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Regional growth and finance in Europe: Is there a quality effect of bank efficiency?

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ABSTRACT

In this study, we test whether regional growth in 11 European countries depends on financial development and suggest the use of cost- and profit-efficiency estimates as quality measures of financial institutions. Contrary to the usual quantitative proxies of financial development, the quality of financial institutions is measured in this study as the relative ability of banks to intermediate funds. An improvement in bank efficiency spurs five times more regional growth then an identical increase in credit does. More credit provided by efficient banks exerts an independent growth effect in addition to direct quantity and quality channel effects.

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1. Introduction

Information asymmetries between lenders and borrowers tend to be lower in better developed financial systems because a better selection of productive investment projects, improved monitoring of borrowing, and a reduction in the amount of resources banks waste in the intermediation process (Pagano, 1993; Bertocco, 2007) facilitates growth and the accumulation of capital and growth. Many studies analyze this finance-growth nexus empirically and explain cross-country growth differentials by the volume of funds relative to economic output (Levine, 2005). This study addresses two concerns regarding this literature.

First, inference drawn from comprehensive cross-country studies covering very different economies possibly suffers from excessive sample heterogeneity.[1] Moreover, cross-country studies treat regions as "isolated islands" (Quah, 1996) and usually neglect regional interdependencies. This can bias results, and studies such as Higgins et al. (2006) therefore analyze economic growth and convergence at the regional level. However, few studies also assess the regional effects of the financial sector on economic growth.[2]

The second concern relates to the measurement of financial development in most studies in terms of (relative) credit volumes. A mere expansion of credit need not indicate a qualitative improvement of intermediaries' abilities to channel scarce funds from savers to borrowers, which is of crucial importance (Romero-Ávila, 2007). We suggest a more direct measure of the quality of financial institutions, thereby addressing the issue of suboptimal empirical proxies for theoretical counterparts raised by Levine (2005).

We test whether better bank efficiency, estimated at the firm level, significantly spurs growth. This relative measure of bank performance gauges the *quality* of financial institutions relative to their peers instead of the quantity of funds intermediated.

We seek to contribute to the few regional studies on financial development in two respects.[3] First, we present evidence of a

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[1] Rousseau and Wachtel (forthcoming) carefully point out that finance-growth nexus results are considerably weaker when assessing only industrialized countries, for example, and more recent periods. This does not necessarily imply the absence of a relation but merely that the inference requires careful sampling.

[2] Exceptions, such as Guiso et al. (2004), provide indirect evidence given the focus on business establishment rather than growth but underpin the importance of regional differences.

[3] See, for example, Lucchetti et al. (2001), Valverde et al. (2003), and Hasan et al. (2009) on the relation between bank market competition, efficiency, legal and political indicators, and growth in Italian, Spanish and Chinese regions, respectively. In an extension of these studies, we suggest here a more explicit measure of bank's intermediation quality.

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positive relation between banking quality and economic growth in several regions within 11 countries of the European Union.[4] Thus, we maintain a regional focus but cover a comprehensive sample of regions in an increasingly integrating financial system. To assess financial institutions, we employ bank-level data obtained from the Bankscope database and associate each bank with a specific European region.

Second, we hypothesize that the economic efficiency of banks converts scarce resources into financial products and services that produce growth. More specifically, Humphrey and Pulley (1997) point out that cost efficiency does not capture a bank's ability to convert inputs efficiently into outputs, because the measure focuses only on the cost aspects of banking businesses. Instead, they emphasize the skills needed to maximize profits for a given production plan by estimating profit efficiency. This study is, to our knowledge, therefore the first to analyze the relation between regional growth in Europe and banks' abilities to provide financial services and products efficiently from cost and profit perspectives.

The remainder of this paper is structured as follows. In Section 2 we introduce the empirical approach to test if higher regional bank efficiency fosters economic growth, and we describe the data. We discuss results in Sections 3 and 4 and conclude the study in Section 5.

2. Methodology

2.1. Regional growth

Different regions of Europe exhibit significantly different growth patterns (Quah, 1996). Likewise, banks' ability to intermediate funds efficiently remains not only heterogeneous across the continent but regionally despite an ongoing harmonization of financial regulation in Europe (Bos and Kool, 2006). Given the importance of regional differences, we hypothesize that higher regional bank efficiency should promote regional growth, too. We specify a reduced-form growth model as a dynamic panel model (Levine et al., 2000):

$$\ln Y_{r,t} = \alpha \ln Y_{r,t-1} + \beta_1 \ln FV_{r,t} + \beta_2 \ln FQ_{r,t} + \beta_3 \ln X_{r,t} + \beta_4 \times \ln Z_{c,t} + \gamma \ln WX_{s,t} + \mu_r + \varepsilon_{r,t}, \quad (1)$$

where Y is the gross domestic product per worker, X is a vector of regional controls,[5] t are time indicators, and r indexes European regions at Eurostat's "NUTS 2 level."[6] To eliminate μ_r, an unobserved region-specific effect, we use the system GMM estimator (Blundell and Bond, 1998).

It is well known that financial development, especially volume-based measures, are prone to endogeneity problems because improving real economic conditions can trigger, for instance, an expansion in both credit demand and supply. Therefore, we follow Levine et al. (2000) and employ lagged levels and differences as instruments for *FV* and *FQ*, respectively, to deal with this possible statistical endogeneity. In addition, we include control variables Z_c to control for banking system traits per country c, which we use in the microestimation of bank efficiency described in this section (Lozano-Vivas et al., 2002). Financial development is measured in two ways: by volume (*FV*) and by the quality of financial development (*FQ*). The former resembles a specification well known in the finance-growth literature: bank credit volume relative to GDP. Due to inherent aggregation problems for financial volumes at the regional level, we specify a measure based on national market capitalization that is used in most finance-growth studies.

A related challenge concerns the spatial allocation of both the volume and the quality of financial-development proxies. Ideally, we would weigh each bank's lending by local customer portfolios or the spatial distribution of branch networks. Unfortunately, neither is publicly available for European banks. We deal with this problem therefore primarily in a statistical way. Specifically, we also specify a spatial-lag model such that *FV* (*FQ*) of the neighboring regions can spill over to region r. Spatial lags are specified in X and account for the possibility that growth in region r depends systematically on financial development in neighboring regions $s \in R$, where R is the set of all regions (Anselin, 1988). We use a predetermined contiguity matrix W to weigh *FV* (or *FQ*) of all neighboring regions.[7] In matrix notation, WX_{st} is the weighted average of financial-development proxies across R_r regions neighboring region r. The parameter γ measures whether regional growth benefits ($\gamma > 0$), suffers ($\gamma < 0$), or is independent ($\gamma = 0$) from the financial development of neighbors.

We have no theoretical precedent as to the spatial effects of financial development on regional growth. On the one hand, better banking might enhance a region's growth by facilitating real economic interaction. On the other hand, superior financial services in neighboring regions may attract investors and therefore have a "pull" effect of investment and growth.

Finally, we exclude regional banking centers and select further subsamples as robustness checks.

2.2. Banking quality

To assess the quality of financial intermediation more directly, we measure a bank's *relative* efficiency in converting inputs into a production set while maximizing profits. This relative measure is conceptually less prone to reverse causality criticism. Banks' ability to demand inputs at given prices in optimal proportions should influence growth positively independent of whether the economy is expanding or contracting. A region in which banks fulfill their project-selection and loan-monitoring functions is on average more efficient than other regions and should benefit in terms of growth because the "right" projects receive funding at the "right" cost of lending given risk.

We assume that banks demand labor, fixed assets, and borrowed funds at given factor prices w to produce customer loans y_1 and other earning assets y_2 subject to a technology constraint, which also depends on bank-specific and environmental controls z, and a pricing opportunity set such that total costs C are minimized and profits before tax *PBT* are maximized (Humphrey and Pulley, 1997).[8] In the alternative profit model, we assume that banks possess some regional market power subject to a pricing opportunity set $H(p,y,w,z)$, where p denotes output prices. Because of local market power, both minimum cost $c^*(y,w,z)$ and maximum profits $\pi^*(y,w,z)$ depend on input prices, equity, and output quantities. A translog stochastic frontier is then:

$$\ln LHS_{it} = \alpha_i + \sum_{j=1}^{J} \alpha_j \ln x_{ijt} + \frac{1}{2} \sum_{k=1}^{K} \sum_{j=1}^{J} \alpha_{jk} \ln x_{ijt} \ln x_{ikt} + \varepsilon_{it}, \quad (2)$$

[4] We avoid excessive heterogeneity and exclude recent members of the EU that still have significantly different financial systems. Results for a sample of 23 EU countries are available upon request.

[5] Regional controls are the growth rate of the working population and spatial lags of FV and FQ. Adequate regional controls for human capital were not available, but we specify patents per capita. We also include a direct and a squared time trend to control for time-specific effects.

[6] NUTS: *Nomenclature des unites territoriales statistiques*. Descriptive statistics are provided in Section 3.

[7] We used binary Queen contiguity as a weighting matrix to average financial development for all regions that either have a direct border with region r or have vertices.

[8] In line with the intermediation approach, we include interest expenses in total cost and specify the price of borrowed funds accordingly as a factor price.

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