators. Policy-makers need to know whether certain policies are conducive to competition and analysts of trade policy and the financial sector need to understand their effects on competition.

This study focuses on the relation between competition and country-specific factors and it is part of the research effort attempting to bring the above predictions to the data. In particular, it investigates the relationship between the degree of competition and the financial environment or trade openness. The empirical estimations are for 50 sectors for 8 Eurozone member states and U.S. over 1981-2004.

We use the Solow residual, a growth accounting methodology which measures the growth rate of productivity, and try to identify the extent at which financial development or trade openness of a country influences competition. Furthermore, we look into whether such a link is stronger for specific industries. More specifically, we investigate the relation between financial depth or the degree of banking liberalization and industry competition. For example, financial depth may be associated with greater ease of entry and thus increased competition. Then, we control for the case of financial depth having a greater effect on competition in sectors where firms are relatively more dependent on external finance, drawing on the central idea of Rajan and Zingales (1998). The relation between trade openness and competition is then investigated. In response to greater foreign competition and increased imports, the market share for domestic producers falls and markups should decline. This relation might be stronger for those industries for which the relative volume of international trade is greater.

The findings of this paper suggest that financial development may have induced lower markups in the Eurozone and US over the period 1981-2004. Moreover, there is evidence that financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance. These findings are not present across all specifications, nor robust to the different financial development measures or external dependence measures considered. Still, their occasional presence suggests pro-competitive effects. The relation is more potent over the period 1995-2004. Furthermore, there is strong evidence that increased trade openness is linked with higher competition and thus lower markups. This relation appears to be more robust for industries with a higher degree of tradability.

The rest of the paper proceeds as follows. Section two explains the methodology and the theoretical underpinnings of the various specifications to be estimated. Section three outlines the data. Section four presents and discusses the results. Section five concludes.

## 2 Methodology and Theoretical Underpinnings

### 2.1 Solow Residual

Growth accounting is central to the attempt of analyzing the fundament determinants of economic growth. It is an empirical methodology for the decomposition of the observed growth of GDP into changes in factor inputs and in production technology. Since it is not possible to measure technological progress directly, it is measured as "residual growth" i.e. as the part of growth of GDP which cannot be accounted for by the growth of the observable inputs. The pioneering work is Solow (1957) who showed that the difference between output growth and the sum of input growth, weighted by the relative contributions of each of the factors to GDP, is equal to technological change. Solow's analysis assumes constant returns to scale, perfect competition and Hicks neutral technological change. It relies on the growth rates of the quantities of inputs and is often called the primal approach.

Hall (1988) shows that by relaxing the assumption of perfect competition, the Solow residual measures the weighted sum of technological change and the growth rate of the output-capital ratio rather than the rate of technological change alone. The weights depend on the markup of price over marginal coast. Thus:

$$\begin{aligned} & \Delta Q_t - \alpha_{N_t} \Delta N_t - \alpha_{M_t} \Delta M_t - (1 - \alpha_{N_t} - \alpha_{M_t}) \Delta K_t \\ &= \left(1 - \frac{1}{\mu_t}\right) (\Delta Q_t - \Delta K_t) + \left(\frac{1}{\mu_t}\right) \theta_t \end{aligned} \quad (1)$$

where  $\Delta Q_t$  is output growth,  $\Delta N_t$  is labour input growth,  $\Delta M_t$  is intermediate input growth,  $\Delta K_t$  is capital input growth,  $\alpha_{N_t}$ ,  $\alpha_{M_t}$  are the labour and capital shares in revenue,  $\mu_t$  the price-cost markup and  $\theta_t$  the rate of technological change.<sup>2</sup> The left hand side of (1) is the definition of the traditional Solow residual ( $SR_t \equiv \Delta Q_t - \alpha_{N_t} \Delta N_t - \alpha_{M_t} \Delta M_t - (1 - \alpha_{N_t} - \alpha_{M_t}) \Delta K_t$ ). Notice that in the case of perfect competition, the markup is equal to one and thus the Solow residual is equal to technological change  $\theta_t$ .

Roeger (1995) uses Hall (1988) to develop a "dual" Solow residual which is computed from growth rates of factors prices, rather than factor quantities. This dual equation is:

$$\begin{aligned} & \Delta p_t - \alpha_{N_t} \Delta w_t - \alpha_{M_t} \Delta m_t - (1 - \alpha_{N_t} - \alpha_{M_t}) \Delta r_t \\ &= \left(1 - \frac{1}{\mu_t}\right) (\Delta p_t - \Delta r_t) + \left(\frac{1}{\mu_t}\right) \theta_t \end{aligned} \quad (2)$$

where  $\Delta p_t$  is the output price change,  $\Delta w_t$  is the wage change,  $\Delta m_t$  is the intermediate input price change and  $\Delta r_t$  is the user cost change. The left

<sup>2</sup>A derivation of this equation can be found in Christopoulou and Vermeulen (2008), for example.

hand side is now defined to be the (negative of) price-based Solow residual ( $-SRP_t \equiv \Delta p_t - \alpha_{Nt}\Delta w_t - \alpha_{Mt}\Delta m_t - (1 - \alpha_{Nt} - \alpha_{Mt})\Delta r_t$ ).

Roeger shows that after subtracting the traditional Solow residual  $SR_t$  from the dual Solow residual  $SRP_t$ , technological growth drops out and the subsequent expression contains only nominal observable variables. Thus adding (1) and (2) and rearranging:

$$\begin{aligned} & (\Delta p_t + \Delta Q_t) - \alpha_{Nt}(\Delta w_t + \Delta N_t) - \alpha_{Mt}(\Delta m_t + \Delta M_t) \\ & - (1 - \alpha_{Nt} - \alpha_{Mt})(\Delta r_t + \Delta K_t) \\ = & \left(1 - \frac{1}{\mu_t}\right) ((\Delta p_t + \Delta Q_t) - (\Delta r_t + \Delta K_t)) \end{aligned} \quad (3)$$

where  $(\Delta p_t + \Delta Q_t)$  denotes the *nominal* output growth,  $(\Delta w_t + \Delta N_t)$  denotes the nominal wage bill,  $(\Delta m_t + \Delta M_t)$  denotes the growth in intermediate input costs and  $(\Delta r_t + \Delta K_t)$  denotes growth in capital costs. In other words, subtracting the price based Solow residual from the quantity based Solow residual one gets a "nominal" Solow residual which is a function of the markup and the difference between nominal output growth and nominal capital cost growth.

The "nominal" Solow residual can be used to estimate markups by the following simple regression:

$$y_t = \beta x_t + \varepsilon_t \quad (4)$$

where  $y_t = SR_t - SRP_t = (\Delta p_t + \Delta Q_t) - \alpha_{Nt}(\Delta w_t + \Delta N_t) - \alpha_{Mt}(\Delta m_t + \Delta M_t) - (1 - \alpha_{Nt} - \alpha_{Mt})(\Delta r_t + \Delta K_t)$ ,  $x_t = (\Delta p_t + \Delta Q_t) - (\Delta r_t + \Delta K_t)$  and  $\beta = \left(1 - \frac{1}{\mu}\right)$ . Notice that the markup  $\mu$  is assumed to be constant over time. A simple OLS regression can be used to derive an estimate of the markup which is simply

$$\mu = \frac{1}{1 - \beta}$$

Whenever there is some degree of monopoly power, the estimated markup should be greater than one i.e.  $\beta$  is expected to be positive.

The method by Roeger (1995) has been used in various studies to estimate industry markups. Roeger (1995), Oliveira Martins et al. (1996), Oliveira Martins and Scarpetta (1999) and Badinger (2007a) use industry level data to estimate markups and Konings et al. 2005, Konings and Vandenbussche 2005, Görg and Warzynski 2006 use firm level data. More important, Christopoulou and Vermeulen (2008) estimate markups for 50 industries in each of the eight Eurozone countries (Italy, Spain, Netherlands, Austria, Germany, Finland, France, Belgium) and the USA for the period 1981-2004. This paper builds on their estimates. In what follows, there is a detailed presentation of the questions addressed.

## 2.2 Specification I

There have been numerous studies on the link between financial development and product market competition. The main question of interest is whether financial intermediation or financial depth have any implications for the extent of product market competition. More specifically, one can look into how markups are affected by financial depth or the degree of banking liberalization. For example, financial depth may be associated with greater ease of entry, and hence greater competition.

There is a rich theoretical and empirical literature on financial development and entry and thus competition. From a theoretical standpoint, Lloyd-Ellis and Bernhardt (2000) and Evans and Jovanovic (1989) suggest that credit constraints leads to lower entry of potentially good entrepreneurs compared with wealthier but less talented ones. Similarly, Cabral and Mata (2003) showed that financing constraints can to some extent explain the positive skewness in the size distribution in young cohorts of firms, whom distribution only moves towards the right-hand side as firms age. Hence, as financial markets develop, access to external finance improves thus making younger firms more likely to enter, and therefore contributing the average firm size to be, all else constant, smaller. Cestone and White (2003) presented a model where more credit market competition spurs more product market competition. The empirical literature agrees with the theoretical predictions. Haber (1997) used historical data and showed that Mexico's textile industry started out larger and relatively more competitive compared to Brazil's. However, since Mexico's financial markets remained underdeveloped, the textile industry had less opportunities for entry and ended up smaller and more concentrated than Brazil's, whom liberalized finance. Guiso, Sapienza, and Zingales (2004) find that financial development enhances the probability an individual starts his own business, favors entry, increases competition, and promotes growth of firms in Italy. Similarly, Cetorelli (2004) showed that deregulation in EU banking markets in the early 1990s has resulted in non-financial sectors's markets characterized by lower average firm size and Cetorelli and Strahan (2006) find that more vigorous banking competition in local U.S. banking markets is associated with higher number of firms in operation and with a smaller average firm size. More recently, Aghion et al. (2007) look on the effects of financial development on the entry of new firms in 16 industrialized and emerging economies and find that access to finance matters most for the entry of small firms but has either no effect or a negative effect on entry by large firms.

However, none to our knowledge has used the Solow residual to explore the relation between financial development and competition. In order to control for the impact of the financial environment, the right hand side of the expression for the nominal Solow residual (3) is interacted with the measure of financial development. Thus, the regression to be estimated is:

$$SR_t - SRP_t = (\beta_0 + \beta_1 FIN_t) ((\Delta p_t - \Delta Q_t) - (\Delta r_t + \Delta K_t)) + \varepsilon_t \quad (5)$$

where  $FIN_t$  is the variable which describes the financial development of the economy. We are interested in whether  $\beta_1$  is negative and significantly different from zero so that higher financial development indicates lower markups. Finally, the markup will be:

$$\mu = \frac{1}{1 - (\beta_0 + \beta_1 FIN)}$$

The markup will be equal to one if the industry is competitive and will be greater than one if there is some degree of monopolistic power. Thus,  $(\beta_0 + \beta_1 FIN)$  should be positive.

As a robustness check we implement a "two-stage" approach. We use the estimates of markups of Christophoulou and Vermeulen (2008) as the dependent variable and check the explanatory power of financial development. We also control for other country-specific or industry-specific characteristics. We thus estimate the following regression:

$$markup_t = \alpha + \beta FIN_t + \sum \gamma z_t + \varepsilon_t \quad (6)$$

where  $z_t$  is any variable that describe country-specific or industry-specific characteristics.

### 2.3 Specification II

The level of financial development is broadly similar among the developed countries, even more for west European countries and USA. Since the implementation of the Single European Act in 1986, which had as a core element the creation of a single market within the EU, up to the introduction of the Euro on January 1999, the economies of the Euro area have been subject to a gradual deregulation. So, although there have been financial reforms during the sample period 1981-2004 which may possibly give interesting results, the variation of financial depth/ banking liberalization might give results of limited interest or imprecise estimates. So, we will also check whether financial depth is differently important across sectors. The theoretical underpinning of our test is Rajan and Zingales (1998). This paper shows that the industrial sectors which are relatively more in need of external finance develop faster in countries with more developed financial markets. Moreover, the growth in the number of new establishments is significantly higher in industries dependent on external finance when the economy is financially developed. Similarly, Aghion et al. (2007) use harmonized firm-level data for 16 industrialized and emerging economies and find that access to finance matters most for the entry of small firms and in sectors that are more dependent upon external finance.

We use this idea by adjusting it as follows. Financial depth might have a greater effect on competition in sectors where firms are unusually dependent on

external finance. In order to capture this idea, (3) changes to:

$$SR_t - SRP_t = (\beta_0 + \beta_1 FIN_t + \beta_2 EXDEP + \beta_3 FIN_t * EXDEP) ((\Delta p_t - \Delta Q_t) - (\Delta r_t + \Delta K_t)) + \varepsilon_t \quad (7)$$

where *EXDEP* is the variable which describes the external financial dependence of an industry. The financial development variable is interacted with each industry's dependence on external finance and the constitutive terms of the interaction term are also included separately. Of course, the three variables are interacted with  $x_t$ . We are interested in whether  $\beta_1$  and  $\beta_3$  are negative and significantly different from zero and whether the derivative of the markup with respect to financial depth is negative. The markup is now given by:

$$\mu = \frac{1}{1 - (\beta_0 + \beta_1 FIN_t + \beta_2 EXDEP + \beta_3 FIN_t * EXDEP)}$$

and the derivative of the markup with respect to *FIN* is:

$$\frac{\partial markup}{\partial FIN} = \frac{\beta_1 + \beta_3 EXDEP_i}{(1 - (\beta_0 + \beta_1 FIN_t + \beta_2 EXDEP + \beta_3 FIN_t * EXDEP))^2}$$

Similarly to before, a robustness check via a "two-stage" approach will also be carried out.

## 2.4 Specification III

The next question this paper looks into is whether the trade openness of a country has an impact on the extent of competition within various industries. In response to exposure to international competition and increased imports, the market share for domestic producers falls and markups should decline. Empirical studies have found that the link is validated by data. Levinsohn (1993), Harrison (1994) and Hoekman et al. (2004) are all studies that find support for the hypothesis that imports are a source of discipline on domestic firm pricing behavior. Badinger (2007b) finds that trade (import penetration) has pro-competitive effects. Chen, Imbs and Scott (2009) using disaggregated data for EU manufacturing over the period 1989–1999 found short run evidence that trade openness exerts a competitive effect although the long run effects are more ambiguous. Harrison et al. (2006) find that the different product market reforms carried out by the European Union under the Single Market Program, a large project by the then members of the European Union to reduce internal non-tariff barriers to trade and other barriers to the free movement and factors of production across borders, have increased competition as reflected by a reduction in markups. Similarly, Badinger (2007a) suggests that the EU's Single Market Programme led to mark-up reductions for aggregate manufacturing and

also for construction although mark-ups have gone up in most service industries since the early 1990s.

The openness of all the countries of our sample has increased over the period of interest. For the Eurozone member states this trend is naturally enhanced by the introduction of the Euro, which resulted in an increased volume of internal trade, a prerequisite as much as a positive outcome of a common currency area. And although one would expect that the common trade policies adopted by the members of EU would not allow for differences in their openness, the data show that the level of openness differs substantially across Euro area countries. So, for the European countries in the sample, Spain exhibits the minimum openness (averaged over time) in the sample (0.37) whereas the maximum openness is found for Belgium (1.23). USA is the least open country of the sample (0.18), where openness is measured by the ratio of exports plus imports to GDP.

To control for the effect of trade openness on product market competition a similar approach to Specification I can be used:

$$SR_t - SRP_t = (\beta_0 + \beta_1 OPEN_t) ((\Delta p_t - \Delta Q_t) - (\Delta r_t + \Delta K_t)) + \varepsilon_t \quad (8)$$

where  $OPEN$  is the variable which measures the trade openness of an economy. We are interested in whether  $\beta_1$  is negative and significantly different from zero, so that higher openness is consistent with lower markups. In this case the markup will be

$$\mu = \frac{1}{1 - (\beta_0 + \beta_1 OPEN)}$$

We will also control whether financial depth has greater explanatory power on competition in these industries which have high relative volume of international trade. Finally, a robustness check via a "two stage" approach will also be carried out.

## 2.5 Specification IV

Rajan and Zingales (2003) showed that trade openness is correlated with financial market development. Hence, the natural last step is to control simultaneously for the impact of the financial development and trade openness on competition. The regression used is:

$$SR_t - SRP_t = (\beta_0 + \beta_1 FIN_t + \beta_2 OPEN_t) ((\Delta p_t - \Delta Q_t) - (\Delta r_t + \Delta K_t)) + \varepsilon_t \quad (9)$$

The markup is given by:

$$\mu = \frac{1}{1 - (\beta_0 + \beta_1 FIN + \beta_2 OPEN)}$$

### 3 Data and summary statistics

Our paper draws heavily on the estimations in Christopoulou and Vermeulen (2008). The sample consists of data on 50 industries in each of the eight Eurozone countries (Italy, Spain, Netherlands, Austria, Germany, Finland, France, Belgium) and the USA for the period 1981-2004. Thus, the data have three dimensions i.e. time, industry and country. Data availability does not allow the inclusion of the remaining Eurozone members of the time.<sup>3</sup>

#### 3.1 Data on industries

The data on the left and right hand side of the "nominal" Solow residual,  $y$  and  $x$  respectively, as well as the estimates of markups used in the "two-stage" approach are from Christopoulou and Vermeulen (2008). For the calculations they use the EU KLEMS data base (March 2007 Release) apart from the user cost of capital for which data are from the AMECO database. The output and input data are at the two digit level (NACE, Rev. 1.1). More details are provided in their paper.

For the tradability of different industries various measures have been suggested. We follow the approach of De Gregorio, Giovannini and Wolf (1994) which defines an industry as "tradable" if more than 10 percent of total production is exported. They use data for 14 OECD countries over 1970-1985 and find that agriculture, mining, manufacturing and transportation are "tradable" whereas services other than transportation are "nontradable".

#### 3.2 Data on Countries

Data on Gross Domestic Product are obtained from the OECD (in constant prices and PPP's).

To measure openness we use the ratio of nominal exports plus imports to nominal GDP, using data in current US dollars from the World Development Indicators (June 2009).

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<sup>3</sup>According to Christopoulou and Vermeulen (2008), the included countries account for over 90% of the 12 member states output of the time.

### 3.3 Measures of Financial Development

We use the following financial measures:

*Liquid liabilities relative to GDP (llgdp)*: This equals currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP. It is a measure of absolute size based on liabilities and is often used to measure financial depth (see e.g. King and Levine (1993) in their seminal paper on finance and growth or Levine, Loayza and Beck (2000)).

*Private credit by deposit money banks relative to GDP (prib)*: This equals claims on the private sector by deposit money banks, divided by GDP. It is a measure of one of the main activities of deposit money banks: the channeling of savings to investors. This measure isolates credit issued to the private sector as opposed to credit issued to governments and public enterprises. Furthermore, it excludes credit issued by the central bank. This indicator has been used by Levine and Zervos (1998), among others.

*Private credit by deposit money banks and other financial institutions relative to GDP (pribof)*: This equals claims on the private sector by deposit money banks and other financial institutions, divided by GDP. Similar to *prib*, it is a measure of activity of financial intermediaries and isolates credit issued to the private sector. This indicator has been used by Levine, Loayza and Beck (2000). Data for the above three measures are from Beck, Demirguc-Kunt and Levine (2000).

*Financial freedom (bankfreed)*: This is a measure of banking security as well as a measure of banks' independence from government control. It is a composite index of the extent of government regulation of financial services, the extent of state intervention in banks and other financial services, the difficulty of opening and operating financial services firms and government influence on the allocation of credit. The authors determine the financial climate and assign an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Data are available from the Heritage Foundation for only a subperiod, namely 1995-2004. We expect this measure to have higher explanatory power compared to the other three since it focuses on the banking industry. The banking industry is the core and most important component in the non Anglo-Saxon financial systems. Although EU member states have adopted Banking Directives<sup>4</sup>, which compel them to harmonize their banking sectors, the implementation dates vary across countries (see e.g. Romero-Avila, 2007).

### 3.4 Measures of External Dependence

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<sup>4</sup>Directives have the character of binding laws and require EU member states to achieve a particular result without dictating the means of achieving that result, as opposed to EU regulations which are self-executing.

Data on the actual use of external financing of different industries, either across countries or over time, are rarely available. Various proxies have been suggested in the literature for the dependence of industries on security markets, banks and investments by other stakeholders.

*extdepR\_Z*: This is the pioneering measure of the dependence on external finance introduced in Rajan and Zingales (1998). It is defined as capital expenditures minus cash flow from operations divided by capital expenditures and is based on data from U.S. firms. The authors argue that since capital markets in the U.S. are among the most advanced in the world, the frictions in accessing external finance are minimal. Thus, the amount of external finance used by large firms is likely to be a good measure of their actual demand for external finance rather than just an equilibrium between the demand and (rationed) supply of such funds. They believe that the dependence of US firms is a good proxy for dependence in other countries, since differences in the degree of dependence of the various industries are due to technological reasons which apply across countries. Data are averaged over the 1980s and are confined to manufacturing industries. The Appendix provides more details.

*extdepM\_G*: Maudos and Fernandez de Guevara (2007) suggest the following proxy for dependence:

$$\frac{(\text{non current liabilities})+(\text{current liabilities: loans})}{(\text{total assets})-(\text{current liabilities:creditors})-(\text{other current liabilities})}$$

Data are averages over 1993-2003 and cover 48 of the 50 industries in our sample. The benchmark country is the United Kingdom on similar reasoning as for the use of U.S.A. for Rajan and Zingales (1998). Moreover, they find that the degree of financial development of U.K. is closer to that of the USA than to the average of the EU-15 and thus is a good proxy for dependence in the countries in the sample for the reasons outlined for the Rajan-Zingales measure. The Appendix provides more details. One can claim that the Maudos-Fernandez de Guevara measure is not a measure of external financial dependence but a measure of dependence to the credit markets as external equity finance (new equity issues) is not taken into account. Inklaar and Koetter (2008) also suggest the use of debt in total assets as a measure of financial dependence.

*Bank Dependence (bankdep)*: This measure tries to isolate the dependence of industries on banks rather than other intermediaries. Carlin and Mayer (2003) suggest the use of the proportion of net physical investment financed by bank loans. They provide estimates for 16 of the industries in our sample. Japan is the benchmark country and data are averages for the years 1981-1990. The argument is similar to the "minimal frictions in raising external finance" argument used by the above two papers, in the sense that Japan has one of the highest bank credit to GDP ratios and an unusually high level of bank financing of industry (see e.g. Corbett and Jenkinson, 1997). We expect this measure to have higher explanatory power compared to the other two for reasons similar to the ones explained in the case of *bankfreed*.

### 3.5 Descriptive Statistics

Table A presents the descriptive statistics. A special note should be made for the data on markups. Real Estate Activities (sector 70) is an outlier. The markup ratio for the whole period is 9.2 in Italy and around 3 in the rest countries. Christopoulou and Vermeulen (2008) attribute this to possible statistical specificities leading to large measurement errors which imply upward bias of the markup. Their paper provides detail.

Table A

Variable	Obs	Mean	Std. Dev.	Min	Max
y	10213	0.00	0.05	-0.84	0.80
x	10290	-0.02	0.17	-1.66	1.79
markup	447	1.35	0.55	0.94	9.20
markup 93-04	447	1.37	0.53	0.89	8.62
gdp	216	1514463	2325521	81925	10600000
openness	216	0.67	0.37	0.17	1.66
llgdp	206	0.70	0.19	0.41	1.74
prib	206	0.75	0.28	0.26	2.18
pribof	208	0.89	0.43	0.26	3.45
bankfreed	87	67.47	13.91	50.00	90.00
extdepM_G	48	0.43	0.11	0.16	0.71
extdepR_Z	22	0.36	0.39	-0.45	1.06
bankdep	16	0.42	1.14	-3.41	1.78

Note: A description of the data is given in the main text.

The cross correlation coefficients of the variables which vary across countries and time but not across industries are given in Table B. An interesting result is the negative and statistically significant correlation between GDP and trade openness. The result is driven by the U.S. More specifically, the U.S. is a relatively closed economy and has higher level of GDP compared to the other countries of the sample. The explanation is similar for the negative correlation between GDP and financial development when the later is measured by *llgdp* and *prib*. The correlation among the three measures of financial development (*llgdp*, *prib*, *pribof*) is high and statistically significant. However, the correlation between each of these measures and the measure of banking freedom (*bankfreed*) is lower although still statistically significant.

Table B						
	gdp	openness	llgdp	prib	pribof	bankfreed
gdp	1					
openness	-0.52*	1				
llgdp	-0.04	0.26*	1			
prib	-0.24*	0.15*	0.80*	1		
pribof	0.39	0.00	0.76*	0.67*	1	
bankfreed	0.19	0.29*	0.38*	0.28*	0.53*	1

Note: A description of the data is given in the main text.

Table C presents the correlation coefficients of the different measures of external dependence i.e those variables which vary only across industries. The correlation is low and insignificant in all cases. This might be due to the different industries for which data are available for each of the three measures (see appendix for details).

Table C			
	extdepR_Z	extdepM_G	bankdep
extdepR_Z	1		
extdepM_G	-0.28	1	
bankdep	0.01	-0.12	1

Note: A description of the data is given in the main text.

## 4 Results

### 4.1 Specification I: Financial Development and Competition

#### 4.1.1 Results from industry-country specific estimations

Equation (5) is estimated for 50 industries in the 8 Eurozone member states and the USA for the period 1981-2004. So, we estimate the following cross-sectional equation for 450 industries:

$$y_t = \beta_0 x_t + \beta_1 x_t FIN_t + \varepsilon_t \quad (10)$$

where  $t = 1981, 1982, \dots, 2004$ . The significance of financial development for competition, for the different measures used for  $FIN$ , is modest in these 450 regressions. The estimated coefficient  $\beta_1$  is significant for 91, 97 and 106 of the regressions for  $llgdp$ ,  $prib$  and  $pribof$  respectively at the 10% significance level.<sup>5</sup>

<sup>5</sup>The measure *bankfreed* is not used due to the small number of observations (each regression would have only ten observations in this case).

This is more than would be expected by chance, but it is clear that a null of zero cannot be rejected in the majority of cases.

#### 4.1.2 Estimations at industry level

It may be reasonable to assume that industries have the same characteristics across different countries. Thus, markups are homogeneous across countries. In that case we are treating the parameters as the same across countries and thus pool the data over time. So, (5) can be estimated by industry. The estimation model is:

$$y_{tk} = \beta_0 x_{tk} + \beta_1 x_{tk} FIN_{tk} + \varepsilon_{tk} \quad (11)$$

where  $k$  is the country index. Equation (11) is estimated for 50 industries and for the four measures of financial depth. Heteroskedasticity-robust standard errors are used. The errors might be correlated within groups and so we also cluster by country. Clustering does not affect the point estimates but only modifies the variance-covariance matrix. If the within-cluster correlations are meaningful, ignoring them leads to inconsistent estimates of the variance-covariance matrix. Table 1 shows the results. The estimated coefficient  $\beta_1$  often has the "correct sign" but is only significant for 12, 0, 3 and 7 sectors for *llgdp*, *prib*, *pribof* and *bankfreed* respectively (10% significance level). If within-cluster correlations are assumed to be negligible, financial development appears significant for more industries but the evidence is still weak.

Hylleberg and Jorgensen (1998) have argued that if the markups are not constant over the period of estimation then a constant term should be added to the regression. We now take this a step further and allow for different intercepts across time and across country. Hence, time and country dummy variables are included as additional explanatory variables. The data set is a panel and the fixed effects model is:

$$y_{tk} = \beta_0 x_{tk} + \beta_1 x_{tk} FIN_{tk} + D_t + D_k + \varepsilon_{ik} \quad (12)$$

where  $D_t$  are 24 dummy variables (10 when *bankfreed* is used) indicating the year and  $D_k$  are 9 dummy variables indicating the country. Table 2 shows that the significance of  $FIN$  is slightly higher. More specifically, the estimated coefficient  $\beta_1$  often has the "correct" sign but is significant for only 13, 3, 2 and 6 sectors for *llgdp*, *prib*, *pribof* and *bankfreed* respectively (10% significance level). Similar to before, no clustering implies greater significance.

Finally, we can also allow for differences in slopes across countries. In that case  $x_{tk}$  is interacted with  $D_k$  and the fixed effects model is:

$$y_{tk} = \beta_1 x_{tk} FIN_{tk} + D_t + D_k + \beta_2 x_{tk} D_k + \varepsilon_{ik} \quad (13)$$

Notice we drop  $x_{tk}$  since this term is collinear with  $x_{tk}D_k$ . Table 3 shows that the significance of  $FIN$  is low even though  $\beta_1$  often has the "correct" sign. Financial depth is significant for 4, 6, 9 and 14 industries for *llgdp*, *prib*, *pribof* and *bankfreed* respectively (10% significance level). No clustering implies greater significance.

No particular industries are repeatedly found to exhibit a sensitive relationship between competition and financial development across the three models of the section and the four measures of financial development. However, there is a looser kind of consistency; Across the three specifications: Electricity and Gas (sector 40) when  $FIN$  is measured by *llgdp* (5% significance level), Sewage and refuse disposal, etc (sector 90) when  $FIN$  is measured by *bankfreed* (10% significance level) and across the four measures of  $FIN$ : Activities related to financial intermediation (sector 67) for the third model (10% significance level).

#### 4.1.3 Robustness test via a "two-stage" approach

A further way to check the robustness of the results is to use a two-stage approach. Christopoulou and Vermeulen (2008) have estimated markups for the current sample. We use their estimates as the dependent variable and control for the extent of financial development. The logarithm of GDP is used as an additional explanatory variable to capture country specific characteristics. The intercepts are allowed to differ across sectors but not across countries (country dummies would be collinear with both  $FIN$  and  $GDP$ ) and thus industry dummies ( $D_i$ ) are included. The data on  $FIN$  and  $GDP$  are averaged over time since markups are also constant over time, by construction. In the case of *bankfreed* we assume that the markup of the period 1981-2004 is a proxy for the markup of the period 1995-2004.<sup>6</sup> Since, data now vary across industry and country but not over time the data set is cross-sectional and the estimation model is:

$$markup_{ik} = D_i + \beta_1 FIN_k + \beta_2 \ln GDP_k + \varepsilon_{ik} \quad (14)$$

where  $i$  is the industry identifier. Heteroskedasticity-robust standard errors are used. Table 4 shows that the findings of the above specifications are reproduced by this model. Financial development has only weak explanatory power for the extent of competition, unless it is assumed that the within-cluster correlations are negligible, in which case higher financial development implies lower markups.

Summarizing the findings of Specification I, financial development appears to promote competition but the estimates of this effect are often imprecise. The evidence is relatively stronger if the within-cluster correlations are assumed to be negligible. Among the four measures, *bankfreed* has higher explanatory power, which matches prior expectations given the particular sample.

<sup>6</sup>Such an assumption is not unreasonable. Christopoulou and Vermeulen (2008) have found that there is no systematic change in markups from 1981-1992 to 1993-2004. A robustness check is carried out later on by repeating the estimation using the markup of 1993-2004.

## 4.2 Specification II: Financial Dependence and Competition

### 4.2.1 Results from pooled and panel data estimations

The data for the three measures of dependence on external finance are obtained from a country-benchmark. Some country-specific characteristics relating to financial markets shall indicate whether the external dependence observed is the best possible proxy for the demand for external funds in other countries. So, the first two measures of financial dependence use the USA or the UK as the benchmark country, as these economies are among the most financially advanced and frictions in accessing funds should be minimal. On the other hand, the Carlin-Mayer measure of dependence on banking finance uses Japan since it has the highest ratio of bank credit to GDP and an unusually high level of bank financing of industry.

The data on external dependence is industry-specific and time-invariant. The estimation of the varying effect of financial depth-amended Solow residual per industry per country or per industry is impossible (the two variables relating to the external dependence,  $EXDEP$  and  $x_t FIN_t * EXDEP$ , cannot be included since the former is constant and the later is collinear with  $x_t FIN_t$ ).

One approach to check whether financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance would be to assume that markups are constant across industries and thus estimate (7) per country. However, such an assumption is not very intuitive. An alternative approach is to treat the parameters as the same across units and pool the data of all countries and industries. Table 5 shows the results of the estimation. Financial development and the interaction with external dependence are never significant and the null of joint insignificance cannot be rejected for any combination of the different measures. The explanatory power of financial development is not much stronger either if within-cluster errors are assumed to be uncorrelated, apart from the case when the measure of financial depth is *bankfreed* and the Maudos-Fernandez de Guevara measure of external finance is used.

If the intercepts and slopes for the various industries and countries are allowed to differ we find the following three specifications of particular interest.

$$y_{tik} = D_k + D_i + D_t + x_{tik}D_k + x_{tik}D_i + \beta_1 x_{tik}FIN_{kt} + \beta_2 x_{tik}FIN_{kt} * EXDEP_i + \varepsilon_{tik} \quad (15)$$

$$y_{tik} = D_k + D_i D_t + x_{tik}D_k + x_{tik}D_i + \beta_1 x_{tik}FIN_{kt} + \beta_2 x_{tik}FIN_{kt} * EXDEP_i + \varepsilon_{tik} \quad (16)$$

$$y_{tik} = D_i + D_k D_t + x_{tik}D_k + x_{tik}D_i + \beta_1 x_{tik}FIN_{kt} + \beta_2 x_{tik}FIN_{kt} * EXDEP_i + \varepsilon_{tik} \quad (17)$$

Notice that the inclusion of country or industry dummies transforms the data set to panel and the equations (15), (16) and (17) are fixed effects models. The component  $x_{tik}EXDEP_i$  cannot be included in these specifications as this term will be collinear with  $x_{tik}D_i$ . The number of industry dummies  $D_i$  reflects the number of industries for which data on each of the three measures of external dependence are available and the number of time dummies  $D_t$  reflects the number of years that each of the three measures of financial development cover. These three specifications are estimated using heteroskedasticity-robust standard errors and within or without within-cluster correlations. However, it is now more sensible to assume that the cluster is each industry in each country rather than a country. Thus, there are now 450 clusters instead of 9 and the blocks with the nonzero elements on the diagonal of the block-diagonal variance-covariance matrix are "smaller".

The results for regression (15) are shown in Tables 6i-6iii, for regression (16) are shown in Tables 6iv-6vi and for regression (17) are shown in Tables 6vii-6ix. To summarize the findings, we see that models (15) and (16) provide evidence that financial depth has a greater effect on competition in sectors where firms are relatively more dependent on external finance only if  $FIN$  is measured by *bankfreed*.<sup>7</sup> However, specification (17) gives more interesting results. When external dependence ( $EXDEP$ ) is measured by *bankdep*, our hypothesis is verified for all four measures of financial development ( $FIN$ ). This result is robust to clustering by industry-country.

#### 4.2.2 A "two-stage" approach

The hypothesis that financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance can also be tested by a "two-stage approach", similar to the one we used in the previous section. The dependent variable is the markup and the explanatory variables are the interaction term between financial development and external dependence, the constitutive terms of the interaction term and, of course, GDP. However, similar to Specification I, industry dummies are also included in order to capture industry characteristics and thus  $EXTDEP$  drops out. The data on  $FIN$  and  $\ln GDP$  are averages over time. Thus, data is transformed into cross-sectional since there is only industry and country variation but no time variation. So, the model to be estimated is:

$$markup_{ik} = D_i + \beta_1 FIN_k * EXTDEP_i + \beta_2 \ln GDP_k + \beta_3 FIN_k + \varepsilon_{ik} \quad (18)$$

Table 7 gives the results with or without clustering. The estimates of  $\beta_1$  or  $\beta_2$  are significant when the Rajan-Zingales measure of external finance is used.

<sup>7</sup>We have tested the regressions (15), (16) and (17) for the joint insignificance of the country dummies or the industry dummies in the case without clustering by industry-country. The null that the industry dummies have zero coefficients cannot be rejected for specification (15). Estimating the model without them does not change the results.

This result is robust whether we cluster or not by country but not when external finance is measured by *extdepM\_G* or *bankdep*.

Table 8 shows the calculations for the derivative  $\frac{\partial markup}{\partial FIN}$  for the four measures of financial depth. Industries are ranked according to *extdepR\_Z*. It is apparent that the higher the external dependence, the higher (in absolute terms) the impact on the markup. Specifically, the hypothesis that greater financial depth is associated with greater competition is verified for the industries with high external dependence when *llgdp* and *pribof* are used, though the derivative is positive for the industries with low dependence. The derivative is negative for all industries with positive external dependence when *prib* is used and close to zero when *bankfreed* is used. The interaction term is significant when external dependence is measured by *extdepR\_Z*. In this specification it is akin to a second derivative since

$$\widehat{\beta}_1 = \frac{\partial^2 markup}{\partial FIN \partial EXTDEP}$$

It shows by how much the marginal influence of external dependence on the markup changes in response to a marginal change in financial depth. In order to get a sense of its magnitude we next take an example using the 25th and 75th percentiles of financial depth and external dependence. According to the Rajan-Zingales measure of external finance, the industry at the 25th percentile of dependence is Beverages while the 75th percentile corresponds to Machinery. The country at the 25th percentile of financial depth, as measured by *llgdp*, is France and at the 75th percentile is Spain. If Beverages moves from France to Spain's level of financial depth then the markup changes by:

$$\begin{aligned} \mu_{Beverages}^{new} - \mu_{Beverages}^{old} &= \widehat{\beta}_3(FIN_{Spain} - FIN_{France}) \\ + \widehat{\beta}_1(FIN_{Spain}EXTDEP_{Beverages}) - \widehat{\beta}_1(FIN_{France}EXTDEP_{Beverages}) \end{aligned}$$

If Machinery moves from France to Spain's level of financial depth then the markup changes by:

$$\begin{aligned} \mu_{Machinery}^{new} - \mu_{Machinery}^{old} &= \widehat{\beta}_3(FIN_{Spain} - FIN_{France}) \\ + \widehat{\beta}_1(FIN_{Spain}EXTDEP_{Machinery}) - \widehat{\beta}_1(FIN_{France}EXTDEP_{Machinery}) \end{aligned}$$

The differential effect is calculated by

$$\begin{aligned} (\mu_{Machinery}^{new} - \mu_{Machinery}^{old}) - (\mu_{Beverages}^{new} - \mu_{Beverages}^{old}) = \\ \widehat{\beta}_1(FIN_{Spain} - FIN_{France})(EXTDEP_{Machinery} - EXTDEP_{Beverages}) = -0.02 \end{aligned}$$

The interpretation of this number is as follows. Given a move from France's level of financial depth to Spain's, the Machinery markup should decrease 2 percent more than the Beverages markup.

In summary, this section shows that there is evidence that financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance. However, the results are not robust to different measures of

external dependence. There is some evidence that *banking freedom* has higher explanatory power compared to other measures of financial depth.

### 4.3 Specification III: Openness and Competition

#### 4.3.1 Results from industry-country specific estimations

Equation (8) can be used to estimate the relation between competition and trade openness for each of the 50 industries in the 8 Eurozone member states and the USA for the period 1981-2004. The cross-sectional equation for each of the 450 industries has the following form:

$$y_t = \beta_0 x_t + \beta_1 OPEN_t x_t + \varepsilon_t \quad (19)$$

The empirical estimation gives weak evidence that a higher degree of trade openness decreases markups. The estimated coefficient  $\beta_1$  is significant for 107 out of 450 regressions (10% significance level).

Although the evidence that openness leads to lower markups is weak, it is interesting to check whether the industries for which openness has significant explanatory power share a common characteristic, that of high tradability. De Gregorio, Giovannini and Wolf (1994) define agriculture, mining, manufacturing and transportation as "tradable" whereas services other than transportation are "nontradable". Interestingly enough, we find that the industries where openness has a significant impact on their competitiveness are mostly the "tradable" ones (57%).

#### 4.3.2 Estimations at industry level

A more restrictive approach in examining the effect of trade openness on competition is to assume that the markup is industry specific. So, if markups are homogeneous across countries then (8) can be estimated per industry. The estimation model is:

$$y_{tk} = \beta_0 x_{tk} + \beta_1 x_{tk} OPEN_{tk} + \varepsilon_t \quad (20)$$

and is estimated by simple pooled OLS for 50 industries. Heteroskedasticity-robust standard errors are used. The estimated coefficient  $\beta_1$  often has the correct sign but is significant for only 11 of the 50 regressions (10% significance level). However, if within-cluster correlations are assumed to be negligible, this number doubles.

Similar to section 3.1.2 on financial development, we use panel data to control for differences in intercepts. Adding time and country dummy variables as explanatory variables does not change the results much. The same is true if time and country dummy variables plus an interaction term between  $x_{tk}$  and country variables are added. Table 9 shows the results of this section.

It is worth noting that the findings of this section support the hypothesis that openness has a stronger effect on the competitiveness of tradable industries. More specifically, for the three specifications of this section, 63%, 71% and 89% of the regressions for which openness is significant are for tradable industries (clustering by country).

Tobacco (sector 16), Manufacturing (sector 36), Other inland transportation (sector 60) and Other service activities (sector 93) are the industries which are found to exhibit a sensitive relationship between competition and openness in all three specifications of this section.

### 4.3.3 Pooled Data

If the data from different industries and countries are pooled, the results suggest that openness has a negative and significant impact on markups. The finding is robust to clustering by country, controlling for industry-specific effects as well as allowing tradable and nontradable industries to have different intercepts (see table 10).

### 4.3.4 A "two-stage" approach

The familiar robustness check in the form of a "two-stage" approach is the next step. The estimated markup from (4) is the dependent variable and the control variables are trade openness and the logarithm of GDP (both time averaged) and industry dummies. Since there is no time variation, data is cross-sectional. Table 11 shows that openness has strong explanatory power for markups. Again, the result is robust to clustering by country, as well as dummies for the tradedness of the sectors.

The empirical investigation of the relation between trade openness and product market competition supports the hypothesis that greater trade openness is linked with smaller markups. The data suggest that this relation is stronger for industries characterized by a higher degree of tradedness. Furthermore, comparing the results with the findings of the previous two sections, the degree of openness of a country might be more important for lower markups than financial development. The natural next step is to control simultaneously for trade openness and financial development and their impact on competition.

## 4.4 Specification IV: Financial Development and Openness Together

### 4.4.1 Results from industry-country specific estimations

To control simultaneously for the significance of financial development and trade openness on competition, specification (9) is estimated for the 50 sectors of the 9 countries. Table 12 presents the results of the estimation of the 450 cross-sectional equations. Both control variables are often insignificant. However, trade openness seem to have some explanatory power for more industries than does financial development.<sup>8</sup>

### 4.4.2 Estimations at industry level

For the estimations of this section the markups of an industry are assumed to be homogeneous across the 9 countries of the sample. Treating the parameters as the same across countries we pool the data over time and estimate (9) per industry. The findings do not provide strong evidence for the hypothesis that the financial development or the trade openness of a country have some explanatory power on the competition of industries. However, trade openness appears again to be significant for more regressions than financial development (see Table 13).

It is interesting to note that the three of the four industries that were repeatedly found to exhibit a sensitive relationship between competition and the explanatory variables in section 3.4.3 (Tobacco, Manufacturing and Other service activities) are included in the industries that for which openness has explanatory power over competition when any of the four measures of financial development is used (the rest are Food and Beverages (15), Fabricated Metal (28) and Research & Development (73)).

### 4.4.3 Pooled Data

If the data are pooled (industry and country parameters are assumed to be the same) the evidence becomes clearer. Although both financial development and trade openness have a negative relation with markups, financial development is not significant for all four measures of  $FIN$ . Contrary to that, trade openness is always significant. This finding is robust to clustering by country (see Table 14).

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<sup>8</sup>Similarly to section 3.4.1., the measure *bankfreed* is not used due to the small number of observations.

#### 4.4.4 A "two-stage" approach

We do a robustness check by using the estimates of markups from (4) for the 450 industries as the dependent variable and time-averaged data of financial development, trade openness and GDP, the cross-sectional analysis as explanatory variables. We also add industry dummies or dummies for tradable industries. The above results are verified. Table 15 shows that trade openness has a negative and significant impact on markups whereas financial development and GDP do not have much explanatory power.

The overall findings of this section suggest that both financial development and trade openness have a negative impact on markups. However, the simultaneous inclusion of the two variables as independent variables suggests that trade openness has greater explanatory power for the extent of competition.

### 4.5 Further robustness checks

From the estimations of Specification I, II and IV, the measure *bankfreed* stands out as the measure of financial development with the highest significance. This finding may lead to concerns that *bankfreed* appears to have explanatory power compared to other measures simply due to the shorter time period that the data cover. Hence, the above regressions of Specifications I, II and IV were estimated for the shorter period 1995-2004 (apart from the "per industry per country" specification as there would only be 10 observations per regression in that case). It should be noted that for the estimations of the "two-stage" approach we use the markups which Christopoulou and Vermeulen (2008) have estimated for 1993-2004. These markups are estimated using a small number of observations and thus there is the possibility of measurement error in our dependent variable. This would lead to a smaller  $R^2$  and higher standard errors but will not bias our estimates.

All results are given at the Appendix. Overall, we find that there is stronger evidence supporting our hypotheses. We give some indicative examples. Specification I shows that the significance of financial development, measured by *llgdp*, *prib* and *pribof*, at industry-country level is stronger or stays the same, compared to the whole period (see Table 16). Moreover, the evidence in favour of our hypotheses is stronger for these three measures of financial depth compared to *bankfreed*. Similarly, evidence appears to be stronger for the hypothesis of Specification II (see Tables 19 (i-ix)). It is interesting to note that this "improvement" in significance is particularly skewed towards the explanatory power of *banking dependence*. Finally, Specification IV shows that the relation between financial depth (and trade openness) and competition is stronger for the subperiod of interest when we estimate the specification per industry.

Summarizing, we interpret these findings as a sign that financial development of the countries has been more effective for the decrease of markups in the

Eurozone and US over the period 1995-2004 compared to 1981-2004. If such a result is driven by the 8 Eurozone member states it may be related to the various regulations for financial markets and the adoption of the Euro.<sup>9</sup>

In the descriptive statistics section it was explained that the US drives the unusual correlation between GDP and trade openness. Moreover, the US is different compared to the Eurozone countries in many ways. This might raise concerns that pooling all countries together may generate some bias. The regression estimates are not sensitive to the inclusion of the US.

## 5 Conclusion

This paper suggests that financial development lead to lower markups in the Eurozone and US over the period 1981-2004. Moreover, there is evidence that financial depth has a greater effect on competition in sectors where firms are unusually dependent on external finance. This relation is stronger over the period 1995-2004, perhaps due to the increased implementation of the EU Directives about the financial services industry and the adoption of the Euro. However, these results are not robust to the use of different measures for financial development or external dependence. Furthermore, there is strong evidence that the trade openness of countries is linked with higher competition and thus lower markups. This finding appears to be stronger for industries traditionally defined as tradable. Controlling simultaneously for trade openness and financial development shows that trade openness has greater explanatory power for the extent of competition compared to financial depth.

What remains an open question is why openness has explanatory power for the extent of competition. Is it because it captures cross-country variation in the sense that more open countries have lower markups overall? Or is it due to cross-time effects i.e. more opening a country over time leads to smaller markups? Moreover, is there some natural clustering and openness has relatively higher significance for particular industries? Answering these questions would be natural extension of our work.

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<sup>9</sup>The Euro was introduced as an accounting currency on 1 January 1999.

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### 3.6 Appendix TABLES

**Table 1**  
**Specification I: per industry**

	$y = \beta_0 x + \beta_1 x \text{FIN} + \varepsilon$					
	cluster by country			No cluster		
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
<b>llgdp</b>	12	8	28	19	15	28
<b>prib</b>	0	0	32	8	4	32
<b>pribof</b>	3	1	29	9	5	29
<b>bankfreed</b>	7	6	26	14	8	26

Notes: The above numbers indicate the number of industries for which the interaction term is statistically significant at the 10%, 5% level or that  $\beta_1$  is negative. The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Heteroskedasticity-robust standard errors are used.

**Table 2**  
**Specification I: per industry**

	$y = \beta_0 x + \beta_1 x \text{FIN} + D_t + D_k + \varepsilon$					
	cluster by country			No cluster		
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
<b>llgdp</b>	13	9	30	19	16	30
<b>prib</b>	3	2	30	6	3	30
<b>pribof</b>	2	1	29	7	4	29
<b>bankfreed</b>	6	3	25	10	8	25

Notes: The above numbers indicate the number of industries for which the interaction term is statistically significant at the 10%, 5% level or that  $\beta_1$  is negative. The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms.  $D_t$  and  $D_k$  are time and country dummies respectively. Heteroskedasticity-robust standard errors are used.

**Table 3**  
**Specification I: per industry**

	$y = \beta_0 x D_k + \beta_1 x \text{FIN} + D_t + D_k + \varepsilon$					
	cluster by country			No cluster		
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
<b>llgdp</b>	4	4	29	6	4	29
<b>prib</b>	6	1	27	5	3	27
<b>pribof</b>	9	5	26	5	10	26
<b>bankfreed</b>	14	6	20	13	6	20

Notes: The above numbers indicate the number of industries for which the interaction term is statistically significant at the 10%, 5% level or that  $\beta_1$  is negative. The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms.  $D_t$  and  $D_k$  are time and country dummies respectively. Heteroskedasticity-robust standard errors are used.

**Table 4**  
**Specification I: "Two-stage" approach**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>lngdp</b>	0.025 (0.019)	(0.013)**	0.023 (0.020)	(0.012)*	0.038 (0.025)	(0.016)**	0.024 (0.016)	(0.012)*
<b>llgdp</b>	-0.189 (0.238)	(0.131)						
<b>prib</b>			-0.144 (0.166)	(0.083)*				
<b>pribof</b>					-0.136 (0.125)	(0.067)**		
<b>bankfreed</b>							0.000 (0.002)	(0.001)
<b>industry dummies clustered at country level</b>	Yes		Yes		Yes		Yes	
<b>R<sup>2</sup></b>	0.94		0.95		0.95		0.94	
<b>N</b>	447		447		447		447	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. llgdp: Liquid liabilities relative to GDP. prib: Private credit by deposit money banks relative to GDP. pribof: Private credit by deposit money banks and other financial institutions relative to GDP. bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 5**  
**Specification II: Pooled Data**

**(5i) Rajan-Zingales measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bank freed</b>	
<b>x</b>	0.113 (0.024)**	(0.024)**	0.139 (0.026)**	(0.018)**	0.124 (0.021)**	(0.013)**	0.130 (0.059)*	(0.052)**
<b>xfin</b>	0.041 (0.041)	(0.034)	0.001 (0.031)	(0.021)	0.020 (0.023)	(0.013)	0.000 (0.001)	(0.001)
<b>xextdep</b>	0.061 (0.058)	(0.095)	-0.001 (0.079)	(0.066)	0.016 (0.042)	(0.049)	-0.204 (0.152)	(0.146)
<b>xfinextdep</b>	-0.102 (0.093)	(0.119)	-0.005 (0.115)	(0.071)	-0.027 (0.054)	(0.042)	0.003 (0.002)	(0.002)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.43		0.42		0.42		0.38	
<b>N</b>	4267		4267		4311		1914	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Rajan and Zingales(1998). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (5ii) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>x</b>	0.019 (0.209)	(0.119)	0.145 (0.149)	(0.102)	0.158 (0.116)	(0.079)**	-0.362 (0.301)	(0.194)*
<b>xfin</b>	0.152 (0.302)	(0.159)	-0.037 (0.161)	(0.106)	-0.051 (0.091)	(0.064)	0.007 (0.005)	(0.003)**
<b>xextdep</b>	0.449 (0.414)	(0.251)*	0.173 (0.277)	(0.221)	0.145 (0.230)	(0.170)	1.252 (0.664)*	(0.418)**
<b>xfinextdep</b>	-0.364 (0.590)	(0.339)	0.051 (0.289)	(0.228)	0.086 (0.165)	(0.136)	-0.015 (0.010)	(0.006)**
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.51		0.51		0.51		0.46	
<b>N</b>	9329		9329		9425		4145	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (5iii) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>x</b>	0.124 (0.025)**	(0.018)**	0.156 (0.031)**	(0.020)**	0.125 (0.020)**	(0.010)**	0.085 (0.046)	(0.030)**
<b>xfin</b>	0.024 (0.038)	(0.028)	-0.022 (0.033)	(0.022)	0.020 (0.027)	(0.012)	0.001 (0.001)	(0.001)
<b>xbankdep</b>	0.042 (0.022)*	(0.018)**	0.004 (0.034)	(0.026)	0.032 (0.017)	(0.010)**	0.027 (0.022)	(0.021)
<b>xfinbankdep</b>	-0.045 (0.036)	(0.030)	0.012 (0.034)	(0.028)	-0.025 (0.022)	(0.015)*	-0.000 (0.000)	(0.000)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.50		0.50		0.50		0.46	
<b>N</b>	3092		3092		3124		1392	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 6 i-ix**  
**Specification II: Pooled Data**

**(6i) Rajan-Zingales measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	0.013 (0.036)	(0.039)	0.033 (0.022)	(0.019)*	0.016 (0.016)	(0.016)	-0.001 (0.001)	(0.001)
<b>xfinextdep</b>	-0.109 (0.102)	(0.101)	-0.014 (0.095)	(0.065)	-0.024 (0.052)	(0.037)	0.002 (0.002)	(0.001)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.48		0.47		0.47		0.48	
<b>N</b>	4267		4267		4311		1914	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Rajan and Zingales(1998). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**(6ii) Maudos-Fernandez de Guevara measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	0.056 (0.133)	(0.112)	0.015 (0.120)	(0.082)	-0.028 (0.067)	(0.048)	0.003 (0.002)	(0.002)*
<b>xfinextdep</b>	-0.192 (0.283)	(0.245)	0.023 (0.235)	(0.163)	0.081 (0.131)	(0.095)	-0.008 (0.004)*	(0.003)**
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.68		0.68		0.68		0.62	
<b>N</b>	9329		9329		9425		4145	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6iii) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	-0.037 (0.031)	(0.029)	-0.017 (0.020)	(0.019)	-0.006 (0.017)	(0.015)	-0.002 (0.001)*	(0.001)
<b>xfinbankdep</b>	-0.041 (0.034)	(0.028)	0.016 (0.029)	(0.026)	-0.022 (0.020)	(0.013)*	-0.000 (0.000)	(0.000)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.56		0.56		0.56		0.53	
<b>N</b>	3092	3092	3092		3124		1392	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6iv) Rajan-Zingales measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	-0.001 (0.035)	(0.038)	0.032 (0.023)	(0.020)	0.011 (0.015)	(0.015)	-0.001 (0.001)	(0.001)
<b>xfinextdep</b>	-0.096 (0.101)	(0.096)	-0.020 (0.091)	(0.064)	-0.026 (0.054)	(0.037)	0.002 (0.002)	(0.001)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.55		0.55		0.55		0.48	
<b>N</b>	4267		4267		4311		1914	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Rajan and Zingales (1998). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6v) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	0.067		0.012		-0.024		0.003	
	(0.131)	(0.105)	(0.114)	(0.079)	(0.065)	(0.046)	(0.002)	(0.002) **
<b>xfinextdep</b>	-0.218		0.026		0.068		-0.008	
	(0.278)	(0.229)	(0.225)	(0.158)	(0.129)	(0.092)	(0.005)*	(0.003) **
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.72		0.72		0.72		0.62	
<b>N</b>	9329		9329		9425		4145	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6vi) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	-0.038		-0.017		-0.010		-0.002	
	(0.034)	(0.028)	(0.019)	(0.018)	(0.016)	(0.014)	(0.001)*	(0.001)
<b>xfinbankdep</b>	-0.036		0.022		-0.016		-0.000	
	(0.037)	(0.025)	(0.024)	(0.023)	(0.020)	(0.012)	(0.000)	(0.000)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.62		0.62		0.62		0.53	
<b>N</b>	3092		3092		3124		1392	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6vii) Rajan-Zingales measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	0.024 (0.046)	(0.048)	0.065 (0.044)	(0.034)*	0.010 (0.028)	(0.025)	-0.000 (0.001)	(0.001)
<b>xfinextdep</b>	-0.120 (0.084)	(0.087)	-0.039 (0.080)	(0.054)	-0.024 (0.046)	(0.032)	0.001 (0.001)	(0.001)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.52		0.52		0.52		0.54	
<b>N</b>	4267		4267		4311		1914	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Rajan and Zingales (1998). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6viii) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	0.015 (0.136)	(0.117)	0.017 (0.135)	(0.095)	-0.047 (0.075)	(0.055)	0.002 (0.002)	(0.002)
<b>xfinextdep</b>	-0.140 (0.267)	(0.236)	0.074 (0.221)	(0.156)	0.106 (0.124)	(0.092)	-0.006 (0.003)	(0.003) **
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.69		0.69		0.69		0.65	
<b>N</b>	9329		9329		9425		4145	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (6ix) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>xfin</b>	-0.092 (0.051)*	(0.049) *	-0.062 (0.030)**	(0.034)*	-0.066 (0.037)*	(0.031) **	-0.003 (0.001) **	(0.001) **
<b>xfinbankdep</b>	-0.036 (0.029)	(0.027)	0.017 (0.027)	(0.026)	-0.020 (0.016)	(0.012) *	-0.000 (0.000)	(0.000)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.62		0.62		0.63		0.60	
<b>N</b>	3092		3092		3124		1392	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 7**  
**Specification II: "Two-stage" approach**

### (7i) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>lngdp</b>	0.025 (0.016)	(0.018)	0.024 (0.014)	(0.016)	0.023 (0.016)	(0.015)	0.026 (0.013)	(0.017)
<b>fin</b>	0.007 (0.095)	(0.107)	-0.181 (0.156)	(0.149)	0.097 (0.101)	(0.105)	0.003 (0.002)	(0.002)
<b>finextdep</b>	-0.007 (0.129)	(0.119)	0.206 (0.221)	(0.205)	-0.169 (0.159)	(0.150)	-0.003 (0.003)	(0.003)
<b>industry dummies clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.98		0.98		0.99		0.98	
<b>N</b>	144		144		144		144	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). Standard errors are clustered by industry-country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (7ii) Rajan-Zingales measure

	(1) <b>llgdp</b>	(2)	(3) <b>prib</b>	(4)	(5) <b>pribof</b>	(6)	(7) <b>bankfreed</b>	(8)
<b>lngdp</b>	0.021 (0.013)	(0.014)	0.019 (0.011)	(0.013)	0.021 (0.013)	(0.012)	0.021 (0.011)	(0.014)
<b>fin</b>	0.133 (0.117)	(0.088)	0.012 (0.099)	(0.069)	0.051 (0.048)	(0.035)	0.002 (0.001)	(0.001)*
<b>finextdep</b>	-0.476 (0.100) **	(0.185)*	-0.306 (0.092)*	(0.123) *	-0.161 (0.059) *	(0.070)*	-0.002 (0.002)	(0.002)
<b>industry dummies clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.99		0.99		0.99		0.99	
<b>N</b>	198		198		198		198	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Rajan and Zingales (1998). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (7iii) Maudos-Fernandez de Guevara measure

	(1) <b>llgdp</b>	(2)	(3) <b>prib</b>	(4)	(5) <b>pribof</b>	(6)	(7) <b>bankfreed</b>	(8)
<b>lngdp</b>	0.029 (0.019)	(0.013)*	0.027 (0.020)	(0.012)*	0.042 (0.025)	(0.016)**	0.029 (0.017)	(0.013)*
<b>fin</b>	-0.258 (0.446)	(0.375)	-0.266 (0.330)	(0.280)	-0.363 (0.206)	(0.171)*	-0.001 (0.004)	(0.004)
<b>finextdep</b>	0.196 (0.767)	(0.868)	0.326 (0.622)	(0.649)	0.522 (0.310)	(0.377)	0.001 (0.008)	(0.008)
<b>industry dummies clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.95		0.95		0.95		0.95	
<b>N</b>	429		429		429		429	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 8**

NACE Description	NACE, Rev 1.1	<i>extdepR_Z</i>	$\frac{\partial \mu}{\partial \text{llgdp}}$	$\frac{\partial \mu}{\partial \text{prib}}$	$\frac{\partial \mu}{\partial \text{pribof}}$	$\frac{\partial \mu}{\partial \text{bankfreed}}$
Tobacco	16	-0.45	0.3472	0.1497	0.1235	0.0029
Leather, leather and footwear	19	-0.11	0.1854	0.0457	0.0687	0.0022
Wearing apparel, dressing and dying of fur	18	0.03	0.1187	0.0028	0.0462	0.0019
Basic metals	27	0.05	0.1092	-0.0033	0.0430	0.0019
Food and beverages	15	0.1	0.0854	-0.0186	0.0349	0.0018
Other non-metallic mineral	26	0.15	0.0616	-0.0339	0.0269	0.0017
Textiles	17	0.16	0.0568	-0.0370	0.0252	0.0017
Pulp, paper and paper	21	0.17	0.0521	-0.0400	0.0236	0.0017
Coke, refined petroleum and nuclear fuel	23	0.19	0.0426	-0.0461	0.0204	0.0016
Printing, publishing and reproduction	22	0.2	0.0378	-0.0492	0.0188	0.0016
Fabricated metal	28	0.24	0.0188	-0.0614	0.0124	0.0015
Wood and of wood and cork	20	0.28	-0.0003	-0.0737	0.0059	0.0014
Manufacturing nec	36	0.36	-0.0384	-0.0982	-0.0070	0.0013
Motor vehicles, trailers and semi-trailers	34	0.39	-0.0526	-0.1073	-0.0118	0.0012
Other transport equipment	35	0.39	-0.0526	-0.1073	-0.0118	0.0012
Machinery, nec	29	0.45	-0.0812	-0.1257	-0.0215	0.0011
Rubber and plastics	25	0.69	-0.1954	-0.1991	-0.0601	0.0006
Electrical machinery and apparatus, nec	31	0.77	-0.2335	-0.2236	-0.0730	0.0005
Chemicals and chemical products	24	0.86	-0.2764	-0.2512	-0.0875	0.0003
Medical, precision and optical instruments	33	0.96	-0.3240	-0.2818	-0.1036	0.0001
Radio, television and communication equipment	32	1.04	-0.3620	-0.3062	-0.1164	-0.0001
Office, accounting and computing machinery	30	1.06	-0.3716	-0.3124	-0.1197	-0.0001

Notes: Calculations use  $\hat{\beta}_1$  and  $\hat{\beta}_2$  from equation (16). llgdp: Liquid liabilities relative to GDP. prib: Private credit by deposit money banks relative to GDP. pribof: Private credit by deposit money banks and other financial institutions relative to GDP. bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms.

**Table 9**  
**Specification III: per industry**

	cluster by country			No clustering		
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
$y = \beta_0 x + \beta_1 x \text{OPEN} + \epsilon$	11	9	36	22	19	36
$y = \beta_0 x + \beta_1 x \text{OPEN} + \beta_2 \text{Dt} + \beta_3 \text{Dk} + \epsilon$	14	10	38	22	26	38
$y = \beta_1 x \text{OPEN} + \beta_2 \text{Dt} + \beta_3 \text{Dk} + \beta_4 x \text{Dk} + \epsilon$	9	7	26	13	9	26

Notes: The above numbers indicate the number of industries for which the interaction term xOPEN is statistically significant at the 10%, 5% level or that  $\beta_1$  is negative. The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. Dt and Dk are time and country dummies respectively.

**Table 10**  
**Specification III: Pooled Data**

	(1)	(2)	(3)	(4)
<b>x</b>	0.249 (0.029)**	(0.011)**	0.254 (0.027)**	(0.011)**
<b>xopen</b>	-0.059 (0.026)*	(0.012)**	-0.063 (0.024)**	(0.012)**
<b>tradedness dummy</b>	No		Yes	
<b>clustered at country level</b>	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.50		0.50	
<b>N</b>	10213		10213	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1 and 3. Columns 2 and 4 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 11**  
**Specification III: "Two stage" approach**

	(1)	(2)	(3)	(4)
<b>open</b>	-0.137 (0.060)*	(0.044)**	-0.137 (0.057)**	(0.065)**
<b>lngdp</b>	0.000 (0.016)	(0.015)	-0.000 (0.015)	(0.019)
<b>tradedness dummy</b>	No		Yes	
<b>industry dummies</b>	Yes		No	
<b>clustered at country level</b>	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.95		0.87	
<b>N</b>	447		447	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1 and 3. Columns 2 and 4 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 12**  
**Specification IV: per industry per country**

$y_t = \beta_0 x_t + \beta_1 x_t FIN_t + \beta_2 x_t OPEN_t + \epsilon_t$	$\beta_1$	$\beta_2$
<b>llgdp</b>	77	87
<b>prib</b>	76	82
<b>pribof</b>	78	83

Notes: The above numbers indicate the number of industries for which the interaction terms are statistically significant at the 10% level. The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP.

**Table 13**  
**Specification IV: per industry**

$y_t = \beta_0 x_t + \beta_1 x_t \text{FIN}_{it} + \beta_2 x_t \text{OPEN}_{it} + \epsilon_t$				
	cluster by country		No cluster	
	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$
<b>llgdp</b>	12	12	19	23
<b>prib</b>	3	11	11	22
<b>pribof</b>	1	11	6	21
<b>bankfreed</b>	13	16	16	30

Notes: The above numbers indicate the number of industries for which the interaction terms are statistically significant at the 10% level. The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms.

**Table 14**  
**Specification IV: Pooled Data**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>x</b>	0.261 (0.028)**		0.263 (0.035)**	(0.019)**	0.263 (0.033)**	(0.016)**	0.183 (0.064)**	(0.055)**
<b>xopen</b>	-0.062 (0.025)**	(0.023)**	-0.061 (0.026)**	(0.013)**	-0.061 (0.025)**	(0.013)**	-0.107 (0.033)**	(0.024)**
<b>xfin</b>	-0.014 (0.021)	(0.015)**	-0.016 (0.030)	(0.021)	-0.014 (0.015)	(0.013)	0.002 (0.001)	(0.001)*
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.50		0.50		0.50		0.43	
<b>N</b>	9729		9729		9829		4319	

Notes: The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 15**  
**Specification IV: “Two-stage” approach**

**(i)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>fin</b>	-0.069 (0.227)	(0.126)	-0.132 (0.130)	(0.080)*	-0.109 (0.121)	(0.067)	0.002 (0.002)	(0.001) **
<b>open</b>	-0.124 (0.052)**	(0.037)**	-0.131 (0.067)*	(0.043)**	-0.108 (0.063)	(0.041)**	-0.185 (0.076)**	(0.050) **
<b>lngdp</b>	0.003 (0.022)	(0.016)	-0.001 (0.022)	(0.016)	0.016 (0.027)	(0.019)	-0.012 (0.016)	(0.015)
<b>industry dummies clustered at country level</b>	Yes		Yes		Yes		Yes	
<b>R<sup>2</sup></b>	0.95	No	0.95	No	0.95	No	0.95	No
<b>N</b>	447		447		447		447	

**(ii)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>fin</b>	-0.069 (0.215)	(0.187)	-0.131 (0.125)	(0.121)	-0.109 (0.114)	(0.097)	0.002 (0.002)	(0.002)
<b>open</b>	-0.124 (0.049)**	(0.071)*	-0.131 (0.063)*	(0.064)**	-0.108 (0.060)	(0.065)*	-0.185 (0.073)**	(0.081)**
<b>lngdp</b>	0.002 (0.021)	(0.022)	-0.001 (0.021)	(0.019)	0.016 (0.026)	(0.025)	-0.012 (0.015)	(0.020)
<b>tradedness dummies clustered at country level</b>	Yes		Yes		Yes		Yes	
<b>R<sup>2</sup></b>	0.87	No	0.87	No	0.87	No	0.87	No
<b>N</b>	447		447		447		447	

Notes for tables 15(i) and 15(ii): The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industry in 9 different countries for 1981-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 16**  
**Specification I: “per industry”**  
**Sample Period 1995-2004**

$y = \beta_0 x + \beta_1 x \text{FIN} + \epsilon$						
cluster by country			No cluster			
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
llgdp	18	12	36	17	14	36
prib	19	13	35	18	15	35
pribof	16	13	28	15	11	28

$y = \beta_0 x + \beta_1 x \text{FIN} + \beta_2 \text{Dt} + \beta_3 \text{Dk} + \epsilon$						
cluster by country			No cluster			
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
llgdp	15	10	35	16	12	35
prib	16	11	33	17	13	33
pribof	18	11	28	18	10	28

$y = \beta_1 x \text{FIN} + \beta_2 \text{Dt} + \beta_3 \text{Dk} + \beta_4 x \text{Dk} + \epsilon$						
cluster by country			No cluster			
	10%	5%	$\beta_1 < 0$	10%	5%	$\beta_1 < 0$
llgdp	18	11	29	12	9	29
prib	16	10	30	12	6	30
pribof	23	16	29	17	10	29

Notes: The above numbers indicate the number of industries for which the interaction term is statistically significant at the 10%, 5% level or that  $\beta_1$  is negative. The dependent variable is the nominal Solow residual and  $x$  is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. Dt and Dk are time and country dummies respectively.

**Table 17: Specification I: “Two stage” approach**  
**Sample Period 1995-2004**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lngdp	0.006 (0.021)	(0.012)	0.009 (0.022)	(0.012)	0.024 (0.025)	(0.014)*	0.013 (0.020)	(0.012)
llgdp	-0.208 (0.125)	(0.077)**						
prib			-0.085 (0.063)	(0.040)**				
pribof					-0.088 (0.066)	(0.037)**		
bankfreed							-0.000 (0.002)	(0.001)
industry dummies clustered at country level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
N	447	447	447	447	447	447	447	k4

Notes: The dependent variable is the markup estimated by Christopoulos and Vermeulen (2008) for 50 NACE industry in 9 different countries for 1993-2004. llgdp: Liquid liabilities relative to GDP. prib: Private credit by deposit money banks relative to GDP. pribof: Private credit by deposit money banks and other financial institutions relative to GDP. bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 18 (i-iii)**  
**Specification II: Pooled Data, Period 1995-2004**

**(18i) Rajan-Zingales measure**

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>x</b>	0.117 (0.029)**	(0.038)**	0.128 (0.023)**	(0.028)**	0.116 (0.019)**	(0.023)**
<b>xfin</b>	0.022 (0.045)	(0.044)	0.005 (0.023)	(0.025)	0.017 (0.017)	(0.015)
<b>xextdep</b>	-0.029 (0.046)	(0.106)	-0.042 (0.043)	(0.088)	-0.030 (0.030)	(0.068)
<b>xfinextdep</b>	-0.016 (0.075)	(0.117)	0.002 (0.059)	(0.078)	-0.011 (0.026)	(0.044)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.33		0.33		0.33	
<b>N</b>	1804		1804		1848	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Rajan and Zingales (1998). Standard errors are clustered by country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**(18ii) Maudos-Fernandez de Guevara measure**

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>x</b>	-0.073 (0.203)	(0.151)	-0.017 (0.179)	(0.131)	0.019 (0.142)	(0.103)
<b>xfin</b>	0.153 (0.252)	(0.164)	0.064 (0.168)	(0.110)	0.017 (0.095)	(0.064)
<b>xextdep</b>	0.635 (0.391)	(0.325)*	0.491 (0.353)	(0.278)*	0.396 (0.284)	(0.219)*
<b>xfinextdep</b>	-0.409 (0.509)	(0.355)	-0.178 (0.335)	(0.231)	-0.053 (0.184)	(0.133)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.43		0.42		0.42	
<b>N</b>	3905		3905		4001	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). Standard errors are clustered by country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**(18iii) Carlin-Mayer measure**

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>x</b>	0.133 (0.032)**	(0.025)**	0.141 (0.028)**	(0.019)**	0.126 (0.023)**	(0.016)**
<b>xfin</b>	0.001 (0.037)	(0.029)	-0.009 (0.021)	(0.018)	0.009 (0.020)	(0.012)
<b>xextdep</b>	0.007 (0.014)	(0.018)	0.005 (0.013)	(0.014)	0.006 (0.009)	(0.011)
<b>xfinextdep</b>	-0.004 (0.021)	(0.025)	-0.001 (0.016)	(0.016)	-0.003 (0.010)	(0.011)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.43		0.43		0.43	
<b>N</b>	1312		1312		1344	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). Standard errors are clustered by country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 19 (i-ix)**  
**Specification II: Pooled Data**  
**Period 1995-2004**

**(19i) Rajan-Zingales measure**

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	-0.013 (0.038)	(0.044)	-0.058 (0.031)*	(0.038)	-0.010 (0.015)	(0.018)
<b>xfinextdep</b>	-0.082 (0.076)	(0.062)	-0.049 (0.059)	(0.045)	-0.036 (0.032)	(0.025)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.45		0.45		0.44	
<b>N</b>	1804		1804		1848	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Rajan and Zingales (1998). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19ii) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>lgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	0.009 (0.099)	(0.084)	-0.039 (0.072)	(0.061)	-0.033 (0.040)	(0.034)
<b>xfinextdep</b>	-0.134 (0.226)	(0.184)	-0.039 (0.159)	(0.127)	0.028 (0.090)	(0.076)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.61		0.61		0.61	
<b>N</b>	3905		3905		4001	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19iii) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>lgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	-0.077 (0.032)**	(0.047)*	-0.109 (0.034)**	(0.044)**	-0.034 (0.013)**	(0.019)*
<b>xfinbankdep</b>	0.004 (0.019)	(0.022)	0.005 (0.012)	(0.015)	0.000 (0.009)	(0.010)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.54		0.54		0.54	
<b>N</b>	1312		1312		1344	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include country, industry and time dummies as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19iv) Rajan-Zingales measure

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>lgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	-0.022 (0.037)	(0.041)	-0.051 (0.030)*	(0.036)	-0.010 (0.014)	(0.016)
<b>xfinextdep</b>	-0.068 (0.073)	(0.058)	-0.041 (0.058)	(0.043)	-0.041 (0.032)	(0.024)*
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.53		0.53		0.53	
<b>N</b>	1804		1804		1848	

Notes: The dependent variable is the nominal Solow residual and x is the the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Rajan and Zingales(1998). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19v) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)
	lgdp		prib		pribof	
<b>xfin</b>	0.038 (0.094)	(0.077)	-0.008 (0.069)	(0.056)	-0.022 (0.038)	(0.031)
<b>xfinextdep</b>	-0.187 (0.214)	(0.169)	-0.085 (0.153)	(0.116)	0.005 (0.085)	(0.068)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.67		0.67		0.67	
<b>N</b>	3905		3905		4001	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19vi) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)
	lgdp		prib		pribof	
<b>xfin</b>	-0.074 (0.032)**	(0.042)*	-0.092 (0.029)**	(0.039)**	-0.031 (0.012)**	(0.016)*
<b>xfinbankdep</b>	0.002 (0.021)	(0.019)	0.004 (0.012)	(0.012)	0.002 (0.010)	(0.008)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.61		0.61		0.61	
<b>N</b>	1312		1312		1344	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include country dummies, industry dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19vii) Rajan-Zingales measure

	(1)	(2)	(3)	(4)	(5)	(6)
	lgdp		prib		pribof	
<b>xfin</b>	0.005 (0.061)	(0.070)	-0.067 (0.057)	(0.068)	-0.006 (0.029)	(0.031)
<b>xfinextdep</b>	-0.109 (0.069)	(0.053)**	-0.080 (0.052)	(0.038)**	-0.042 (0.030)	(0.022)*
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.50		0.50		0.49	
<b>N</b>	1804		1804		1848	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: lgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Rajan and Zingales(1998). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19viii) Maudos-Fernandez de Guevara measure

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	-0.095 (0.106)	(0.096)	-0.138 (0.086)	(0.082)*	-0.080 (0.050)	(0.041)*
<b>xfinextdep</b>	-0.046 (0.215)	(0.169)	0.019 (0.150)	(0.116)	0.062 (0.084)	(0.070)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.63		0.63		0.63	
<b>N</b>	3905		3905		4001	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Maudos and Fernandez de Guevara (2007). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

### (19ix) Carlin-Mayer measure

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>	
<b>xfin</b>	-0.188 (0.099)*	(0.089)**	-0.315 (0.093)**	(0.087)**	-0.098 (0.037)**	(0.033)**
<b>xfinbankdep</b>	0.006 (0.016)	(0.023)	0.006 (0.011)	(0.015)	0.001 (0.008)	(0.010)
<b>clustered at industry-country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.60		0.60		0.60	
<b>N</b>	1312		1312		1344	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). All regressions include industry dummies, country dummy\*time dummy as well as x\*industry dummies and x\*country dummies. Standard errors are clustered by industry-country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 20**  
**Specification II: “Two stage” approach**  
**Period 1995-2004**

**(20i) Carlin-Mayer measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
lngdp	0.009 (0.018)	(0.009)	0.009 (0.019)	(0.009)	0.008 (0.019)	(0.009)	0.010 (0.015)	(0.009)
fin	-0.021 (0.047)	(0.045)	-0.016 (0.033)	(0.030)	0.024 (0.038)	(0.026)	0.002 (0.002)	(0.024)
finextdep	-0.011 (0.028)	(0.036)	-0.002 (0.023)	(0.026)	-0.013 (0.016)	(0.023)	-0.000 (0.001)	(0.001)
industry dummies clustered at country level	Yes		Yes		Yes		Yes	
R <sup>2</sup>	0.99	No	0.99	No	0.99	No	0.99	No
N	144		144		144		144	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1993-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is the one from Carlin and Mayer (2003). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**(20ii) Rajan-Zingales measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
lngdp	0.007 (0.020)	(0.008)	0.006 (0.020)	(0.008)	0.007 (0.021)	(0.008)	0.009 (0.017)	(0.007)
fin	0.006 (0.061)	(0.066)	0.018 (0.046)	(0.038)	0.031 (0.035)	(0.031)	0.002 (0.002)	(0.002)
finextdep	-0.143 (0.095)	(0.131)	-0.148 (0.043)**	(0.073)*	-0.070 (0.051)	(0.060)	0.000 (0.004)	(0.003)
industry dummies clustered at country level	Yes		Yes		Yes		Yes	
R <sup>2</sup>	0.99	No	0.99	No	0.99	No	0.99	No
N	198		198		198		198	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1993-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is from Rajan and Zingales(1998). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**(20iii) Maudos-Fernandez de Guevara measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>llgdp</b>		<b>prib</b>		<b>pribof</b>		<b>bankfreed</b>	
<b>lngdp</b>	0.013 (0.021)	(0.011)	0.015 (0.022)	(0.012)	0.029 (0.024)	(0.013)*	0.019 (0.020)	(0.011)
<b>fin</b>	-0.134 (0.318)	(0.222)	-0.076 (0.174)	(0.139)	-0.178 (0.134)	(0.102)	0.001 (0.005)	(0.004)
<b>finextdep</b>	-0.135 (0.519)	(0.515)	0.003 (0.317)	(0.323)	0.213 (0.236)	(0.232)	-0.002 (0.009)	(0.010)
<b>industry dummies clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.95		0.95		0.95		0.95	
<b>N</b>	429		429		429		429	

Notes: The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industries in 9 different countries for 1981-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. EXDEP: The measure of external dependence used is from Maudos and Fernandez de Guevara (2007). Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 21**  
**Specification IV: Per Industry**  
**Period 1995-2004**

	$y = \beta_0 x + \beta_1 x \text{FIN}_{kt} + \beta_2 x_{ik} \text{OPEN}_{ik} + \epsilon$			
	cluster by country		No cluster	
	$\beta_1$	$\beta_2$	$\beta_1$	$\beta_2$
<b>llgdp</b>	15	14	14	19
<b>prib</b>	17	16	16	18
<b>pribof</b>	17	17	16	22

Notes: The above numbers indicate the number of industries for which the interaction term is statistically significant at the 10% level. The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. Heteroskedasticity-robust standard errors are used.

**Table 22**  
**Specification IV: Pooled Data**  
**Period 1995-2004**

	(1)	(2)	(3)	(4)	(5)	(6)
	llgdp		prib		pribof	
<b>x</b>	0.276 (0.030)**	(0.038)**	0.276 (0.028)**	(0.032)**	0.280 (0.031)**	(0.028)**
<b>xopen</b>	-0.096 (0.032)**	(0.029)**	-0.097 (0.032)**	(0.024)**	-0.093 (0.029)**	(0.018)**
<b>xfin</b>	-0.001 (0.028)	(0.059)	-0.000 (0.016)	(0.037)	-0.007 (0.006)	(0.018)
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.41		0.41		0.41	
<b>N</b>	4069		4069		4169	

Notes: The dependent variable is the nominal Solow residual and x is the difference between nominal output growth and nominal capital cost growth. FIN denotes one of the following measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1, 3 and 5. Columns 2, 4 and 6 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

**Table 23 (i-ii)**

**Table 23i**  
**Specification IV: “Two stage” approach**  
**Period 1995-2004**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>fin</b>	-0.054 (0.179)	(0.100)	-0.012 (0.049)	(0.038)	-0.034 (0.070)	(0.039)	0.003 (0.002)	(0.001)**
<b>open</b>	-0.165 (0.095)	(0.054)**	-0.187 (0.066)**	(0.041)**	-0.169 (0.073)**	(0.045)**	-0.250 (0.079)**	(0.053)**
<b>lngdp</b>	-0.022 (0.032)	(0.018)	-0.025 (0.026)	(0.016)	-0.017 (0.035)	(0.020)	-0.036 (0.024)	(0.017)**
<b>industry dummies</b>	Yes		Yes		Yes		Yes	
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.95		0.95		0.95		0.95	
<b>N</b>	447		447		447		447	

**Table 23ii**  
**Specification IV: “Two stage” approach**  
**Period 1995-2004**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	llgdp		prib		pribof		bankfreed	
<b>fin</b>	-0.052 (0.170)	(0.145)	-0.010 (0.048)	(0.063)	-0.035 (0.066)	(0.060)	0.003 (0.002)	(0.002)
<b>open</b>	-0.165 (0.090)	(0.090)*	-0.188 (0.062)**	(0.071)**	-0.168 (0.070)**	(0.071)**	-0.249 (0.075)**	(0.079)**
<b>lngdp</b>	-0.023 (0.030)	(0.024)	-0.026 (0.024)	(0.021)	-0.017 (0.033)	(0.026)	-0.037 (0.023)	(0.021)*
<b>tradedness dummyies</b>	Yes		Yes		Yes		Yes	
<b>clustered at country level</b>	Yes	No	Yes	No	Yes	No	Yes	No
<b>R<sup>2</sup></b>	0.88		0.88		0.88		0.88	
<b>N</b>	447		447		447		447	

Notes for tables 23(i) and 23(ii): The dependent variable is the markup estimated by Christopoulou and Vermeulen (2008) for 50 NACE industry in 9 different countries for 1993-2004. FIN denotes one of the following four measures of financial development: llgdp: Liquid liabilities relative to GDP, prib: Private credit by deposit money banks relative to GDP, pribof: Private credit by deposit money banks and other financial institutions relative to GDP, and bankfreed: This is a composite index which measures banking security as well as banks' independence from government control with an overall score on a scale of 0 to 100 with higher values implying fewer restrictions on banking freedoms. Trade openness is the ratio of nominal exports plus imports to nominal GDP. Following De Gregorio, Giovannini and Wolf (1994), the sectors agriculture, mining, manufacturing and transportation are "tradable" whereas all other services are "nontradable". Standard errors are clustered by country in columns 1, 3, 5 and 7. Columns 2, 4, 6 and 8 report the standard errors when within-clusters correlations are assumed to be negligible. Heteroskedasticity-robust standard errors are reported in parentheses. \*\*=significant at 5% level, \*=significant at 10% level

## Data on External Dependence

### **extdepR\_Z**

The data used are given in Rajan and Zingales (1998) pp. 566-567. Data are given at the 3 or 4 digit level. Some explanation must be given about how their data are matched with the rest of the data of this paper. In an earlier version of the paper they quote:

Data on value added and gross fixed capital formation for each industry in each country are obtained from the Yearbook of Industrial Statistics (vol 1) database put together by the United Nations Statistics Division. We checked the data for inconsistencies, changes in classification of sectors, and changes in units. The U.N. data is classified by International SIC code. In order to obtain the amount of external dependence used by the industry in the U.S., we matched ISIC codes with SIC codes. (...) Not all the ISIC sectors for which the Yearbook of Industrial Statistics report data on value added are mutually exclusive. For example, drugs (3522) is a subsector of other chemicals (352). In these cases, the values of the broader sectors are net of the values of the subsectors that are separately reported. We follow this convention...

The revision of ISIC that Rajan and Zingales (1998) use is not mentioned. However, it seems that Revision 2 is being used. Since in the EU KLEMS database used by Christophoulou and Vermeulen (2008), data are classified according to NACE code, Revision 1.1 there was a problem of correspondence. U.N. does not give an official and direct correspondence table between the two. We use an empirical correspondence. For the few values that Rajan and Zingales (1998) report at the 4 digit level we used unweighted averages of the subsector and the broader sector. We used unweighted averages too in the cases that two or more of ISIC codes correspond to a single NACE code. The correspondence is presented in the table below.

<b>ISIC,Revision 2</b>	<b>NACE code, Revision 1.1</b>
313, 311	15
314	16
321, 3211	17
322	18
323, 324	19
331	20
341, 3411	21
342	22
353, 354	23
352, 3522	24

355, 356	25
361, 362, 369	26
371, 372	27
381	28
382	29
3825	30
383	31
3832	32
385	34
3843	35
384, 3841	36
332, 390	37

### **extdepM\_G**

Maudos and Fernandez de Guevara (2007) use data from Amadeus (Bureau Van Dijk), which contains financial and economic information on more than 7 million European firms. Data were obtained according to NACE but were converted according to ISIC Rev. 3.1. and then aggregated according to ISIC Rev. 3 using U.N.'s correspondence table. We reversed the procedure and used an unweighted average in the case of imperfect matches. The correspondence is presented in the table below.

<b>ISIC,Rev 3</b>	<b>NACE, Rev 1.1</b>	<b>ISIC,Rev 3</b>	<b>NACE, Rev 1.1</b>
5	15	32	41
5	16	33	45
6	17	34	50
7	18	35	51
8	19	36	52
9	20	37	55
10	21	38	60
11	22	39	61
12	23	40	62
13	24	41	63
14	25	42	64
15	26	43	65
16	27	45	67
17	28	46	70
18	29	47	71
19	30	48	72
21	31	49	73
22, 23, 24	32	50, 51	74
25	33	53	80
27	34	54	85
28, 29	35	55	90
31	36	55	91
31	37	55	92
32	40	55	93

## Bank Dependence

The measure is flow measure derived from the sources and uses of funds constructed from the aggregate balance sheet data compiled by the Ministry of Finance.

<b>NACE Description</b>	<b>NACE, Rev 1.1</b>	<b>Carlin &amp;Mayer</b>
Food and beverages	15	Food, Beverages
Tobacco	16	Tobacco
Textiles	17	Textiles
Wearing apparel, Dressing and Dying of fur	18	Clothing
Wood and of wood and cork	20	Wood products
Pulp, paper and paper	21	Paper & Products
Printing, publishing and reproduction	22	Printing & Publishing
Chemicals and chemical products	24	Industrial chemicals, Other Chemicals
Other non-metallic minerals	26	Pottery, China etc, Glass & products, Non-metallic products, nec
Basic metals	27	Iron & steel, Non-ferrous metals
Fabricated metal	28	Metal products
Machinery, nec	29	Non-Electrical machinery
Electrical machinery and apparatus, nec	31	Electrical machinery
Medical, precision and optical instruments	33	Instruments
Motor vehicles, trailers and semi-trailers	35	Motor vehicles
Other transport equipment	36	Shipbuilding & Repairing