BANCA D'ITALIA

EUROSISTEMA

Temi di Discussione

(Working Papers)

Convergence clubs, the euro-area rank and the relationship between banking and real convergence

by Massimiliano Affinito

June 2011

Number 809

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working papers)

Convergence clubs, the euro-area rank and the relationship between banking and real convergence

by Massimiliano Affinito

Number 809 - June 2011

The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

CONVERGENCE CLUBS, THE EURO-AREA RANK AND THE RELATIONSHIP BETWEEN BANKING AND REAL CONVERGENCE

by Massimiliano Affinito•

Abstract

This paper analyses banking convergence, measured through the ratios of deposits and loans to GDP, across 65 countries, compares it with per capita income convergence, and tests its effect on real convergence. The focus of the paper is the group of countries that have adopted the euro as a single currency (euro area). It compares the degree of banking and real convergence among these countries with that reached by other 17 potential convergence clubs around the world (including the EU-27, the OECD, the G20, OPEC, and the Arab League). It employs a diversity of methods (β- and σ- analyses, stationarity tests, IV regressions) and finds three main results. First, the degree of convergence is higher within the clubs than in the entire sample, and it is diversified across the clubs. Second, all methodologies confirm euro-area banking convergence. Third, banking convergence has a positive and significant impact in fostering real convergence.

JEL Classification: G21, F36, C22.
Keywords: convergence, comparing banking systems, euro area.

Contents

• Bank of Italy, Economics, Research and International Relations.

1. Introduction[1]

The analysis of economic growth long-run convergence across countries is a traditional and central issue of economic research. After the euro was chosen as a single currency by several countries, many works extended the analysis of convergence to banking indicators. Banking convergence is a relevant issue because it is strictly linked to integration (e.g. Adam et al., 2002), which in turn has implications for the single monetary policy, financial stability and economic growth (e.g. Artis et al., 2000; Danthine et al., 2001; Gaspar et al., 2003; Guiso et al., 2004; Lane, 2006). Moreover, convergence of banking indicators counts in itself since it helps to avoid asymmetric effects and to allow the single monetary policy to perform its smooth functioning (e.g. ECB, 2007). This paper deals with these issues and draws on three vast fields of research: income convergence, banking convergence, and the literature on finance and growth.

Regarding the literature on income convergence, I exploit the many different interpretations of convergence that have been offered and methodologies used (see, for example, the surveys of Durlauf and Quah, 1999; Temple, 1999; Islam, 2003) to pursue an eclectic and pragmatic strategy that combines several empirical methods applied to both income and banking convergence indicators. My empirical strategy is divided into three steps. The first step relies on β- and σ- convergence analysis (e.g. Barro and Sala-i-Martin, 1991 and 1992; Mankiw et al., 1992; Sala-i-Martin, 1996; Lee et al., 1997), and obtains an overview of general convergence for real and banking indicators. The second step is based on tests of zero mean stationarity (e.g. Bernard and Durlauf, 1995 and 1996; Evans and Karras, 1996; and Tsionas, 2000), and it is used for checking the first-step results, and to detect the degree of convergence of separate clusters around different cross-country averages. The third step combines the results of the first two steps to verify whether there is a link between real and banking convergence.

Turning to the literature on banking convergence, I exploit three aspects on which researchers and policymakers have reached a substantial consensus. First, I tackle the issue empirically, and investigate banking convergence through the analysis of two indicators (the ratios of deposits and loans respectively to GDP), since the literature shows that, compared with real GDP growth rate convergence, there is no clear theory on banking convergence and that the issue is therefore basically an empirical question. Second, I collect data from the 1960s, since the literature stresses that convergence is a long-term concept. Finally, I compare euro-area

[1] Correspondence: massimiliano.affinito@bancaditalia.it. I wish to thank two anonymous referees for very helpful comments. I also thank Riccardo De Bonis, Fabio Farabullini, Silvia Giacomelli, Matteo Piazza, and Andrea Silvestrini for their useful suggestions; and Miria Rocchelli, for her invaluable help. The opinions expressed are mine alone and in no way involve the responsibility of the Bank of Italy.

convergence with that reached by other groups of countries around the world, since the literature states that convergence is a relative concept and the only reliable method to assess the degree of convergence of a group of countries is to use control samples.

I refer to these control samples as potential convergence clubs. This expression derives from Baumol (1986), who coined the term "convergence club" to express the idea that some sets of countries, characterized by economic or institutional links, might converge faster and more fully than others. My overall sample includes 65 countries, which I divide into 17 partially overlapping potential convergence clubs. As clarified in detail later, subsequent studies showed that Baumol's analysis suffered from a selection bias, and that any identification of clubs is not free of problems. Accordingly, and since I am interested in the effects of international affiliation and not in abstract statistical clustering, I follow a simple criterion. Since my focus is the euro area (which can be treated as an international organization), I simply identify the control clubs on the basis of countries' membership in international organizations (the EU-27, OECD, G20, OPEC, the Arab League, etc.), and for further control, I add clubs identified by geography contiguity.

The literature on banking convergence generally concludes that in the euro area some segments of financial market have made greater progress in convergence than retail banking (e.g. Centeno and Mello, 1999; De Bandt and Davis, 2000; Kleimeier and Sander, 2000; Adam et al., 2002; Baele et. al., 2004; Dermine, 2006). It also finds that intra-country convergence is higher than euro-area convergence (e.g. Affinito and Farabullini, 2009; Gropp and Kashyap, 2009), and consequently analyses the factors hampering convergence (e.g. Affinito and Piazza, 2009). By contrast, my approach based on a comparison among several potential convergence clubs around the world shows that euro-area banking convergence is higher than that of the other clubs.

Finally, as for the literature on growth and finance, I exploit some of its concepts and methodologies (in particular from Aghion, Howitt and Mayer-Foulkes, 2005; and Abiad, Leigh and Mody, 2007), and show, as far as I know for the first time, that banking convergence facilitates per capita income convergence.

My findings are statistically robust, because they are based on the concurrence of results and tests obtained by very different methods, and are economically and politically relevant. They show that euro-area affiliation makes banking convergence easier, which in turn seems to enhance per capita income convergence, disclosing another reason why it is significant to monitor banking convergence.

The remainder of the paper proceeds as follows. Section 2 describes my methodology. Section 3 reviews the potential convergence clubs in my dataset, and explains how they are

identified. Section 4 describes the data. Section 5 shows my econometric outcomes and robustness checks. Section 6 concludes.

2. Methodology

My empirical analysis is divided into three steps. Each step in turn relies on different indicators, approaches and specifications, which are summarized in Figure 1.

2.1. First step (β and σ convergence): Do banking and real convergence exist?

In the first step, I use two complementary measures: β and σ convergence. As far as β-convergence is concerned, the empirical literature on income growth regresses the average growth rate of per capita income on its initial level and interprets a negative correlation as a sign of convergence. In other words, there is β-convergence if poor economies tend to grow faster than and to "catch up" with richer countries. I proceed in the same way, applying the concepts of β-analysis to per capita income as well as to two banking indicators (Loans/GDP and Deposits/GDP).

In formal terms, β-convergence may be analysed using the following equation:

$$\frac{1}{T}\Delta[\log(Y_{it})]_{t=t_0}^{T} = \alpha + (1+\beta)\log(Y_{it_0}) + \gamma X_{it} + \varepsilon_{it} \qquad (1.1)$$

where $Y_{i,t}$ is the variable of interest for country i at date t; $\frac{1}{T}\Delta[\log(Y_{it})]_{t=t_0}^{T}$ is the average, between the first period t_0 and the last one T, of first differences of the logarithm of $Y_{i,t}$, corresponding to its average growth rate; $\log Y_{it_0}$ is the logarithm of the initial level of the variable of interest; ε_{it} is an error term.

Following the literature on economic growth, I distinguish between absolute and conditional convergence for all my indicators. Convergence is absolute if β is negative in a univariate regression, i.e. without controlling for additional variables on the right-hand side of the equation (1.1), then $X_{it} = 0$.[2] Convergence is conditional if a negative β is obtained after allowing for other country structural characteristics X_{it}. Conditional convergence implies that, even if countries do not reach the same level of the variable of interest, they can reach their respective

[2] Absolute convergence can be viewed as a test for a unit root (e.g. Levin et al., 2002), which underpins my second approach. In fact, if $|\beta| = 1$, a unit root is present, the time series is said to have a stochastic trend and there is no convergence. On the contrary, if β is negative, the hypothesis of the unit root can be rejected.

steady states. Therefore, conditional convergence suggests that a country positioned further below the steady state level tends to grow faster.[3]

My second measure of convergence is σ-convergence, which is obtained from the following equation:

$$\sigma_t^{\,2} = 1/N \sum_{i=1}^{N} [\log(Y_{it}) - \bar{y}_t]^2 \qquad (1.2)$$

where $\bar{y}_t$ is the mean of the logarithm of Y_{it}. There is σ-convergence when the dispersion of the variable of interest across groups of economies tends to fall over time: $\sigma_{t+T} < \sigma_t$.

Although related, the two measures of convergence have different informational contents. Moreover, β-convergence does not formally imply σ-convergence, since it is a necessary but not a sufficient condition for σ-convergence (Quah, 1993; Barro and Sala-i-Martin, 1995).[4]

2.2. Second step (tests of zero mean stationarity): What is the most convergent club?

My second step explores real and banking convergence through tests of stationarity applied to differentials between two time-series (e.g. Hobjin and Franses, 2000; Harvey and Carvalho, 2002; Harvey, 2002; Busetti *et al*., 2007). My methodology is based on three computations (Busetti et al., 2007; Affinito and Farabullini, 2009).

First, I calculate the differentials D_{it} for each variable of interest. These differences can be computed following two alternative approaches (Figure 1): (i) the bilateral differentials D_{it}^{j} between each pair of countries; or (ii) the differences D_{it}^{A} between each country and the common average of a group of countries (e.g. Bernard and Durlauf, 1995; Hobijn and Franses, 2000; Corrado, Martin and Weeks, 2005; Pesaran, 2007).

In the first approach, the bilateral differentials D_{it}^{j} between each pair of countries are defined as:

$$D_{it}^{j} = Y_{it} - Y_{jt} \qquad (2.1)$$

[3] About conditional convergence of per capita income, Islam (1995) argues that "... convergence is more commonly understood as different countries of the world approaching the same or similar levels of income [i.e., in the 'absolute' sense]. There is probably little solace to be derived from finding that countries in the world are converging ... when the points to which they are converging remain very different".

[4] In other words, mean reversion is not an indication that cross-sectional variance decreases over time. Sala-i-Martin (1996) explains the conceptual difference between the two convergence measures writing: "σ-convergence studies how the distribution of income evolves over time and β-convergence studies the mobility of income within the same distribution".

where apex j indicates that the differences D_{it} are between countries i and j, with $i \neq j$, and $Y_{i,t}$ is defined as in equation (1.1). If these differentials D_{it}^{j} are computed for all pairs of countries, the total number of bilateral differentials is $N_T\,(N_T - 1)\,/\,2$, where N_T is the total number of countries.

In the second approach, the differentials D_{it}^{A} between each country and the common average of a group of countries are defined as:

$$D_{it}^{A} = Y_{it} - \overline{Y}_t \tag{2.2}$$

where apex A indicates that the differences D_{it} are obtained between each country i and the common average of a group of countries $\overline{Y}_t = N_C^{-1} \sum_{1}^{N_C} \mathrm{Y_{it}}$, where N_C is the number of countries in the group; and $Y_{i,t}$ is defined as in equation (1.1).

Second, once the differentials D_{it} are computed as either in equation (2.1) or (2.2), I verify whether they are either nonstationary or stationary processes by utilizing the augmented Dickey-Fuller (ADF) test. In formal terms, the ADF test verifies if a unit root is present by testing the null hypothesis $\rho_i^{*} = 0$ against $\rho_i^{*} < 0$ in the following equation:

$$\Delta D_{it} = \mu_i + \rho_i^{*} D_{it-1} + \sum_{k=1}^{p-1} \phi_{ik} \Delta D_{it-k} + \varepsilon_{it} \tag{2.3}$$

where $\phi_k = \sum_{s=k+1}^{p} \rho_s$ and $\rho^{*} = (\sum_{r=1}^{p} \rho_r) - 1$. The test signals convergence when $\rho_i^{*} < 0$, i.e. if it rejects the hypothesis that a unit root is present; or equivalently when $\rho_i < 1$, i.e. if it rejects the hypothesis of nonstationarity.

Third, I verify the zero-mean stationarity of stationary differentials D_{it} by utilizing the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, which verifies their zero-mean stationarity, rejecting this null hypothesis for large values of ζ statistic:

$$\zeta = \sum_{t=1}^{T} (\sum_{i=1}^{N} D_{it})^2 \Big/ T^2 \, \hat{\sigma}_{LR}^{\,2} \tag{2.4}$$

where $\hat{\sigma}_{LR}^{\ 2}$ is a non-parametric estimator, robust to autocorrelation and to heteroscedasticity, of the long-run variance of D_{it}:

$$\hat{\sigma}_{LR}^{\ 2} = \hat{\gamma}(0) + 2\sum_{\tau=1}^{m} w(\tau, m)\hat{\gamma}(\tau) \tag{2.5}$$

where $\hat{\gamma}(\tau)$ is the sample autocovariance of D_{it} at lag τ; $w(\tau, m)$ is a weight function defined as $w(\tau, m) = 1 - |\tau|/m + 1$, and m is such that, as $T \to \infty$, $m \to \infty$ and $m^2/T \to 0$.

This methodology based on both ADF and KPSS tests aims at increasing the power of the tests, in particular at decreasing biases in favour of convergence. However, as a check of my results, the two kinds of test are also run separately.

Since in equation (2.2) the differentials D_{it}^{A} are computed on an average of countries in the same group, the average $\overline{Y}_t$ can be seen as a steady state where the group of countries might converge. In other words, if the countries of a group converge to the common mean $\overline{Y}_t$, then a homogeneous model of development might emerge (convergence club), and it should be captured by $\overline{Y}_t$, which represents the common, long-run trend.

In the following, I refer to equation (2.1) to indicate the approach based on equations (2.1), (2.3), (2.4) and (2.5); and I refer to equation (2.2) to indicate the approach based on equations (2.2), (2.3), (2.4) and (2.5).

2.3. Third step (parallel convergences): Does banking convergence favour real convergence?

My third step uses the results of the previous steps in order to assess if there is a link between banking and real convergence. Although many studies have found a nexus between finance and growth (e.g. King and Levine, 1993a,b; Rajan and Zingales, 1998; Levine, 1998 and 1999; Levine, Loayza and Beck, 2000; Aghion, Howitt and Mayer-Foulkes, 2005; Demirgüç-Kunt and Levine, 2008), the relationship that might emerge between their respective convergences has received less attention. A number of factors can contribute to their simultaneous convergence. Obstfeld (1994) demonstrates that financial integration allows greater saving diversification and hence a shift in output growth. Gourinchas and Jeanne (2006) note that financial integration and high capital mobility may accelerate the convergence toward long-run levels of per capita output. Abiad, Leigh and Mody (2007) point out that greater financial integration differentiates current

accounts and allows poorer countries to attract capital from richer countries and to accelerate their growth.

In this light, some studies have tested if global financial integration benefits long-run growth and investigated the effect on growth rates of the international reallocation of capital. This literature has produced no consensus because, paradoxically, capital often moves from poorer to richer countries (e.g. Lucas, 1990; Kose, Prasad, Rogoff and Wei, 2006; Prasad, Rajan and Subramanian, 2006). More recently, Henry (2006) and Abiad, Leigh and Mody (2007) have argued that the role of international capital flows might be that of influencing the income convergence rather than raising the steady-state rate of growth. I follow their argument, testing the effect of banking convergence on per capita income convergence. To the best of my knowledge, such an analysis has not yet been utilized, probably because of the difficulty of measuring banking convergence and implementing this measure in an estimation of real convergence. Again I use two approaches (Figure 1).

The first approach consists simply in regressing the following equation:

$$g_i = b_i + u_i \tag{3.1}$$

where g_i and b_i are dummies taking the value of one when the bilateral differentials between a pair of countries is zero-mean stationary (results of equation 2.1), respectively, for per capita income and, alternatively, for one of the two banking indicators, and u_i is an error term. The regressor b_i is instrumented as explained in detail in Section 5.

The second approach basically follows the methodology of Aghion, Howitt and Mayer-Foulkes (2005), who examine the effect of a phenomenon on per-capita income convergence interacting a proxy of the phenomenon with the initial level of per-capita income. The likelihood of real convergence increases if and only if the coefficient of interaction term turns out to be significantly negative (in this line also Abiad, Leigh and Mody, 2007).[5]

This second approach is described by the following equation of an IV absolute β-analysis:

$$1/T\,\Delta[\log(G_{it})]_{t=t_0}^{T} = \alpha + (1+\beta_{BG})\log(G_{it_0}) \times B_i + \varepsilon_{it} \tag{3.2}$$

where G is the per capita income, B is a proxy of banking convergence; β_{BG} is the coefficient of the interaction term, and the other symbols are defined as in equation (1.1). My interaction term

[5] Aghion, Howitt and Mayer-Foulkes (2005) explore the effect of financial development on per capita income convergence, while I analyse the effect of banking convergence on per capita income convergence. As clarified in Section 5, I also fellow Aghion, Howitt and Mayer-Foulkes in the choice of several robustness checks.

is between the initial level of per capita income and a proxy of banking convergence B_i, which is computed either on Loans/GDP or on Deposits/GDP.

In turn B_i is alternatively measured in two ways. The first uses the results of equation (2.2). In this case, the banking convergence proxy is a dummy taking the value of one when the country converges to the average of my entire sample (bilateral differentials between each country and the whole cross-country average). The second uses the results of σ-convergence analysis of equation (1.2) to get a convergence indicator with continuous values. In order not to change the interpretation of the sign of the interaction term coefficient, B_i in this case is obtained as follows:

$$B_i = 1 - \sigma_i / \sigma_{max} \qquad (3.3)$$

where σ_i is defined as in equation (1.2), and σ_{max} is the highest value of σ_i. Banking convergence decreases in σ_i and increases in B_i; this is bounded between zero and one by construction.[6]

As detailed in Section 5, the banking convergence proxy B_i, in both its definitions, and the regressor b_i in equation (3.1), are all estimated with linear models and are instrumented to solve possible problems of endogeneity. This is done because most studies find that the nexus between finance and growth moves from the former to the latter, but there is no lack of reverse causality explanations (e.g. Shan et al. 2001; Allen et al., 2005), and the finance-growth relationship might also be driven by simultaneity bias.

3. Potential clubs

My entire dataset includes 65 countries, divided into 17 partially overlapping potential convergence clubs (Table 1 and 2). As mentioned in the Introduction, my main focus is the euro area, the potential club composed by the countries adopting the euro. The other countries and potential clubs are basically used as control samples.

I use the expression "potential convergence clubs" to mean groups of countries which may be supposed to converge faster and to a greater degree than the larger sample as a whole. This interpretation of potential convergence clubs derives form the concept of convergence club that can be traced back to Baumol (1986), who coined the expression to indicate that the presence or absence of unconditional convergence depends on the country sample.[7] My potential

[6] σ_i tends to zero and B_i tends to one when convergence improves in the sample. By construction, $\sigma_i = \sigma_{max}$ and B_i is equal to zero when convergence is minimum in the sample.

[7] Baumol (1986) obtains a significant negative coefficient on the initial income variable in a growth-initial level regression for 16 OECD countries and for a group of formerly centrally planned countries, and takes this as evidence

convergence clubs are identified on the basis of their geographic contiguity or countries' membership in international organizations. This choice deserves to be clarified because it could appear open to the same criticism levelled at Baumol, whose club selection, according to De Long (1989) and Quah (1996a), suffers from a self-selection bias.[8]

In the literature that addresses the problem of the choice of criteria to be used in order to group the countries before testing for club convergence so as to prevent self-selection biases, two main approaches can be found. The first holds that a group of countries can reach a particular equilibrium, and thus can be empirically identified as a club, on the basis of conditioning variables, namely if each of countries shares the initial position or they all present strong similarities in structural, institutional and technological conditions (e.g. Durlauf and Johnson, 1995; Desdoigts, 1999; Canova, 2004). The second approach identifies the clubs endogenously with no conditioning variables, but using statistical tools (e.g. Hobijn and Franses, 2000; Corrado, Martin, and Weeks, 2005). However, there are drawbacks to both of these procedures. For the first approach: (i) it entails the difficulty of detecting and choosing the relevant conditioning variables; (ii) if the initial income cut-off is used, the choice of the cut-off date remains arbitrary; (iii) allowing for any attribute makes it hard to distinguish club convergence from conditional convergence.[9] By contrast, the second approach omits factors which determine the clustering, and so it is liable not to yield any policy guidance (for a broad discussion, see Islam, 2003).

On the other hand, Corrado, Martin and Weeks (2005) suggest that "hypothetical clubs" of intra-country regions may be easily identified on the basis of simple common characteristics such as spatial proximity, political factors and country membership. Accordingly, a reasonable method of classifying groups of countries is to use their geographic contiguity or their membership in international organizations. As neighbouring regions, and regions within a given nation, share institutional frameworks, regulatory systems, consumer tastes, and technologies, it stands to reason that neighbouring countries, and countries within a given international organization, are more likely to have characteristics in common, determined by similar histories, similar cultures or even decisions and rules adopted in common in an international organization.

---

of (unconditional) convergence; while he does not find evidence of convergence in an extended sample of 72 countries.

[8] DeLong (1988) shows that the proper criterion for sample selection in analysing convergence is *ex-ante* income level, and not *ex-post*. He also shows that, when the *ex-ante* criterion is used and Baumol's OECD sample is modified slightly, the result of unconditional convergence no longer holds.

[9] Actually, the concept of convergence club is strictly related to the notion of conditional convergence. In the case of unconditional convergence, there is only one equilibrium level for all economies. For countries belonging to a club, instead, absolute and conditional convergence should be equivalent, because club affiliation (if correctly identified) should capture the economies' "fundamentals" that are otherwise captured by the regressors included in conditional estimations.

Indeed, some international organizations implicitly or explicitly pursue "convergence" as a goal. Further, geographic contiguity and membership in international organizations can also be viewed as exogenous determinants of those conditioning variables used by some studies to identify potential clubs. Finally, since the literature stresses that the only reliable method for measuring different degrees of convergence is to use control samples, and since my focus is the euro area, taken as an international organization, then the most suitable control samples appear to be other groups of countries that have decided to join an international organization.[10]

My first criterion − geographic contiguity − allows me to obtain 5 potential clubs as shown in Table 1. The first potential club is formed by all countries in my dataset, and thus I call it the "World". The other four potential clubs are four continents: Europe, America, Africa and Asia. Oceania is excluded because it would include only Australia and New Zealand.

Using the criterion of membership in international organizations, I obtain nine potential clubs (Table 2).[11] The first potential club is the euro area. My dataset covers 15 out of the 16 euro-area countries, excluding only Luxembourg. The "euro-founders" club consists of the countries that adopted the single currency from its launch in January 1999. There were 11 countries; my sample covers 10 of them (Luxembourg is excluded).[12] The distinction between the euro area as a whole and the euro-founders serves to investigate whether convergence in the euro area has changed significantly with the entry of new countries.

The third potential club is the European Union (the EU-27), composed of 27 members and represented in my sample by 26 countries (again, only Luxembourg is missing).[13] The OECD

[10] Many works analyse convergence by selecting an affiliated group of economies, in particular belonging to the euro area or the OECD. For example, Bianco, Gerali and Massaro (1997) present a comparison of six developed economies and find that convergence across financial systems was limited. Schmidt, Hackethal and Tyrrel (2001) find that France in particular moved towards a more market-oriented system. Byrne and Davis (2002) find σ-convergence towards a more market-oriented financial system for the UK, France, Germany and Italy. Examining euro-area countries, Hartmann, Maddaloni and Manganelli (2003) find that the dispersion of currency, deposits and loans increased, while bond investment and financing became more uniform. Rajan and Zingales (2003) show that in the last two decades the convergence of European financial markets has improved and become more market oriented. Analysing seven European countries, Murinde, Agung and Mullineux (2004) find convergence of equity issues and internal firm finance, but not of bank loans. Sørensen and Gutierrez (2006) conclude that the introduction of the euro has increased the degree of cross-country homogeneity. By contrast, Dahl, Shrieves and Spivey (2006) reject the hypothesis that banks in different European countries have common activities. Affinito, De Bonis and Farabullini (2006) show the persistence of a country-effect in the composition of national banks' balance sheets. On the other hand, Goddard et al. (2007) conclude that the process of transition towards a single European banking market is multi-faceted and ongoing. Di Giacinto and Esposito (2008) find β-convergence for indicators of financial development of 13 European countries, but not for banking business. Bruno and De Bonis (2009) analyse the financial accounts of eight OECD countries and find some signs of convergence.

[11] Table 2 also identifies the countries of each club that are excluded from my dataset because data are unavailable or series are too short.

[12] The single currency was adopted from the beginning by Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain. Greece joined in 2001; Slovenia in 2007; Cyprus and Malta in 2008; and Slovakia in 2009.

[13] The EU-27 indicates the 27 countries members of European Union. Previously, the acronyms were EU-12; EU-15 and EU-25. In order not to overload my discussion, I do not analyse those "historical" clubs separately.

club consists of 27 out of 29 countries (excluding Island and Luxembourg). All eight countries of the G8 are included in my dataset. The G20 club includes 16 out of 19 countries (Argentina, South Africa and Saudi Arabia are left out). The NAFTA club includes all three members. OPEC includes 9 out of 13 member countries, and the Arab League 14 out of 22.

Finally, I obtained three "other" clubs which, though not identified by geographic contiguity or affiliation in organizations, are often considered together in international analyses. BRIC is the acronym for four large, rapidly developing countries: Brazil, Russia, India and China. CEEC is the club of 13 Central and East Europe Countries. "Former socialists" are countries were politically and economically similar at least until the end of 1980s.

As is evident, my potential convergence clubs are partially overlapping, in the sense that some countries are included in several clubs. For example, France belongs to eight potential clubs: the euro area, the euro-founders, the EU-27, the OECD, the G8, the G20, Europe, and the World; Indonesia belongs to four: the G20, OPEC, Asia, and the World.

My clubs constitute good samples in terms of both the number of countries and their population. My complete sample includes the largest countries in the world, a total population of more than 5 billion and almost all of global GDP. Even when the sample number of countries is low compared with the actual number (that is the case of the Arab League), the missing countries are small. Nevertheless, my selection may suffer from two problems. First, some my potential clubs, obtained for geographic contiguity, may be under-representative samples. For instance, the Europe club is a representative sample of the continent in terms of both population and number of countries; whereas the number of countries is low in the clubs America, Africa and Asia. Second, at least in two cases (NAFTA and BRIC), though the clubs are self-representative, the number of countries is very small. Nonetheless, where possible I keep these clubs in the analysis for the sake of completeness and because their comparison is interesting in any case. At the same time, I am forced to drop the smallest clubs when the number of observations is very low.

4. The data

The methodology described in Section 2 is applied to my three variables of interest: one indicator of real economic development (per capita income) and two indicators of banking development (Deposits/GDP and Loans/GDP). The source of data is the International Monetary Fund database (IMF).

Several studies, some of which are reviewed in this paper, have examined cross-country banking convergence using variables that are very similar to my two indicators. Like others (e.g. Levine, Loayza and Beck, 2000), I use private deposits and loans divided by GDP, excluding

interbank business and credit granted to the public sector, as well as loans granted by central banks and development banks. Interbank transactions are excluded because I am interested in the relationship between banks and their final customers; credit to the public sector because banks that are allocating credit to the private sector are more likely to effectively monitor borrowers than banks that are allocating credit to government and public enterprises (Levine and Zervos, 1998; Demirgüç-Kunt and Levine, 2008).

Ex-ante, it is hard to guess which banking indicator is more likely to converge earlier (Affinito and De Bonis, 2011). Deposits might converge more because of reduced global use of currency in circulation for payments and because of increased cash remittances from richer to poorer countries; however, the indicator could be affected by differences in national saving rates and in the availability of alternative forms of saving. The Loans/GDP ratio might converge faster because it reflects the general and similar credit needs once they are weighted for GDP; however, convergence could be impeded by differences between countries in the size of firms, the size of stock exchanges, the securities issued by firms, and so on.

I collected available annual data from 1964 to 2007 (44 periods for each country). The first year was chosen because the series are available for the majority of countries from it onwards. In several cases the time-series are shorter. For a few countries the length of time-series differs for the different variables.[14] Table 3 provides summary statistics for the three variables in the 17 potential clubs. As expected, the G8 and the OECD present the highest average values for the per capita income, Africa the lowest. The highest figures for Deposits/GDP and Loans/GDP are in the euro area. Dispersion, measured by standard deviation, is lower in the euro area than in the OECD, but that of banking indicators is also low in the OPEC and Arab League. This confirms that the analysis needs more sophisticated statistical tools.

In the exercise on conditional β-convergence, even if I do not need to allow for specific factors influencing growth and convergence (as spelled out later), the matrix X_{it} of equation (1.1) contains a few control variables, typically used in the literature: GDP growth rate; a proxy for the size of the banking system; official exchange rates against the US dollar; inflation rates; and volumes of exports and imports. The source of data is again the IMF.

A further methodological choice I have made with regard to the data deserves to be stressed. Even if I have long time-series, in β- and σ-convergence analysis, and thus in my first

[14] The data are available for: Bulgaria from 1969; Indonesia from 1967 for GDP and 1980 for deposits and loans; Hungary from 1970 for GDP and 1982 for loans and deposits; the United Arab Emirates from 1973; Bahrain and Oman from 1975; China from 1978; Lebanon, Poland and Romania from 1980; Turkey from 1987; Yemen from 1990; Slovenia from 1991; Albania, Russia and Ukraine from 1992; Croatia, Macedonia, the Czech Republic, Estonia, Latvia, Lithuania and Slovakia from 1993; Georgia from 1994; Spain (loans) from 1972; Ireland (deposits) from 1999.

step (equations 1.1 and 1.2) and in the second part of my third step (equation 3.2), I split my entire sample period into different spans, averaging my observations over these intervals. This procedure allows me both to exploit the panel dimension of data and to emphasize their cross-sectional nature, and thus allows avoiding the trade-off between panel and cross-section estimation of the speed of convergence that was pointed out by the empirical growth literature. For example, Quah (1993 and 1996a,b) stresses that panel estimations, though they allow not taking steady states as identical, still tend to overestimate the speed of convergence. Barro (1997) and Durlauf and Quah (1999) contend that the cross-sectional dimension of data contains long-run features that are more pertinent to growth study than the panel estimation. Hauck and Wacziarg (2004), and Aghion, Howitt and Mayer-Foulkes (2005) point out that a cross-sectional approach is preferable because development is imperfectly measured and persistent. Demirgüç-Kunt and Levine (2008) argue that panel methods may be less precise in assessing long-run growth issues than methods based on lower frequency data.

In particular, the procedure of averaging data over several, non-overlapping and non-frequent years is widely accepted because it makes it possible (for a broad discussion see, for example, Quah, 1993 and 1996a,b; Islam, 1995 and 2003; Barro, 1997; Cellini, 1997; Lee et al., 1998; Temple, 1999): (i) to enhance the long-run notion of convergence; (ii) to reduce measurement errors; (iii) to abstract from business cycle fluctuations; (iv) to decrease serial correlation; and (v) to avoid short-term disturbances and biases in favour of finding convergence that have been found when brief intervals and too frequent spans are used. On the other hand, using this procedure reduces the number of observations and forces me to give up the smallest clubs in the β-analysis.

The length of the intervals is chosen in such a way as to define periods of equal length and with an adequate number of years. In particular, my basic estimations (i.e. those presented in the tables) are carried out on three time intervals defined as r_1, r_2 and r_3.[15] In any case, in order to test the robustness of my results and in particular their sensitivity to the definition of the spans, I try several combinations for the composition and length of the time intervals, both in the β- and σ-convergence analysis.

[15] For the same reasons, and to avoid an excessive sensitivity to the first period values, initial levels of variables are computed as averages over the previous period. In formal terms, in equation (1.1), the first periods t_0 are respectively the time spans r_2 and r_1; the last periods T are respectively the time spans r_3 and r_2; $1/T\,\Delta[\log(Y_{it})]_{t=t_0}^{T}$ are the average growth rates of dependent variables for the periods r_3 and r_2; Y_{it_0} are the initial average values of the dependent variables, respectively, in the periods r_2 and r_1; X_{it} are the average values of other regressors, respectively, in the periods r_3 and r_2 or in the spans r_2 and r_1 if they are lagged. In the σ-convergence analysis I simply compute the averages of the three dependent variables for each country over each period, and then the cross-section standard deviations. In the specifications presented in the tables: r_1 is the span 1964-1978; r_2 is 1979-1992; and r_3 is 1993-2007.

By contrast, my second step, based on stationarity tests, keeps all the available yearly (not averaged) observations.

5. Results

The results of my three steps may be interesting in themselves, be viewed as mutual robustness checks or read as successive moments of the analysis.

5.1. First step (β- and σ- convergence): The euro area always exhibits signs of convergence

To obtain the β coefficients, I implemented a pooled regression, respectively for per capita income, Deposits/GDP, and Loans/GDP.[16] The upper panel of Table 4 shows the results for the euro-area club; the lower panels show the results for all countries in my sample (the "World"), for "Europe", the EU-27 and the OECD. The results of the other potential clubs are not reported for β-analysis because of the insufficient number of observations.

Table 4 contains two specifications. The first specification does not contain regressors, initial levels apart, and corresponds to the test of absolute β-convergence. The second specification reports the covariates included in the X_{it} matrix and represents a test of conditional β-convergence. The natural logarithms of Loans/GDP and the GDP growth rate are computed as lagged averages when they are used as regressors, in line with the empirical literature on growth and finance. A part of this literature uses previous-period lags as regressors in order to discern possible casual links (e.g. King and Levine, 1993a, b). However, even if this device is used to enhance the robustness of estimations, I am not interested in the effects of control variables because, analysing convergence, I focus only on the sign and statistical significance of β. Moreover, I am confident that the most important condition is that the matrix X_{it} always includes country-by-country dummies. In line with Durlauf and Quah (1999) and Islam (2003), the idea is that these dummies capture all remaining national specificities, and so I do not need to add any other control variable, contrary to the literature that deals with the effect of specific factors on growth and convergence.[17]

[16] In the estimations, I used a standard robust regression model that implements a data-dependent method for down-weighting outliers.

[17] The prevailing literature states that the central factor underlying the divergence is the technology. In turn, the cross-country differences in rates of technological progress can be explained by several factors. For example, a few studies include in the estimations variables measuring population health, political instability, educational attainment (e.g. Galor and Zeira, 1993; Howitt, 2000), or geographical, institutional and policy variables (e.g. Parente and Prescott, 1994; Acemoglu, Aghion and Zilibotti, 2002).

Turning to my empirical results, for per capita income, absolute β-convergence does not exist when I consider all the countries in my dataset, while it does emerge for the euro area, Europe, the EU-27, and the OECD. By contrast, a minor conditional convergence appears even for the World. This result is coherent with the prevailing empirical literature, which has found robust β-convergence only for developed industrialized economies and reported mixed results when emerging countries are included in the regressions (see Baumol, 1986; Romer, 1989; King and Rebelo, 1989; Rebelo, 1991; Mankiw, Romer and Weil, 1992; Romer, 1994; Evans, 1996; Pritchett, 1997; Maddison, 2001).

The results are interestingly diversified for the two banking indicators. The World does not converge at all. Deposits show neither absolute nor conditional convergence, and in no club. On the contrary, Loans seem to converge to similar levels in the euro area, Europe, the EU-27, and the OECD.[18]

The σ-analysis allows me to compare different groups of countries at any point of time and the same club over time (Table 5). From the former point of view, the euro area and, even more, the euro-founders, display the lowest intra-group dispersion for my three indicators. From the latter perspective, the euro area, besides presenting the lowest dispersion, also shows a clear σ-convergence for all three indicators.[19] The OECD, for example, which has the second-lowest degree of dispersion, registers stable figures and then absence of σ-convergence.

As noted, β- and σ- analyses capture two partially different aspects that, taken together, give a more complete picture and reveal the uniqueness of the euro area, which is the only club that always exhibits signs of convergence (Table 6).

5.2. Second step (tests of zero mean stationarity): The euro area stands out for banking convergence

As illustrated in Section 2.2 and Figure 1, the tests of zero mean stationarity are run with two approaches based on equations (2.1) and (2.2). First, I analyse the individual differentials D_{it}^{j} between each pair of countries belonging to a certain group, including the World club, and therefore between all bilateral pairs: N_T (N_T – 1) / 2 = 2,080 observations. Second, I test the differentials D_{it}^{A} between each country and the common average computed for countries belonging to the same club.

[18] The results of Table 4 also validate my selection of clubs. In fact, if clubs are correctly identified, the value of β should not change when regressions are run with and without the set of conditioning variables.

[19] In my exercises, there are cases in which σ-convergence follows absence of β-convergence. Yet it can be demonstrated, on the contrary, that if there is no β-convergence, there cannot be σ-convergence (e.g. Barro and Sala-i-Martin, 1995). The reason for my seemingly strange result is twofold. First, it depends on my choice of averaging observations over three time intervals. Second, σ-convergence is presented for all three time spans, while for β-convergence one time observation is dropped when regressing the variable on its initial level.

To make the results easier to read, I do not show all these tests. What I present, for both approaches and for each variable, are the percentage shares of convergent differentials on the total number of differentials. Figure 2 (geographical clubs and "other" clubs) and Figure 3 (international organizations) present the results of the first approach (equation 2.1). Figures 4 (geographical clubs and "other" clubs) and Figure 5 (international organizations) present the results of the second approach (equation 2.2).

For example, the G8 presents 28 combinations [$N_T (N_T - 1) / 2 = 8 \times 7/2 = 28$] when I adopt equation (2.1), while it has 8 country-observations when I follow equation (2.2). In the first approach, I found that 12 bilateral pairs of countries were convergent for per capita income, and so Figure 3 reports the percentage share of 42.9 (= 12/28×100). In the second approach, four G8 countries converge to the common G8 per capita income mean, and so Figure 5 reports the percentage share of 50 (= 4/8×100). To facilitate comparison, the results for the euro area and euro-founders are reported in all the figures. The right-scale, labelled as banking convergence, is the sum of the two banking indicators.

This second step basically confirms the results of the β- and σ- analyses. The degree of convergence is different for my three indicators and across the clubs; in particular, it is higher within each group than in the World as a whole.[20] The World club exhibits a generally low share of convergence (as it did not display signs of β- and σ- convergence). Symmetrically, the OECD confirms a good degree of convergence (as it showed β-convergence).

The outcome that also emerges clearly in this second step is the nature of effective convergence clubs of the two euro clubs. In the first approach (Figures 2 and 3), the euro-founders show a higher degree of convergence than all the other clubs. The euro area is outstripped by several clubs as regards per capita GDP and Deposits, while its convergence is high for Loans/GDP. Even more, the second exercise (Figures 4 and 5) confirms that the euro-founders are the most homogeneous club, while the euro area reveals its specificity in banking convergence: although other clubs exceed it for per capita income convergence, the euro area presents a common steady state for Deposits and notably for Loans.

5.3. Third step (parallel convergences): Banking convergence spurs real convergence

The results of the third step of my analysis are shown in Table 7. Briefly, the third step consists in regressing per capita income convergence on banking convergence, which in turn is instrumented in order to deal with endogeneity. The regressors b_i in (3.1) and B_i in (3.2)-(3.3) are

[20] Needless to say, paraphrasing Islam (1995), there is probably little solace to be derived from finding that countries of a club are converging when the points to which they are converging remain very low.

instrumented with two kinds of instrumental variables: four dummies capturing the legal origin of each country and four alternative indexes of banking supervisory practice.[21]

The set of four dummies for legal origin is based on the legal scholars' view that national legal systems present sufficient similarities to be classified into four major families of law: English, French, German and Scandinavian.[22] La Porta et al. (1997) and (1998) asserted that legal traditions were typically introduced into countries through conquest and colonization and, as such, are largely exogenous. The same studies underscored that legal origin affects legal rules and institutions, and thus can be used as an instrument in a two-stage procedure, where the second stage explains financial development. Since then, an abundant literature has taken legal origins as good instrumental variables because, in addition to be exogenous, they have a strong effect on finance and − of greater relevance for my purposes − also on banks.[23]

Despite the wide use of these instruments in the literature, I include a second kind of instrumental variable in my estimations and I carry out several checks (described below) to verify the robustness of my results, as the possible pitfalls of using legal origin as an instrument have been pointed out by La Porta et al. (2008) and Shleifer (2008), the authors who pioneered its use in empirical economics.[24] The second kind of instrumental variable includes four alternative indexes of banking supervisory practice. The four indexes are taken from Barth, Caprio and Levine (2006), and are calculated using a cross-country database on Bank Regulation and Supervision originally kept by the World Bank. For each country they measure respectively: (i)

[21] In addition, I use other instruments as robustness checks (see Section 5.4).

[22] In my exercises the omitted case is the Scandinavian dummy.

[23] See, among others, Rajan and Zingales (1998); Levine (1998 and 1999); Demirgüç-Kunt and Maksimovic (1998); Beck, Levine and Loayza (2000); Levine, Loayza and Beck (2000); Ongena and Smith (2000); Esty and Megginson (2003); Aghion, Howitt and Mayer-Foulkes (2005); Jappelli, Pagano and Bianco (2005); Djankov et al. (2007); Qian and Strahan (2007); Demirgüc-Kunt and Levine (2008); Haselmann, Pistor and Vig (2010). The evidence showing that legal origin affects banking systems' characteristics deserves to be stressed because I use legal origins as instruments for banking convergence. For example, it has been found that legal origins affect the number of banking relationships (Ongena and Smith, 2000), the contours of foreign bank lending (Esty and Megginson, 2003), credit availability (Jappelli, Pagano and Bianco, 2005), private credit (Djankov et al., 2007), and bank lending rates (Qian and Strahan, 2007). Using banking indicators very similar to mine ones, Haselmann, Pistor and Vig (2010) find that they have a positive effect on lending volumes. Aghion, Howitt and Mayer-Foulkes (2005) also measure financial development through indicators very similar to those on which I estimated banking convergence.

[24] There are potentially two problems, one bearing on the channels through which legal origin influences finance, the other on the channels other than finance through which legal origin influences growth. With regard to the first issue, when La Porta et al. (2008) warn that "legal origins influence many spheres of law making and regulation, which makes it dangerous to use them as instruments", they are referring to the fact that it is difficult to identify the channels through which legal origin influences finance, because legal origin influences finance through multiple channels (e.g. laws and regulations, their interpretation, contract enforcement, the judiciary's quality and judicial flexibility). However, "this criticism in no way rejects the significance of legal origins in shaping outcomes [that is in affecting finance]; it speaks only to the difficulty of identifying the channel". In this light, since I do not use legal origins as instruments for specific rules or institutions (because I use them as instruments for my general indicators of banking convergence), the question of the channels through which legal origin influences finance is irrelevant in my exercises. As for the second issue, La Porta et al. (2008), though they admit that legal origins may influence growth through their effect on finance, labour markets and competition, emphasize that "the most obvious potential channel of influence of legal origins on growth is financial development". In any case, I have adopted a prudent approach in my estimations and have added other instruments and several checks.

the restrictiveness of banking supervision, by defining the scope of credit institutions' activities (e.g. if they are allowed to engage in securities business, to sell insurance, the rules for entry, etc.); (ii) the set of general supervisory powers; (iii) supervisory forbearance; and (iv) financial statement transparency. The idea is that these factors have a direct effect on banking systems' characteristics but not on real convergence.

However, these instrumental variables are likely to be correlated or even endogenous to the first one (the set of dummies of legal origin). In fact, Barth, Caprio and Levine (2004) show that cross-country measures of banking regulation vary systematically by legal origin. This could bias my estimations when I use the two instruments simultaneously. To address this issue, in the third step I run three different specifications (Figure 1): the first specification (labelled *a* in Table 7: 1a; 2a; and 3a) includes the two kinds of instrument, the second (labelled *b*) only the legal origins, and the third (labelled *c*) only an index of supervisory practice.[25]

The first part of Table 7 (specifications 1a; 1b; and 1c) reports the results of equation (3.1), where the dependent and independent variables are the results of equation (2.1), respectively, for per capita income and Deposits/GDP.

The second part of Table 7 reports the results of an IV β-analysis of per capita income using as a regressor the interaction term between the initial level of per capita income and two alternative indicators of banking convergence measured on the ratio Loans/GDP.[26] The first indicator of banking convergence (specifications 2a; 2b; and 2c) is a dummy that take the value of one when the country's Loans/GDP ratio is zero-mean stationary with the World average (equation 3.2, which uses the results of equation 2.2). The second indicator of banking convergence (specifications 3a; 3b; and 3c) is the complement to one of the ratio between the standard deviation and its highest value (equations 3.2-3.3, which use the results of equation 1.2). I do not present estimations with other regressors, which, however, are run (Section 5.4), because the results of Table 7 are closer to the concept of absolute β-convergence, and the presence of absolute convergence renders analysis of conditional convergence pointless.

All IV estimations indicate that banking convergence has a significant impact fostering real convergence. The standard statistical tests (reported in the Table 7) signal that my instruments are likely to be weak in the model of equation (3.1).[27] However, the same statistical

[25] In the results of Table 7, the supervisory practice index is the restrictiveness of banking supervision. However, I used alternatively all four indexes in my regressions and the results are equivalent. Instrumenting with the four indexes of banking supervisory practice, there are fewer observations because they are not available for some countries in my dataset.

[26] I show the results obtained running equation (3.1) with the Deposits/GDP ratio and equations (3.2)-(3.3) with the Loans/GDP ratio. However, the results are analogous using Loans in (3.1) and Deposits in (3.2)-(3.3).

[27] In equation (3.1), both the dependent and covariate are not observed variables but proxies resulting from statistical tests, and thus both are subject to measurement errors. This may lead to inconsistency in the inferential procedure.

tests corroborate the validity and strength of my instruments in the models of equations (3.2)-(3.3).[28] Therefore, while Aghion, Howitt and Mayer-Foulkes (2005) found that financial development spurs real convergence, my results suggest that banking convergence also spurs real convergence.

5.4. Robustness checks

The main check of my results on convergence consisted in using several empirical methods. I adopted two different methodologies and two different measures/approaches for each methodology. When the results are consistent across several markedly different econometric methods, they appear robust and reliable. This is precisely the case of the high degree of convergence reached by the euro-area countries and the euro-founders. Moreover, I also performed the following checks.

In the first step, in addition to estimation based on the three spans described in Section 4, I ran a single cross-section regression, following the method of Barro and Sala-i-Martin; and I also tried to change the composition and the length of the three spans. These results were analogous to those of the pooled regression and so they are not reported. As for conditional β-analysis, I ran several specifications by progressively introducing the explanatory variables in order to control for endogeneity; by substituting exports with exchange rates; by dropping each country in turn (since in the literature it is still an open question whether individual country outliers exist). The results remained stable.

For the same reason, in the second step I also dropped each country in turn in the whole sample and in the single clubs. This exercise simultaneously changed both the numerator and the denominator of the shares shown in the Figures 2-5 and left the relative differences among clubs broadly stable.[29] Likewise, relative comparisons across clubs remained stable even applying to

---

However, I decided also to show the results of this model, which are weaker but equivalent to those found in equations (3.2)-(3.3).

[28] In each of the three specifications (a), it was possible to carry out a Sargan test because the number of instruments is greater than the number of endogenous variables. The results of the tests indicate that the sample evidence is consistent with the joint validity of all instruments. In particular, they corroborate the idea that legal origin instruments affect growth only through financial indicators. In fact, if my instruments affected growth through a variable not included in my specifications, then the Sargan test should reject the null, that is to say the validity of instruments. In line with Aghion, Howitt and Mayer-Foulkes (2005), I computed the Sargan test in specifications (b) as well, even if in this case the greaterr number of instruments derives from the use of three dummies, which refer to the different legal origins. The results again corroborate my choice of instruments. Moreover, in all specifications, in order to check the strength of my instruments, I estimated the reduced form of each specification, and I computed the corresponding *F*-statistic. According to the reference value of the *F*-statistic proposed by Staiger and Stock (1997), and Stock and Watson (2003), which is equal to 10, the results of equation (3.1) are liable to be based on weak instruments. However, the results of equations (3.2) and (3.3), specifications 2 and 3, are based on valid and strong instruments.

[29] Since China is mentioned as a counterexample to the general findings on finance and growth (Allen, Qian and Qian, 2005), it is worth underscoring that my results remain stable even when China is dropped.

the differentials D_{it} in equations (2.1) and (2.2) either the ADF or the KPSS tests instead of both of them. The results remained the same even when I dropped observations over time and changed the first or the last sample period.

The results of the third step were checked by: running other models without instrumenting (probit for the first exercise and OLS for the second exercise); dropping countries in turn; measuring alternatively banking convergence with Deposits or Loans; changing again the composition and length of the three time-spans; including my additional explanatory variables in matrix X_{it} and country dummies; and interacting the additional explanatory variables with the initial output.[30] The outcomes always remained stable.

Finally, in addition to the instrumental variables and statistical tests already described in the previous subsection, I verified whether the results of my third step are determined by the choice of the instruments by using three further alternative instruments. The first was obtained interacting the legal origins with initial output instead of using the simple legal origins.[31] As a second alternative instrument, I used the lagged B_i of equation (3.3). As a third alternative instrument, I used the settler mortality (see Acemoglu, Johnson, and Robinson, 2001), interacted or not with initial output.[32] The results were always confirmed.

6. Conclusions

Combining the literature on euro-area banking convergence, real convergence and finance and growth, and comparing banking convergence with convergence of per capita income, I have pursued three goals in this paper. First, I sought to verify whether membership in international organizations and geographical contiguity constitute suitable criteria to select potential

[30] As argued by Aghion, Howitt and Mayer-Foulkes (2005), the addition of other interactions serves both as a test for the robustness of the sign and significance of the relevant coefficient, and as a further test for instruments' validity. In particular, it is interesting to mention the results when I include as a single or interacted regressor the natural logarithm of Loans/GDP (used in the matrix X_{it}. of my equation 1.1, and by Aghion, Howitt and Mayer-Foulkes as a proxy of financial development): (i) it is significantly positive if I include it as a non-interacted regressor and maintain my main interacted regressor (i.e. banking convergence × initial per-capita income); (ii) it is significantly negative if I interact it with the initial output and omit my main interacted regressor (and thus am able to replicate the result of Aghion, Howitt and Mayer-Foulkes); (iii) it is statistically insignificant if I interact it with the initial output and maintain my main interacted regressor (which remains significantly negative). The results are substantially the same even alternating the use of my instruments. Therefore, in my sample, my result on the role of convergence is more robust than Aghion, Howitt and Mayer-Foulkes' result on financial development.

[31] Furthermore, following again Aghion, Howitt and Mayer-Foulkes (2005), I used the interacted instrument (legal origin × initial per-capita income) to model the interaction term (banking convergence × initial per-capita income), and instrumented separately for the banking convergence component with the non-interacted legal origin.

[32] Several scholars considered settler mortality a strong instrument for financial development (e.g. Beck, Demirgüç-Kunt and Levine, 2003). Of course, the variable is not available for non-ex-colonies. In order not to lose observations, I again replicated the methodology of Aghion, Howitt and Mayer-Foulkes (2005), assigning settler mortality of New Zealand (the lowest available value in the dataset) to all non-ex-colonies. Alternatively, I set the settler-mortality of each country equal to the lowest value in the same continent (I again used the New Zealand value for European countries). In both cases I included in the regression a dummy equal to one for non-ex-colonies. the results always supported my outcomes.

convergence clubs around the world; in other words, whether such clubs converge more (and, if so, which ones). Second, I analysed if the convergence club formed by the euro-area countries represents a special case; in other words, if it converges even more than the other international clubs. Third, I tested whether banking convergence favours per capita income convergence.

I reasoned that, since convergence is a relative concept, the comparison between the euro area and the other potential clubs can shed light on the effective degree of convergence reached by countries adopting the euro. Therefore, I split my entire sample of 65 countries in 17 partially overlapping potential convergence clubs, and I juxtaposed their convergence results. To this end, I analysed three indicators (per capita income, Deposits/GDP and Loans/GDP), and applied in the econometric exercises the concepts of β- and σ- convergence, on one hand, and stationarity tests, on the other. I obtained three main findings.

First, convergence changes across the clubs and it is higher within the single groups than in the global sample.

Second, despite some differences among the results of minor clubs, the euro area exhibits convergence according to all methodologies. In particular, euro-area convergence reaches its peak for banking indicators, confirming the expectation that the euro-area banking systems are more homogeneous. The euro-founders – the subset of countries in the euro from the beginning – show higher convergence than the euro area as a whole, signalling that there is room for improved convergence when the last joiners close the gap with the older members.

Third, this paper provides evidence for the first time supporting the hypothesis that the exogenous component of banking convergence favours economic convergence.

Taken together, these results imply that new euro-area entrants have to be chosen carefully because they can jeopardize the convergence that has been achieved by the first joiners. On the other hand, the successful entry of a country into the euro area enhances banking convergence and this in turn seems likely to improve per capita-income convergence.

References

Abiad A., D. Leigh and A. Mody (2007), "International Finance and Income Convergence: Europe is Different," IMF Working Paper.

Acemoglu D., S. Johnson and J.A. Robinson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, XCI, 1369–1401.

Acemoglu D., P. Aghion and F. Zilibotti (2002), "Distance to Frontier, Selection and Economic Growth," NBER Working Paper, 9066, July.

Adam K., T. Jappelli, A. Menichini, M. Padula and M. Pagano (2002), *Analyse, Compare and Apply Alternative Indicators and Monitoring Methodologies to Measure the Evolution of Capital Market Integration in the European Union*, Center for Studies in Economics and Finance (CSEF), Department of Economics and Statistics, University of Salerno.

Affinito M. and F. Farabullini (2009), "Does the Law of One Price Hold in Euro-Area Retail Banking?," *International Journal of Central Banking*, 5-1, 5-37.

Affinito M. and M. Piazza (2009), "What are borders made of? An analysis of barriers to European banking integration," in P. Alessandrini, M. Fratianni and A. Zazzaro (eds.), *The Changing Geography of Banking and Finance*, New York: Springer 2009.

Affinito M., R. De Bonis and F. Farabullini (2006), "Strutture finanziarie e sistemi bancari: differenze e analogie tra i paesi europei," M. De Cecco and G. Nardozzi (eds.), *Banche e finanza nel futuro: Europa, Stati Uniti, Asia*, Bancaria Editrice.

Affinito M. and R. De Bonis (2011), "The Mediterranean Banking Systems: Convergence or Path Dependence?," in J.A. Consiglio, J.C. Martinez Oliva and G. Tortella (eds.), *Banking and Finance in the Mediterranean: A Historical Perspective*, London, Ashgate Publishing Limited.

Aghion P., P. Howitt and D. Mayer-Foulkes (2005) "The Effect of Financial Development on Convergence : Theory and Evidence," *The Quarterly Journal of Economics*, 120-1, 173-222.

Allen F., J. Qian and M. Qian (2005), "Law, Finance, and Economic Growth in China," *Journal of Financial Economics*, 77(1): 57-116.

Allen F., L. Bartiloro and O. Kowalewski (2005), "Does Economic Structure Determine Financial Structure?, mimeo.

Artis M., A. Weber and E. Hennessy (2000) (eds.), *The Euro A Challenge and Opportunity for Financial Markets*, Routledge International Studies in Money and Banking.

Baele L., A. Ferrando, P. Hördahl, E. Krylova and C. Monnet (2004), "Measuring European Financial Integration," *Oxford Review of Economic Policy*, 20-4.

Barro R.J. and X. Sala-i-Martin (1995), *Economic Growth*, Cambridge, MIT Press.

Barro R.J. and X. Sala-i-Martin (1991), "Convergence across States and Regions," *Brooking Papers on Economic Activity*, 1.

Barro R.J. and X. Sala-i-Martin (1992), "Convergence," *Journal of Political Economy*, 100, 223± 51.

Barro R.J. (1997), *Determinants of Economic Growth*, Cambridge, MIT Press.

Barth J.R., G.J. Caprio and R. Levine (2004), "Bank Regulation and Supervision: What Works Best?," *Journal of Financial Intermediation*, 13(2), 205–48.

Barth J.R., G.J. Caprio and R. Levine (2006), *Rethinking Bank Regulation*, Cambridge University Press.

Baumol W.J. (1986), "Productivity Growth, Convergence and Welfare: what the Long-Run Data Show," *American Economic Review*, 76.

Beck T., R. Levine, and N. Loayza (2000), "Finance and the Sources of Growth," *Journal of Financial Economics*, 58(1–2), 261–300.

Beck,T., A. Demirgüç-Kunt, and Ross Levine (2003), "Law, Endowments, and Finance," *Journal of Financial Economics,* 70, 137–181.

Bernard A. and N. S. Durlauf (1995), "Convergence in International Output," *Journal of Applied Econometrics*.

Bernard A. and N.S. Durlauf (1996), "Interpreting Tests of the Convergence Hypothesis," *Journal of Econometrics*, 71.

Bianco, M., Gerali, A. e R. Massaro (1997), "Financial System Across Developed Economies: Convergence or Path Dependence?," *Research in Economics*, 51, 303-331.

Bruno G. and R. De Bonis (2009), "Do Financial Systems Converge ? Evidence on Household Financial Assets in the Main OECD Countries," OECD Statistical Working Paper Series, 1.

Busetti F., L. Forni, A. Harvey and F. Venditti (2007), "Inflation Convergence and Divergence within the European Monetary Union," *International Journal of Central Banking*.

Byrne J. P. and E. P. Davis (2002), "A Comparison of Balance Sheet Structures in Major EU Countries," *National Institute Economic Review*, 180.

Canova F. (2004), "Testing for Convergence Clubs in Income per Capita: a Predictive Density Approach," *International Economic Review*, 45(1), 49–77.

Cellini R. (1997), "Growth Empirics: Evidence from a Panel of Annual Data," *Applied Economics Letters*, 4.

Centeno M. and A.S. Mello (1999), "How Integrated are the Money Market and Bank Loans Market within the European Union?," *Journal of International Money and Finance* 18 (1).

Corrado L., R. Martin and M. Weeks (2005), "Identifying and Interpreting Regional Convergence Clusters across Europe,", *The Economic Journal*, 115, 133-160.

Dahl D., R.E. Shrieves and M.F. Spivey (2006), "Convergence in the Activities of European Banks," mimeo.

Danthine J.P., F. Giavazzi and E.L. von Thadden (2001), "European Financial Markets after EMU: a first Assessment," C. Wyplosz (eds.) *The impact of EMU on Europe and the Developing Countries,* Oxford University Press, Oxford.

De Bandt O. and E.P. Davis (2000), "Competition, Contestability and Market Structure in European Banking Sectors on the Eve of EMU," *Journal of Banking and Finance*, 24.

De Long J.B. (1989), "Productivity Growth, Convergence, and Welfare," *American Economic Review*, LXXM.

Demirgüç-Kunt A. and R. Levine (2008), "Finance, Financial Sector Policies, and Long-Run Growth", *Policy Research Working Paper*, 4469.

Demirgüç-Kunt A. and V. Maksimovic (1998), "Law, Finance, and Firm Growth," *Journal of Finance*, 53, 2107–2137.

Dermine J. (2006), "European Banking Integration: Don't Put the Cart before the Horse," *Journal of Financial Markets, Institutions and Instruments*, 15, 2.

Desdoigts A. (1999), "Patterns of Economic Development and the Formation of Clubs," *Journal of Economic Growth*, vol. 4(3), 305–30.

Di Giacinto V. and L. Esposito (2008), "Convergence of Financial Structures in Europe: an Application of Factorial Matrix Analysis," Proceedings of the conference "Financial Accounts: History, Methods, The Case of Italy and International Comparisons," available at www.bancaditalia.it.

Djankov S., C. McLiesh, and A. Shleifer (2007), "Private Credit in 129 Countries", *Journal of Financial Economics*, 84-2, 299-329.

Durlauf S.N. and P. Johnson (1995), "Multiple Regimes and Cross-Country Growth Behavior," *Journal of Applied Econometrics*, 10(4), 365–84.

Durlauf S.N. and D.T. Quah (1999), "The New Empirics of Economic Growth," in J. Taylor and M. Woodford (eds.), *Handbook of Macroeconomics*, Vol. 1A, Amsterdam, North-Holland.

Esty B.C. and W.L. Megginson (2003), "Creditor Rights, Enforcement, and Debt Ownership Structure: Evidence from the Global Syndicated Loan Market." *Journal of Financial and Quantitative Analysis*, 38(1), 37–59.

ECB (2007), *Financial integration in Europe*, March, Frankfurt.

Evans P. (1996), "Using Cross-Country Variances to Evaluate Growth Theories," *Journal of Economic Dynamics and Control,* 20, 1027–1049.

Evans P. and G. Karras (1996), "Do Economies Converge? Evidence from a Panel of US States," *The Review of Economics and Statistics*, 78.

Galor O. and J. Zeira (1993), "Income Distribution and Macroeconomics," *Review of Economic Studies,* LX, 35–52.

Gaspar V., P. Hartmann and O. Sleijpen (2003) (eds.), *The Transformation of the European Financial System*, European Central Bank, Frankfurt.

Goddard J., P. Molyneux, J.O.S. Wilson, and M. Tavakoli (2007), "European banking: An Overview," *Journal of Banking and Finance*, 31.

Gourinchas P.O. and O. Jeanne (2006), "The Elusive Gains from International Financial Integration," *Review of Economic Studies*, 73-3, 715-741.

Gropp R. and A.K. Kashyap (2009), "A New Metric for Banking Integration in Europe," *NBER Working Paper*, 14735.

Guiso L., T. Jappelli, M. Padula and M. Pagano (2004), "Financial Market Integration and Economic Growth in the EU," *Economic Policy*, 523–577.

Hartmann P., A. Maddaloni, and S. Manganelli (2003), "The Euro Area Financial System: Structure, Integration and Policy Initiatives," *Oxford Review of Economic Policy*, 19, 180–213.

Harvey A.C. (2002), "Trends, Cycles and Convergence," N. Loayza and R. Soto (eds.), *Economic Growth: Sources, Trends and Cycles,* Central Bank of Chile.

Harvey A.C. and V. Carvalho (2002), "Models for Converging Economies," *University of Cambridge – DAE Working Papers*.

Haselmann R., K. Pistor, and V. Vig (2010), "How Law Affects Lending," *Review of Financial Studies*, 23(2), 549-580.

Henry P.B. (2006), "Capital Account Liberalization: Theory, Evidence, and Speculation," *NBER Working Paper*, 12698, Cambridge-Massachusetts.

Hobjin B. and P.H. Franses (2000), "Asymptotically Perfect and Relative Convergence Productivity," *Journal of Applied Econometrics*, 15.

Howitt P. (2000), "Endogenous Growth and Cross-Country Income Differences," *American Economic Review,* XC, 829–846.

Islam N. (1995), "Growth Empirics: a Panel Data Approach," *Quarterly Journal of Economics*, 100.

Islam N. (2003), "What Have we Learnt from the Convergence Debate?," *Journal of Economic Surveys*, 17-3, 309-362.

Jappelli T., M. Pagano, and M. Bianco (2005), "Courts and Banks: Effects of Judicial Enforcement on Credit Markets." *Journal of Money, Credit, and Banking*, 37(2), 223–45.

King R.G. and S. T. Rebelo (1989), "Transitional Dynamics and Economic Growth in the Neoclassical Model," *NBER Working Paper*, 3185, Cambridge-Massachusetts.

King R.G. and R. Levine (1993a), "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics*, 108, 717-738.

King R.G. and R. Levine (1993b), "Finance, Entrepreneurship, and Growth: Theory and Evidence," *Journal of Monetary Economics*, 32, 513-542.

Kleimeier S. and H. Sander (2000), "Regionalisation versus Globalisation in European Financial Market Integration: Evidence from Co-integration Analyses," *Journal of Banking and Finance*, 24.

Kose M.A., E. Prasad, K. Rogoff and S.J. Wei (2006), "Financial Globalization: A Reappraisal," IMF Working Paper, No. 06/189.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52, 1131–1150.

La Porta R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny (1998), "Law and Finance," *Journal of Political Economy*, 106-6.

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer (2008), "The Economic Consequences of Legal Origins," *Journal of Economic Literature*, 46-2, 285–332.

Lane P. R. (2006), "The Real Effects of European Monetary Union," *Journal of Economic Perspectives*, 20-4.

Lee K., M. H. Pesaran and R. Smith (1997), "Growth and Convergence in a Multi-Country Empirical Stochastic Solow Model," *Journal of Applied Econometrics*, 12.

Lee M., R. Longmire, L. Màtyàs and M. Harris (1998), "Growth Convergence: some Panel Data Evidence," *Applied Economics*, 30.

Levin A., C.F. Lin and C.S.J. Chu (2002), "Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties," *Journal of Econometrics*, 108.

Levine R. (1998), "The Legal Environment, Banks, and Long-Run Economic Growth," *Journal of Money, Credit, and Banking*, 30, 596-613

Levine R. (1999), "Law, Finance, and Economic Growth," *Journal of Financial Intermediation*, 8, 36-67.

Levine R. (2003), "More on Finance and Growth: More Finance, More Growth?," The Federal Reserve Bank of St. Louis, July-August.

Levine R. and S. Zervos (1998), "Stock Markets, Banks, and Economic Growth," *American Economic Review*, 88, 537–558.

Levine R., N. Loayza and T. Beck (2000), "Financial Intermediation and Growth: Causality and Causes," *Journal of Monetary Economics,* 66, 31–77.

Lucas R. (1990), "Why Doesn't Capital Flow from Rich to Poor Countries?," *American Economic Review*, 80-2, 92-6.

Maddison A. (2001), *The World Economy: A Millennial Perspective*, Paris, France: OECD.

Mankiw N.G., D. Romer and D.N. Weil (1992), "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics,* CVII, 407–437.

Murinde V., J. Agung and A. Mullineux (2004), "Patterns of Corporate Financing and Financial System Convergence in Europe," *Review of International Economics*, 12(4).

Obstfeld M. (1994), "Risk-Taking, Global Diversification, and Growth," *American Economic Review*, 84-5, 1310-1329.

Ongena S. and D.C. Smith (2000), "What Determines the Number of Bank Relationships? Cross-Country Evidence." *Journal of Financial Intermediation*, 9(1), 26–56.

Parente S.L. and E.C. Prescott (1994), "Technology Adoption and Growth," *Journal of Political Economy,* CII, 298–321.

Pesaran M.H (2007), "A Pair-Wise Approach to Testing for Output and Growth Convergence," *Journal of Econometrics*, 138, 312–355.

Prasad E., R. Rajan and A. Subramanian (2006), "Patterns of International Capital Flows and their Implications for Economic Development," mimeo.

Pritchett L. (1997), "Divergence, Big-Time," *Journal of Economic Perspectives,* 11, 3–17.

Qian J. and P.E. Strahan (2007), "How Laws and Institutions Shape Financial Contracts: The Case of Bank Loans." *Journal of Finance*, 62(6), 2803–34.

Quah, D.T. (1993), Galton's Fallacy and Tests of the Convergence Hypothesis, *Scandinavian Journal of Economics*, 95, 427-443.

Quah, D.T. (1996a), "Empirics for Economic Growth and Convergence," *European Economic Review*, 40.
Quah, D.T. (1996b), "Regional Convergence Clusters across Europe," *European Economic Review*, 40.
Rajan R.G. and L. Zingales (1998), "Financial Dependence and Growth." *American Economic Review* 88, 559–586.
Rajan R.G. and L. Zingales (2003), "Banks and Markets: the Changing Character of European Finance", NBER Working Paper Series, 9595.
Rebelo S. (1991), "Long-Run Policy Analysis and Long-Run Growth," *Journal of Political Economy*, XCIX.
Romer P. (1989), "Capital Accumulation in the Theory of Long-Run Growth," *Modern Business Cycle Theory*, Robert J. Barro, ed. Cambridge, MA: Harvard University Press.
Romer P. (1994), "Origins of Endogenous Growth," *Journal of Economic Perspectives*, 8, 3–22.
Sala-i-Martin X. (1996), "Regional Cohesion: Evidence and Theories of Regional Growth and Convergence," *European Economic Review*, 40.
Schmidt, R.H., E. Hackethal and M. Tyrell (2001), "The Convergence of Financial Systems in Europe," J.W. Goethe Universität, Frankfurt Am Mein, *Working Papers: Finance and Accounts*, 75.
Shan J.Z., A.G. Morris and F. Sun (2001), "Financial Development and Economic Growth: an Egg-and-Chicken Problem?," *Review of International Economics*, 9.
Shleifer A. (2008), *Legal Foundations of Corporate Governance and Market Regulation*, Baffi Lecture 2007, Banca d'Italia.
Sørensen C.K. and J.M. Gutierrez (2006), "Euro Area Banking Sector Integration: Using Hierarchical Cluster Analysis Techniques," ECB working paper, 627.
Staiger D. and J.H. Stock (1997), "Instrumental Variables Regression with Weak Instruments", *Econometrica*, 65.
Stock J.H. and M.W. Watson (2003), *Introduction to Econometrics*, Addison-Wesley, Boston.
Temple J. (1999), "The New Growth Evidence," *Journal of Economic Literature*, 37, 112–156.
Tsionas E. G. (2000), "Real Convergence in Europe: how Robust are Econometric Inferences?," *Applied Economics*, 32.

Tables and figures

Figure 1. Summary of methodology

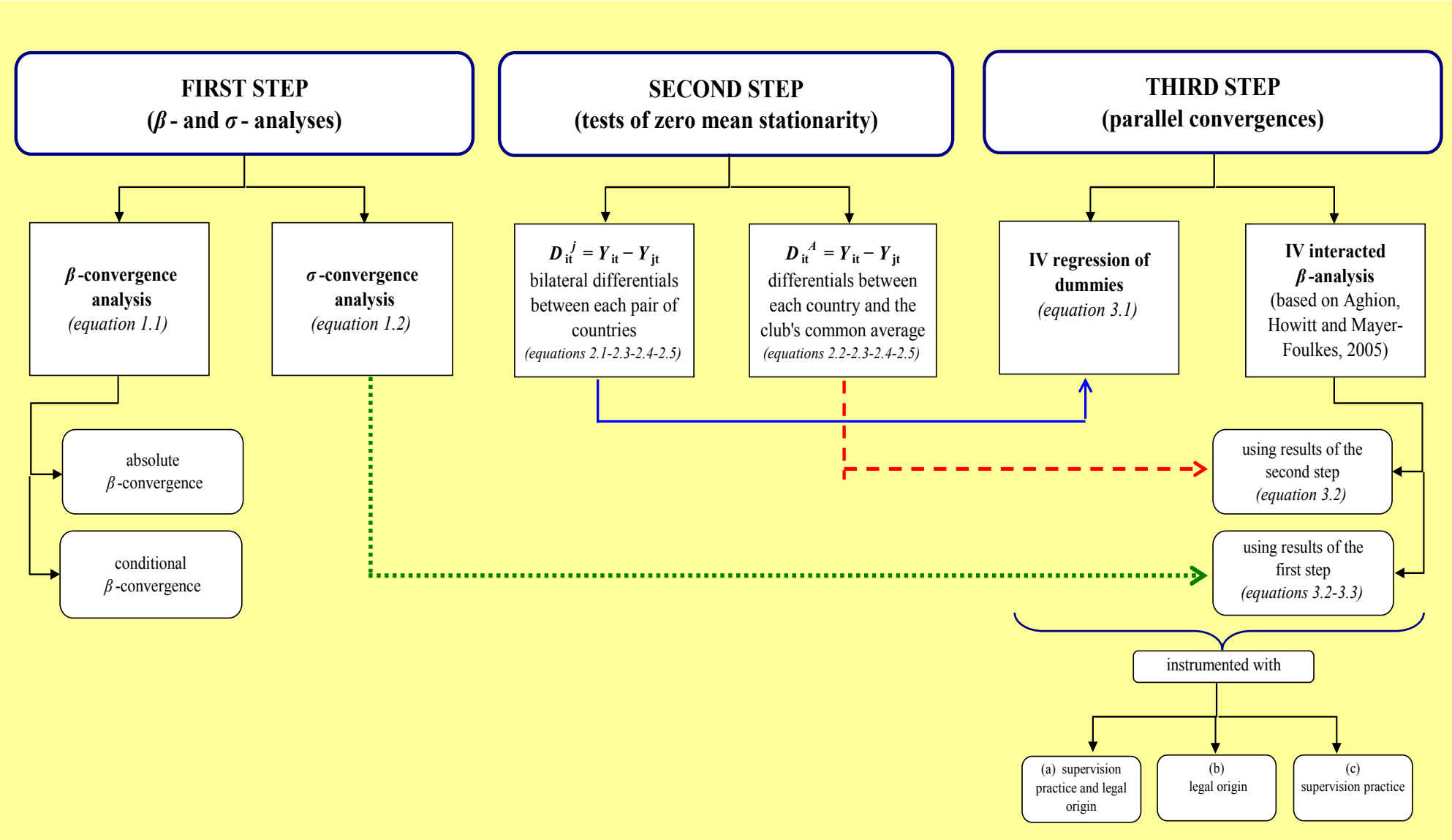

Table 1– Countries in the dataset and their classification in potential geographical clubs

Countries in dataset ("World" club)	Europe	America	Africa	Asia
Albania	Albania			
Algeria			Algeria	
Australia				
Austria	Austria			
Bahrain				Bahrain
Brazil		Brazil		
Belgium	Belgium			
Bulgaria	Bulgaria			
Canada		Canada		
China				China
Croatia	Croatia			
Cyprus	Cyprus			
Czech Republic	Czech Republic			
Denmark	Denmark			
Egypt			Egypt	
Estonia	Estonia			
Finland	Finland			
France	France			
Gabon			Gabon	
Georgia	Georgia			
Germany	Germany			
Greece	Greece			
Hungary	Hungary			
India				India
Indonesia				Indonesia
Iran				Iran
Ireland	Ireland			
Israel				Israel
Italy	Italy			
Japan				Japan
Jordan				Jordan
Kuwait				Kuwait
Latvia	Latvia			
Lebanon				Lebanon
Lithuania	Lithuania			
Macedonia	Macedonia			
Malta	Malta			
Mauritania			Mauritania	
Mexico		Mexico		
Morocco			Morocco	
Netherlands	Netherlands			
New Zealand				
Nigeria			Nigeria	
Norway	Norway			
Oman				Oman
Poland	Poland			
Portugal	Portugal			
Qatar				Qatar
Romania	Romania			
Russia	Russia			
Slovakia	Slovakia			
Slovenia	Slovenia			
South Korea				South Korea
Spain	Spain			
Sweden	Sweden			
Switzerand	Switzerand			
Syria				Syria
Tunisia			Tunisia	
Turkey	Turkey			
Ukraine	Ukraine			
United Arab Emirates				U. A. Emirates
United Kingdom	U. Kingdom			
United States		United States		
Venezuela		Venezuela		
Yemen				Yemen
Number of countries in the dataset for each club	**35**	**5**	**7**	**16**
Total number of countries in each club	**44**	**27**	**54**	**50**

Table 2 – Countries in the dataset and their classification in potential clubs for international organizations and other clubs

Countries in dataset ("World" club)	Euro		International organizations' clubs							Other clubs		
	Euro area	Euro area founders	European Union - 27	OECD	G8	G20	NAFTA	OPEC	Arab League	BRIC	CEEC	Former socialists
Albania											Albania	Albania
Algeria								Algeria	Algeria			
Australia				Australia		Australia						
Austria	Austria	Austria	Austria	Austria								
Bahrain									Bahrain			
Brazil						Brazil				Brazil		
Belgium	Belgium	Belgium	Belgium	Belgium								
Bulgaria			Bulgaria								Bulgaria	Bulgaria
Canada				Canada	Canada	Canada	Canada					
China						China				China		
Croatia											Croatia	Croatia
Cyprus	Cyprus		Cyprus									
Czech Republic			Czech Rep.	Czech Rep.							Czech Rep.	Czech Rep.
Denmark			Denmark	Denmark								
Egypt									Egypt			
Estonia			Estonia								Estonia	Estonia
Finland	Finland	Finland	Finland	Finland								
France	France	France	France	France	France	France						
Gabon								Gabon				
Georgia												Georgia
Germany	Germany	Germany	Germany	Germany	Germany	Germany						
Greece	Greece		Greece	Greece								
Hungary			Hungary	Hungary							Hungary	Hungary
India						India				India		
Indonesia						Indonesia		Indonesia				
Iran								Iran				
Ireland	Ireland	Ireland	Ireland	Ireland								
Israel												
Italy	Italy	Italy	Italy	Italy	Italy	Italy						
Japan				Japan	Japan	Japan						
Jordan									Jordan			
Kuwait								Kuwait	Kuwait			
Latvia			Latvia								Latvia	Latvia
Lebanon									Lebanon			
Lithuania			Lithuania								Lithuania	Lithuania
Macedonia											Macedonia	Macedonia
Malta	Malta		Malta									
Mauritania									Mauritania			
Mexico				Mexico		Mexico	Mexico					
Morocco									Morocco			
Netherlands	Netherlands	Netherlands	Netherlands	Netherlands								
New Zealand				New Zealand								
Nigeria								Nigeria				
Norway				Norway								
Oman									Oman			
Poland			Poland	Poland							Poland	Poland
Portugal	Portugal	Portugal	Portugal	Portugal								
Qatar								Qatar	Qatar			
Romania			Romania								Romania	Romania
Russia					Russia	Russia				Russia		Russia
Slovakia	Slovakia		Slovakia								Slovakia	Slovakia
Slovenia	Slovenia		Slovenia									Slovenia
South Korea				South Korea		South Korea						
Spain	Spain	Spain	Spain	Spain								
Sweden			Sweden	Sweden								
Switzerand				Switzerand								
Syria									Syria			
Tunisia									Tunisia			
Turkey				Turkey		Turkey					Turkey	
Ukraine												Ukraine
United Arab Emirates								U. A. Emirates	U. A. Emirates			
United Kingdom			U. Kingdom	U. Kingdom	U. Kingdom	U. Kingdom						
United States				United States	United States	United States	United States					
Venezuela								Venezuela				
Yemen									Yemen			
Number of countries in the dataset for each club	**15**	**10**	**26**	**27**	**8**	**16**	**3**	**9**	**14**	**4**	**13**	**16**
Total number of countries in each club	**16**	**11**	**27**	**29**	**8**	**19**	**3**	**13**	**22**	**4**	**13**	chenging
	Missing countries in the dataset											
	Luxembourg	Luxembourg	Luxembourg	Island		Argentina		Ecuador	Comoro			
				Luxembourg		South Africa		Iraq	Djibouti			
						Saudi Arabia		Libya	Iraq			
								South Arabia	Libya			
									Palestine & Gaza			
									Somalia			
									South Arabia			
									Sudan			

Table 3
Descriptive statistics for the 17 potential clubs in the dataset

Kind of club	Period	Per-capita income	Deposits/GDP	Loans/GDP
Euro	**Euro-area**			
	Observations	604	569	596
	Mean	12.13	0.65	0.67
	Std. Dev.	10.98	0.23	0.32
	Min	0.38	0.16	0.13
	Max	66.57	1.42	1.98
	Euro-founders			
	Observations	440	405	432
	Mean	13.93	0.64	0.72
	Std. Dev.	11.81	0.20	0.31
	Min	0.38	0.20	0.13
	Max	66.57	1.22	1.98
Geographical contiguity	**World**			
	Observations	2,355	2,256	2,287
	Mean	9.21	0.50	0.49
	Std. Dev.	11.41	0.35	0.37
	Min	0.00	0.00	0.00
	Max	92.58	3.05	2.02
	Europe			
	Observations	1,129	1,056	1,083
	Mean	11.41	0.58	0.59
	Std. Dev.	12.42	0.34	0.38
	Min	0.15	0.00	0.00
	Max	92.58	3.05	2.02
	America			
	Observations	220	220	220
	Mean	10.03	0.44	0.40
	Std. Dev.	10.86	0.28	0.27
	Min	0.43	0.08	0.08
	Max	48.12	1.60	1.39
	Africa			
	Observations	308	306	308
	Mean	1.36	0.27	0.26
	Std. Dev.	1.54	0.20	0.17
	Min	0.06	0.02	0.03
	Max	8.11	0.85	0.69
	Asia			
	Observations	610	586	588
	Mean	8.27	0.50	0.46
	Std. Dev.	10.81	0.40	0.40
	Min	0.00	0.00	0.00
	Max	64.53	2.33	2.00
International organizations	**EU-27**			
	Observations	929	860	887
	Mean	11.26	0.60	0.61
	Std. Dev.	11.27	0.32	0.35
	Min	0.38	0.11	0.02
	Max	66.57	3.05	2.02
	OECD			
	Observations	1,114	1,067	1,094
	Mean	13.78	0.63	0.65
	Std. Dev.	12.98	0.37	0.40
	Min	0.11	0.06	0.02
	Max	92.58	3.05	2.02

Kind of club	Period	Per-capita income	Deposits/GDP	Loans/GDP
International organizations	**G8**			
	Observations	324	323	323
	Mean	15.55	0.82	0.77
	Std. Dev.	12.05	0.52	0.39
	Min	0.31	0.13	0.08
	Max	48.12	3.05	2.00
	G20			
	Observations	636	615	615
	Mean	10.28	0.60	0.59
	Std. Dev.	11.38	0.46	0.39
	Min	0.00	0.06	0.08
	Max	48.43	3.05	2.00
	NAFTA			
	Observations	132	132	132
	Mean	13.02	0.55	0.48
	Std. Dev.	12.18	0.30	0.27
	Min	0.43	0.08	0.11
	Max	48.12	1.60	1.39
	OPEC			
	Observations	383	367	369
	Mean	8.01	0.32	0.26
	Std. Dev.	11.26	0.22	0.19
	Min	0.03	0.02	0.03
	Max	64.53	1.78	1.39
	Arab League			
	Observations	539	535	537
	Mean	6.65	0.39	0.34
	Std. Dev.	10.04	0.24	0.28
	Min	0.12	0.02	0.01
	Max	64.53	1.78	1.90
Other	**BRIC**			
	Observations	134	126	126
	Mean	3.13	0.32	0.41
	Std. Dev.	5.82	0.18	0.33
	Min	0.00	0.10	0.08
	Max	29.12	1.15	1.36
	CEEC			
	Observations	275	239	239
	Mean	3.79	0.34	0.33
	Std. Dev.	3.18	0.16	0.20
	Min	0.15	0.06	0.02
	Max	19.17	0.73	0.94
	Former socialists			
	Observations	316	278	278
	Mean	3.97	0.31	0.31
	Std. Dev.	3.82	0.17	0.21
	Min	0.15	0.00	0.00
	Max	22.82	0.73	0.94

Table 4
First step: β-convergence analysis (equation 1.1)

	Per-capita income		Deposits/GDP		Loans/GDP	
	absolute β-convergence	conditional β-convergence	absolute β-convergence	conditional β-convergence	absolute β-convergence	conditional β-convergence
Euro-area						
initial level of dependent variable	-0.016 ***	-0.024 **	-0.016	-0.058	-0.024	-0.092 **
	0.004	*0.012*	*0.013*	*0.045*	*0.016*	*0.040*
Inflation rate (r-1)		0.000		-0.001		-0.005 ***
		0.002		*0.002*		*0.002*
Exports/GDP (r-1)		0.133		-0.273		-0.592 ***
		0.140		*0.236*		*0.208*
Ln(Loans/GDP) (r-1)		0.044 *				
		0.027				
GDP growth rate (r-1)				-0.481 *		-0.725 **
				0.289		*0.346*
Country-by country dummies	no	yes	no	yes	no	yes
constant	0.089 ***	0.093 **	0.009	0.132	0.013	0.261 ***
	0.007	*0.038*	*0.010*	*0.077*	*0.013*	*0.068*
Number of observations	27	25	25	24	27	24
World						
initial level of dependent variable	-0.001	-0.013 *	-0.006	-0.011	-0.006	0.005
	0.002	*0.007*	*0.004*	*0.016*	*0.006*	*0.029*
Inflation rate (r-1)		0.000		0.000		0.000
		0.000		*0.000*		*0.000*
Exports/GDP (r-1)		-0.017 **		0.044		0.024 *
		0.008		*0.084*		*0.013*
Ln(Loans/GDP) (r-1)		0.032				
		0.021				
GDP growth rate (r-1)				-0.039		-0.206
				0.089		*0.166*
Country-by country dummies	no	yes	no	yes	no	yes
constant	0.060 ***	0.125 ***	0.015 ***	-0.022	0.019 ***	-0.102
	0.004	*0.044*	*0.005*	*0.042*	*0.007*	*0.101*
Number of observations	105	89	96	81	98	88
Europe						
initial level of dependent variable	-0.014 ***	-0.022 *	-0.012	-0.059	-0.022 **	-0.107 ***
	0.003	*0.012*	*0.009*	*0.062*	*0.010*	*0.034*
Inflation rate (r-1)		-0.001		-0.001		-0.005 ***
		0.002		*0.003*		*0.002*
Exports/GDP (r-1)		0.143		-0.248		-0.531 ***
		0.144		*0.372*		*0.189*
Ln(Loans/GDP) (r-1)		0.040 *				
		0.025				
GDP growth rate (r-1)				-0.320		-0.699 **
				0.391		*0.279*
Country-by country dummies	no	yes	no	yes	no	yes
constant	0.088 ***	0.147	0.009	0.118	0.014	0.343 **
	0.004	*0.206*	*0.007*	*0.136*	*0.009*	*0.151*
Number of observations	47	40	40	37	42	39
EU-27						
initial level of dependent variable	-0.015 ***	-0.023 **	-0.013	-0.053	-0.024 *	-0.118 ***
	0.004	*0.011*	*0.011*	*0.039*	*0.012*	*0.025*
Inflation rate (r-1)		0.000		-0.001		-0.005 ***
		0.002		*0.002*		*0.001*
Exports/GDP (r-1)		0.147		-0.254		-0.613 ***
		0.124		*0.238*		*0.138*
Ln(Loans/GDP) (r-1)		0.040 *				
		0.021				
GDP growth rate (r-1)				-0.377		-0.949 ***
				0.273		*0.225*
Country-by country dummies	no	yes	no	yes	no	yes
constant	0.089 ***	0.192 *	0.008	0.364	0.013	0.300 ***
	0.006	*0.109*	*0.008*	*0.241*	*0.011*	*0.095*
Number of observations	39	35	35	33	37	34
OECD						
initial level of dependent variable	-0.013 ***	-0.042 ***	-0.007	-0.050	-0.023 ***	-0.082 *
	0.003	*0.012*	*0.007*	*0.034*	*0.008*	*0.044*
Inflation rate (r-1)		-0.003 *		0.000		-0.006 *
		0.002		*0.001*		*0.003*
Exports/GDP (r-1)		0.297 *		-0.004		0.418
		0.172		*0.256*		*0.307*
Ln(Loans/GDP) (r-1)		0.047 **				
		0.021				
GDP growth rate (r-1)				-0.245		0.051
				0.223		*0.369*
Country-by country dummies	no	yes	no	yes	no	yes
constant	0.084 ***	0.314 **	0.012 *	0.020	0.012	-0.189
	0.005	*0.115*	*0.006*	*0.081*	*0.008*	*0.118*
Number of observations	50	46	47	45	49	45

Table reports regression coefficients and associated standard errors in italics. ***, **, and * denote statistical significance at 1, 5 and 10 % level, respectively.

Table 5
First step:
σ-convergence analysis (equation 1.2)

Kind of club	Period	Per-capita income	Deposits/GDP	Loans/GDP
Euro	**Euro-area**			
	r_1 = 1964-1978	0.53	0.40	0.44
	r_2 = 1979-1992	0.52	0.30	0.34
	r_3 = 1993-2007	0.50	0.29	0.37
	Euro-founders			
	r_1 = 1964-1978	0.46	0.30	0.43
	r_2 = 1979-1992	0.44	0.23	0.30
	r_3 = 1993-2007	0.26	0.21	0.21
Geographical contiguity	**World**			
	r_1 = 1964-1978	1.64	0.68	0.62
	r_2 = 1979-1992	1.59	0.54	0.70
	r_3 = 1993-2007	1.37	0.73	0.88
	Europe			
	r_1 = 1964-1978	0.59	0.40	0.46
	r_2 = 1979-1992	1.38	0.41	0.59
	r_3 = 1993-2007	1.20	0.76	0.82
	America			
	r_1 = 1964-1978	0.75	0.50	0.37
	r_2 = 1979-1992	0.85	0.47	0.53
	r_3 = 1993-2007	0.84	0.62	0.75
	Africa			
	r_1 = 1964-1978	0.70	0.60	0.41
	r_2 = 1979-1992	0.90	0.55	0.44
	r_3 = 1993-2007	1.00	0.85	0.89
	Asia			
	r_1 = 1964-1978	2.50	0.58	0.64
	r_2 = 1979-1992	2.01	0.55	0.87
	r_3 = 1993-2007	1.44	0.50	0.85
International organizations	**EU-27**			
	r_1 = 1964-1978	0.57	0.39	0.42
	r_2 = 1979-1992	0.77	0.38	0.54
	r_3 = 1993-2007	0.92	0.55	0.61
	OECD			
	r_1 = 1964-1978	0.70	0.45	0.54
	r_2 = 1979-1992	0.79	0.47	0.63
	r_3 = 1993-2007	0.72	0.47	0.55

Kind of club	Period	Per-capita income	Deposits/GDP	Loans/GDP
International organizations	**G8**			
	r_1 = 1964-1978	0.33	0.32	0.46
	r_2 = 1979-1992	1.27	0.35	0.33
	r_3 = 1993-2007	0.83	0.72	0.66
	G20			
	r_1 = 1964-1978	2.39	0.57	0.57
	r_2 = 1979-1992	2.13	0.59	0.61
	r_3 = 1993-2007	1.46	0.61	0.69
	NAFTA			
	r_1 = 1964-1978	0.89	0.39	0.27
	r_2 = 1979-1992	0.96	0.55	0.64
	r_3 = 1993-2007	0.83	0.59	0.67
	OPEC			
	r_1 = 1964-1978	1.71	0.55	0.28
	r_2 = 1979-1992	1.45	0.56	0.40
	r_3 = 1993-2007	1.56	0.74	0.80
	Arab League			
	r_1 = 1964-1978	1.54	0.50	0.45
	r_2 = 1979-1992	1.22	0.43	0.75
	r_3 = 1993-2007	1.31	0.55	0.87
Other	**BRIC**			
	r_1 = 1964-1978	3.24	0.05	0.24
	r_2 = 1979-1992	2.14	0.13	0.46
	r_3 = 1993-2007	1.30	0.40	0.68
	CEEC			
	r_1 = 1964-1978	0.22	n.a.	n.a.
	r_2 = 1979-1992	0.99	0.37	0.84
	r_3 = 1993-2007	0.52	0.50	0.49
	Former socialists			
	r_1 = 1964-1978	0.22	n.a.	n.a.
	r_2 = 1979-1992	1.27	0.34	0.81
	r_3 = 1993-2007	0.76	0.63	0.58

Table 6
First step: summary of results (equations 1.1 and 1.2)

Kind of club	Club	Per capita GDP			Deposits/GDP			Loans/GDP		
		absolute β-convergence	conditional β-convergence	σ-convergence	absolute β-convergence	conditional β-convergence	σ-convergence	absolute β-convergence	conditional β-convergence	σ-convergence
Euro	Euro area	yes	Yes	yes	No	no	yes	no	yes	yes
	Euro-founders	yes	Yes	yes	No	yes	yes	no	yes	yes
Geographical contiguity	World	no	Yes	yes	No	no	no	no	no	no
	Europe	yes	Yes	no	No	no	no	yes	yes	no
	Asia	yes	Yes	yes	No	no	yes	no	no	no
International organizations	EU-27	yes	Yes	no	No	no	no	yes	yes	no
	OECD	yes	Yes	no	No	no	no	yes	yes	no
	G20	yes	Yes	yes	No	no	no	no	no	no
	OPEC	no	No	yes	No	yes	no	no	no	no
	Arab League	no	No	yes	No	no	no	no	no	no

In order to improve the comparisons, Table 6 also summarizes the results of β-analysis for some clubs (the euro-founders, Asia, the G20, OPEC and the Arab League) not detailed in Table 4 because of sample size problems. In any case, their results are mostly confirmed by the second step of my analysis.

Figure 2
Second step - first approach (equation 2.1)
Tests of differences of each country with every other country in the club
(percentage shares of statistically similar bilateral differences in each club)
Outline by geographical clubs and "other" clubs

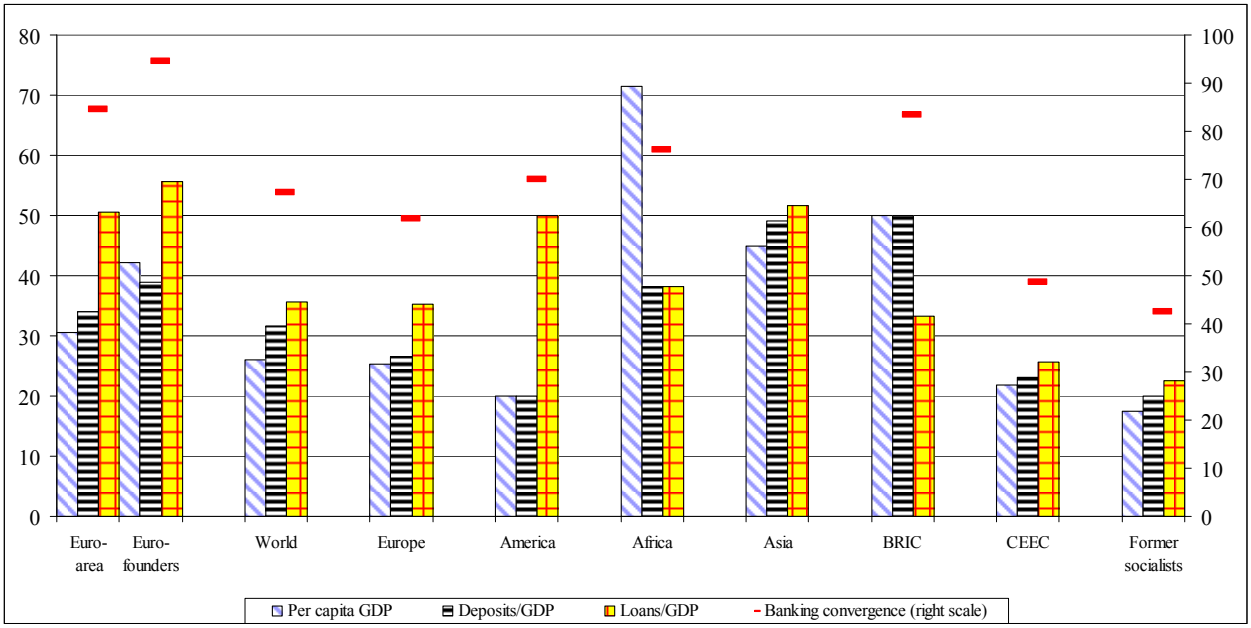

Figure 3
Second step - first approach (equation 2.1)
Tests of differences of each country with every other country in the club
(percentage shares of statistically similar bilateral differences in each club)
Outline by international organization clubs

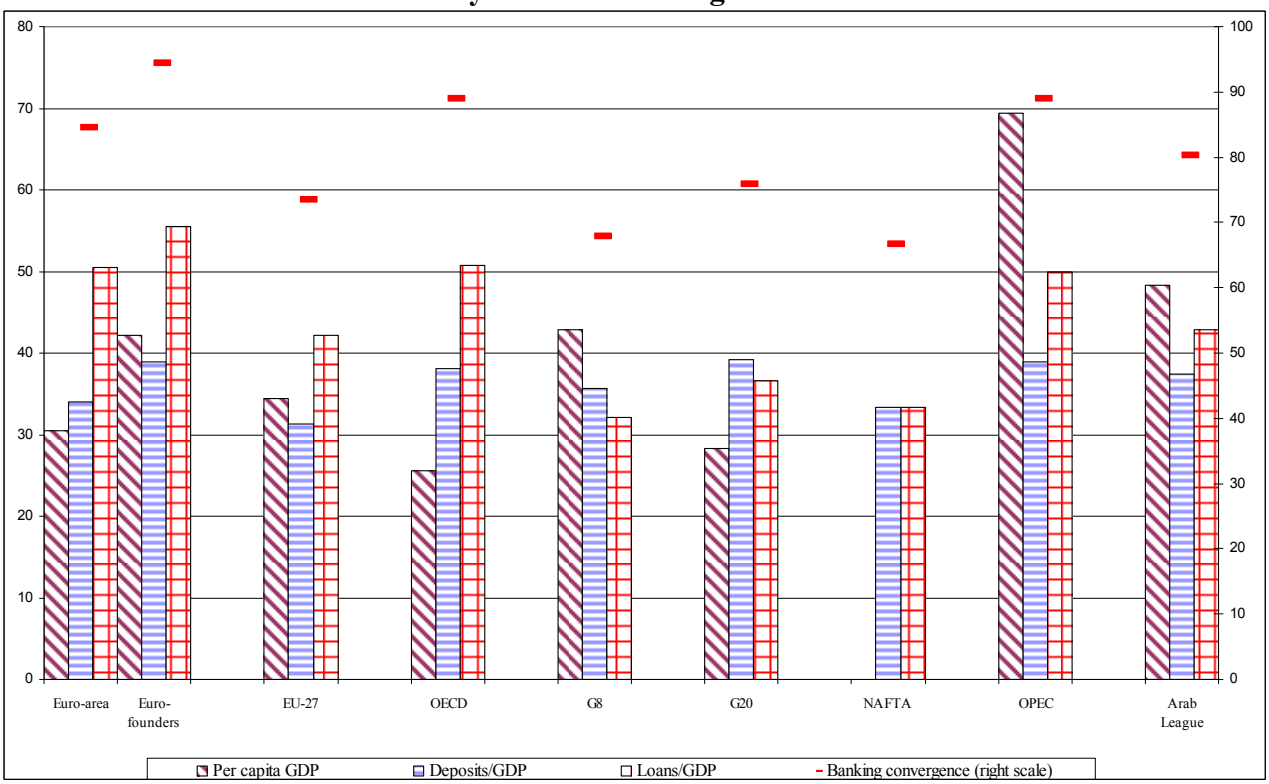

Figure 4
Second step - second approach (equation 2.2)
Tests of differences of each country with the mean of the club
(percentage shares of statistically similar differences in each club)
Outline by geographical clubs and other clubs

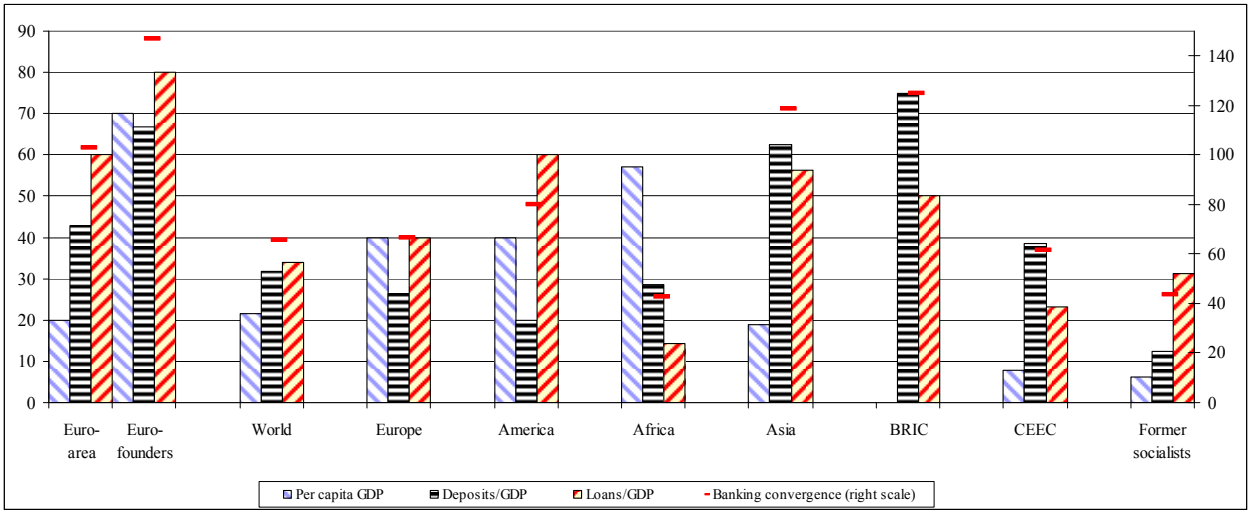

Figure 5
Second step - second approach (equation 2.2)
Tests of differences of each country with the mean of the club
(percentage shares of statistically similar differences in each club)
Outline by international organization clubs

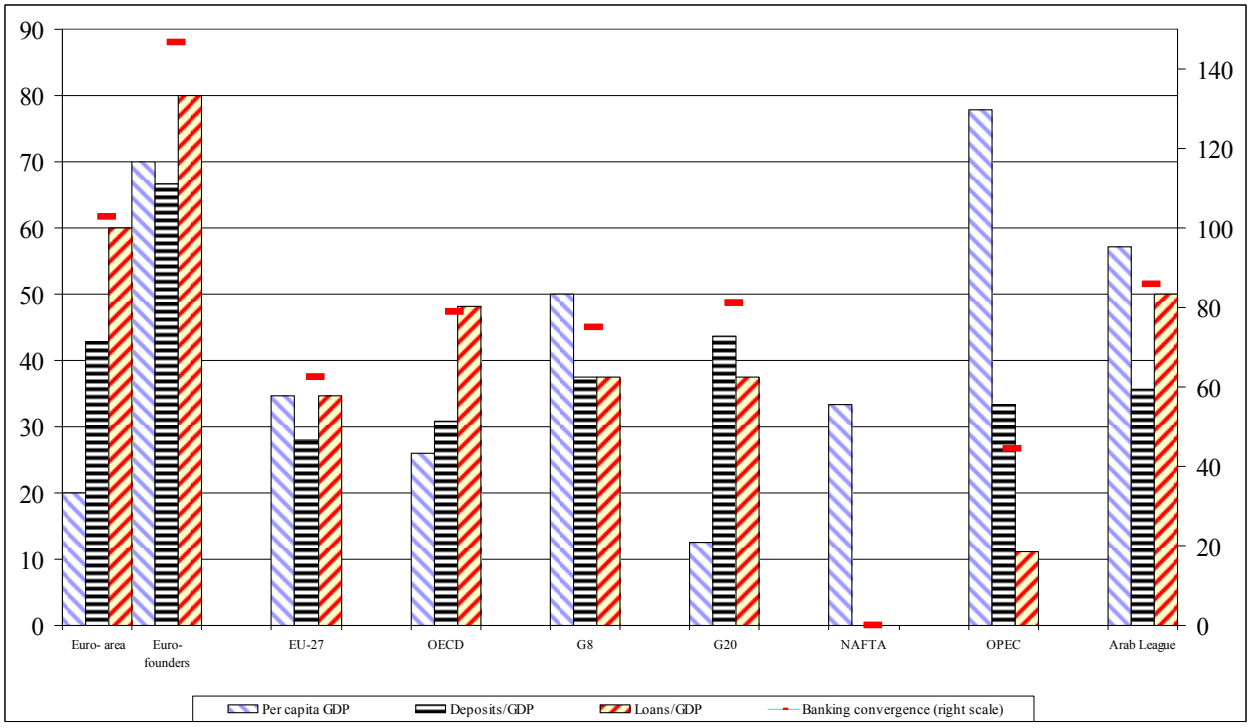

Table 7
Third step – parallel convergences: banking convergence spurs real convergence

Dependent variable →	Equation 3.1			Equation 3.2			Equations 3.2-3.3		
	Stationary per-capita income (results of equation 2.3)			Average growth rate of per-capita income			Average growth rate of per-capita income		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Stationary Deposits/GDP (bilateral differentials approach)	5.164 ***	2.233 **	7.825 **						
	1.716	*1.118*	*3.205*						
Interaction: initial level of per-capita income × stationary Loans/GDP (differentials from the mean of the World club, results of equation 2.2)				-0.023 ***	-0.021 ***	-0.027 ***			
				0.008	*0.008*	*0.008*			
Interaction: initial level of per-capita income × covergent Loans/GDP (far from standard deviation of the World club, based on equation 1.2 and 3.3)							-0.176 ***	-0.169 ***	-0.179 ***
							0.037	*0.039*	*0.038*
Constant	-1.397 **	-0.414	-2.256 **	0.077 ***	0.072 ***	0.079 ***	0.072 ***	0.067 ***	0.072 ***
	0.557	*0.340*	*1.038*	*0.006*	*0.006*	*0.007*	*0.005*	*0.005*	*0.005*
Sargan test: *Chi-sq* -statistic	1.769	1.173		3.141	1.716		2.962	2.057	
F -statistic of reduced form	3.26	6.33	5.96	19.69	21.31	33.30	14.50	20.32	55.45
Number of observations	1,711	2,278	1,711	96	105	96	96	105	96

Table reports regression coefficients and associated standard errors in italics. In model (1), the dependent variable and the regressor are dummies assuming value one when the bilateral differentials of, respectively, per-capita income and the Deposits/GDP ratio, between a pair of countries are zero-mean stationary (results of equation 2.1). Models (2) and (3) are IV absolute β-convergence estimations. The dependent variable is the average growth rate of per-capita GDP, and the key regressor is the interaction-term between the initial level of per-capita income and a proxy of banking convergence (measured on the ratio Loans/GDP). The components of the interaction-term are included, but not reported. In model (2), the proxy of banking convergence is a dummy assuming value one when the country converges to the average of my entire sample (equation 2.2). In model (3), the proxy of banking convergence is the complement to one of the World standard deviation. In order to take account of possible endogeneity problems, in all cases regressions are ran by IV estimations, instrumenting for banking convergence, with: in specifications (a), both an index of supervisory practice and the legal origin of each country; in specifications (b), only the legal origins; and in specifications (c), only the index of supervisory practice. The index of supervisory practice is not available for some countries in my dataset. Table reports also the χ^2-statistic of the Sargan test for specifications (a) and (b), where it is applicable; and the *F*-statistics of the reduced forms of each specification. ***, ** denote statistical significance at 1% and 5% level, respectively.

RECENTLY PUBLISHED "TEMI" (*)

N. 788 – *FaMIDAS: a mixed frequency factor model with MIDAS structure*, by Cecilia Frale and Libero Monteforte (January 2011).

N. 789 – *Policies for local development: an evaluation of Italy's "Patti Territoriali"*, by Antonio Accetturo and Guido de Blasio (January 2011).

N. 790 – *Testing for east-west contagion in the European banking sector during the financial crisis*, by Emidio Cocozza and Paolo Piselli (February 2011).

N. 791 – *Are incentives for R&D effective? Evidence from a regression discontinuity approach*, by Raffaello Bronzini and Eleonora Iachini (February 2011).

N. 792 – *Evaluating the impact of innovation incentives: evidence from an unexpected shortage of funds*, by Guido de Blasio, Davide Fantino and Guido Pellegrini (February 2011).

N. 793 – *Credit availability and investment in Italy: lessons from the "Great Recession"*, by Eugenio Gaiotti (February 2011).

N. 794 – *Bridging the gap between migrants and the banking system*, by Giorgio Albareto and Paolo Emilio Mistrulli (February 2011).

N. 795 – *I fondi comuni aperti in Italia: performance delle società di gestione del risparmio*, by Michele Leonardo Bianchi and Maria Grazia Miele (February 2011).

N. 796 – *Securitization is not that evil after all*, by Ugo Albertazzi, Ginette Eramo, Leonardo Gambacorta and Carmelo Salleo (February 2011).

N. 797 – *Reserve management and sovereign debt cost in a world with liquidity crises*, by Flavia Corneli and Emanuele Tarantino (March 2011).

N. 798 – *Managerial incentives, financial constraints and ownership concentration*, by Marco Protopapa (March 2011).

N. 799 – *Bootstrap LR tests of stationarity, common trends and cointegration*, by Fabio Busetti and Silvestro di Sanzo (March 2011).

N. 800 – *Performance pay and shifts in macroeconomic correlations*, by Francesco Nucci and Marianna Riggi (March 2011).

N. 801 – *Monetary and macroprudential policies*, by Paolo Angelini, Stefano Neri and Fabio Panetta (March 2011).

N. 802 – *Imperfect information, real-time data and monetary policy in the euro area*, by Stefano Neri and Tiziano Ropele (March 2011).

N. 803 – *Financial subsidies and bank lending: substitutes or complements? Micro level evidence from Italy*, by Amanda Carmignani and Alessio D'Ignazio (April 2011).

N. 804 – *Il miglioramento qualitativo delle produzioni italiane: evidenze da prezzi e strategie delle imprese*, by Valter di Giacinto and Giacinto Micucci (April 2011).

N. 805 – *What determines annuity demand at retirement?*, by Giuseppe Cappelletti, Giovanni Guazzarotti and Pietro Tommasino (April 2011).

N. 806 – *Heterogeneity and learning with complete markets*, by Sergio Santoro (April 2011).

N. 807 – *Housing, consumption and monetary policy: how different are the U.S. and the euro area?*, by Alberto Musso, Stefano Neri and Livio Stracca (April 2011).

N. 808 – *The monetary transmission mechanism in the euro area: has it changed and why?*, by Martina Cecioni and Stefano Neri (April 2011).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2008

P. ANGELINI, *Liquidity and announcement effects in the euro area*, Giornale degli Economisti e Annali di Economia, v. 67, 1, pp. 1-20, **TD No. 451 (October 2002).**

P. ANGELINI, P. DEL GIOVANE, S. SIVIERO and D. TERLIZZESE, *Monetary policy in a monetary union: What role for regional information?*, International Journal of Central Banking, v. 4, 3, pp. 1-28, **TD No. 457 (December 2002).**

F. SCHIVARDI and R. TORRINI, *Identifying the effects of firing restrictions through size-contingent Differences in regulation*, Labour Economics, v. 15, 3, pp. 482-511, **TD No. 504 (June 2004).**

L. GUISO and M. PAIELLA,, *Risk aversion, wealth and background risk*, Journal of the European Economic Association, v. 6, 6, pp. 1109-1150, **TD No. 483 (September 2003).**

C. BIANCOTTI, G. D'ALESSIO and A. NERI, *Measurement errors in the Bank of Italy's survey of household income and wealth*, Review of Income and Wealth, v. 54, 3, pp. 466-493, **TD No. 520 (October 2004).**

S. MOMIGLIANO, J. HENRY and P. HERNÁNDEZ DE COS, *The impact of government budget on prices: Evidence from macroeconometric models*, Journal of Policy Modelling, v. 30, 1, pp. 123-143 **TD No. 523 (October 2004).**

L. GAMBACORTA, *How do banks set interest rates?*, European Economic Review, v. 52, 5, pp. 792-819, **TD No. 542 (February 2005).**

P. ANGELINI and A. GENERALE, *On the evolution of firm size distributions*, American Economic Review, v. 98, 1, pp. 426-438, **TD No. 549 (June 2005).**

R. FELICI and M. PAGNINI, *Distance, bank heterogeneity and entry in local banking markets*, The Journal of Industrial Economics, v. 56, 3, pp. 500-534, **No. 557 (June 2005).**

S. DI ADDARIO and E. PATACCHINI, *Wages and the city. Evidence from Italy*, Labour Economics, v.15, 5, pp. 1040-1061, **TD No. 570 (January 2006).**

S. SCALIA, *Is foreign exchange intervention effective?*, Journal of International Money and Finance, v. 27, 4, pp. 529-546, **TD No. 579 (February 2006).**

M. PERICOLI and M. TABOGA, *Canonical term-structure models with observable factors and the dynamics of bond risk premia*, Journal of Money, Credit and Banking, v. 40, 7, pp. 1471-88, **TD No. 580 (February 2006).**

E. VIVIANO, *Entry regulations and labour market outcomes. Evidence from the Italian retail trade sector*, Labour Economics, v. 15, 6, pp. 1200-1222, **TD No. 594 (May 2006).**

S. FEDERICO and G. A. MINERVA, *Outward FDI and local employment growth in Italy*, Review of World Economics, Journal of Money, Credit and Banking, v. 144, 2, pp. 295-324, **TD No. 613 (February 2007).**

F. BUSETTI and A. HARVEY, *Testing for trend*, Econometric Theory, v. 24, 1, pp. 72-87, **TD No. 614 (February 2007).**

V. CESTARI, P. DEL GIOVANE and C. ROSSI-ARNAUD, *Memory for prices and the Euro cash changeover: an analysis for cinema prices in Italy*, In P. Del Giovane e R. Sabbatini (eds.), The Euro Inflation and Consumers' Perceptions. Lessons from Italy, Berlin-Heidelberg, Springer, **TD No. 619 (February 2007).**

B. H. HALL, F. LOTTI and J. MAIRESSE, *Employment, innovation and productivity: evidence from Italian manufacturing microdata*, Industrial and Corporate Change, v. 17, 4, pp. 813-839, **TD No. 622 (April 2007).**

J. SOUSA and A. ZAGHINI, *Monetary policy shocks in the Euro Area and global liquidity spillovers*, International Journal of Finance and Economics, v.13, 3, pp. 205-218, **TD No. 629 (June 2007).**

M. DEL GATTO, GIANMARCO I. P. OTTAVIANO and M. PAGNINI, *Openness to trade and industry cost dispersion: Evidence from a panel of Italian firms*, Journal of Regional Science, v. 48, 1, pp. 97-129, **TD No. 635 (June 2007).**

P. DEL GIOVANE, S. FABIANI and R. SABBATINI, *What's behind "inflation perceptions"? A survey-based analysis of Italian consumers*, in P. Del Giovane e R. Sabbatini (eds.), *The Euro Inflation and Consumers' Perceptions. Lessons from Italy*, Berlin-Heidelberg, Springer, **TD No. 655 (January 2008).**

R. BRONZINI, G. DE BLASIO, G. PELLEGRINI and A. SCOGNAMIGLIO, *La valutazione del credito d'imposta per gli investimenti*, Rivista di politica economica, v. 98, 4, pp. 79-112, **TD No. 661 (April 2008).**

B. BORTOLOTTI, and P. PINOTTI, *Delayed privatization,* Public Choice, v. 136, 3-4, pp. 331-351, **TD No. 663 (April 2008).**

R. BONCI and F. COLUMBA, *Monetary policy effects: New evidence from the Italian flow of funds,* Applied Economics , v. 40, 21, pp. 2803-2818, **TD No. 678 (June 2008).**

M. CUCCULELLI, and G. MICUCCI, *Family Succession and firm performance: evidence from Italian family firms,* Journal of Corporate Finance, v. 14, 1, pp. 17-31, **TD No. 680 (June 2008).**

A. SILVESTRINI and D. VEREDAS, *Temporal aggregation of univariate and multivariate time series models: a survey,* Journal of Economic Surveys, v. 22, 3, pp. 458-497, **TD No. 685 (August 2008).**

2009

F. PANETTA, F. SCHIVARDI and M. SHUM, *Do mergers improve information? Evidence from the loan market,* Journal of Money, Credit, and Banking, v. 41, 4, pp. 673-709, **TD No. 521 (October 2004).**

M. BUGAMELLI and F. PATERNÒ, *Do workers' remittances reduce the probability of current account reversals?*, World Development, v. 37, 12, pp. 1821-1838, **TD No. 573 (January 2006).**

P. PAGANO and M. PISANI, *Risk-adjusted forecasts of oil prices*, The B.E. Journal of Macroeconomics, v. 9, 1, Article 24, **TD No. 585 (March 2006).**

M. PERICOLI and M. SBRACIA, *The CAPM and the risk appetite index: theoretical differences, empirical similarities, and implementation problems,* International Finance, v. 12, 2, pp. 123-150, **TD No. 586 (March 2006).**

U. ALBERTAZZI and L. GAMBACORTA, *Bank profitability and the business cycle,* Journal of Financial Stability, v. 5, 4, pp. 393-409, **TD No. 601 (September 2006).**

S. MAGRI, *The financing of small innovative firms: the Italian case*, Economics of Innovation and New Technology, v. 18, 2, pp. 181-204, **TD No. 640 (September 2007).**

V. DI GIACINTO and G. MICUCCI, *The producer service sector in Italy: long-term growth and its local determinants,* Spatial Economic Analysis, Vol. 4, No. 4, pp. 391-425, **TD No. 643 (September 2007).**

F. LORENZO, L. MONTEFORTE and L. SESSA, *The general equilibrium effects of fiscal policy: estimates for the euro area*, Journal of Public Economics, v. 93, 3-4, pp. 559-585, **TD No. 652 (November 2007).**

R. GOLINELLI and S. MOMIGLIANO, *The Cyclical Reaction of Fiscal Policies in the Euro Area. A Critical Survey of Empirical Research*, Fiscal Studies, v. 30, 1, pp. 39-72, **TD No. 654 (January 2008).**

P. DEL GIOVANE, S. FABIANI and R. SABBATINI, *What's behind "Inflation Perceptions"? A survey-based analysis of Italian consumers*, Giornale degli Economisti e Annali di Economia, v. 68, 1, pp. 25-52, **TD No. 655 (January 2008).**

F. MACCHERONI, M. MARINACCI, A. RUSTICHINI and M. TABOGA, *Portfolio selection with monotone mean-variance preferences,* Mathematical Finance, v. 19, 3, pp. 487-521, **TD No. 664 (April 2008).**

M. AFFINITO and M. PIAZZA, *What are borders made of? An analysis of barriers to European banking integration*, in P. Alessandrini, M. Fratianni and A. Zazzaro (eds.): The Changing Geography of Banking and Finance, Dordrecht Heidelberg London New York, Springer, **TD No. 666 (April 2008).**

A. BRANDOLINI, *On applying synthetic indices of multidimensional well-being: health and income inequalities in France, Germany, Italy, and the United Kingdom*, in R. Gotoh and P. Dumouchel (eds.), Against Injustice. The New Economics of Amartya Sen, Cambridge, Cambridge University Press, **TD No. 668 (April 2008).**

G. FERRERO and A. NOBILI, *Futures contract rates as monetary policy forecasts,* International Journal of Central Banking, v. 5, 2, pp. 109-145, **TD No. 681 (June 2008).**

P. CASADIO, M. LO CONTE and A. NERI, *Balancing work and family in Italy: the new mothers' employment decisions around childbearing*, in T. Addabbo and G. Solinas (eds.), Non-Standard Employment and Qualità of Work, Physica-Verlag. A Sprinter Company, **TD No. 684 (August 2008).**

L. ARCIERO, C. BIANCOTTI, L. D'AURIZIO and C. IMPENNA, *Exploring agent-based methods for the analysis of payment systems: A crisis model for StarLogo TNG,* Journal of Artificial Societies and Social Simulation, v. 12, 1, **TD No. 686 (August 2008).**

A. CALZA and A. ZAGHINI, *Nonlinearities in the dynamics of the euro area demand for M1,* Macroeconomic Dynamics, v. 13, 1, pp. 1-19, **TD No. 690 (September 2008).**

L. FRANCESCO and A. SECCHI, *Technological change and the households' demand for currency*, Journal of Monetary Economics, v. 56, 2, pp. 222-230, **TD No. 697 (December 2008).**

G. ASCARI and T. ROPELE, *Trend inflation, taylor principle, and indeterminacy*, Journal of Money, Credit and Banking, v. 41, 8, pp. 1557-1584, **TD No. 708 (May 2007).**

S. COLAROSSI and A. ZAGHINI, *Gradualism, transparency and the improved operational framework: a look at overnight volatility transmission*, International Finance, v. 12, 2, pp. 151-170, **TD No. 710 (May 2009).**

M. BUGAMELLI, F. SCHIVARDI and R. ZIZZA, *The euro and firm restructuring*, in A. Alesina e F. Giavazzi (eds): Europe and the Euro, Chicago, University of Chicago Press, **TD No. 716 (June 2009).**

B. HALL, F. LOTTI and J. MAIRESSE, *Innovation and productivity in SMEs: empirical evidence for Italy*, Small Business Economics, v. 33, 1, pp. 13-33, **TD No. 718 (June 2009).**

2010

A. PRATI and M. SBRACIA, *Uncertainty and currency crises: evidence from survey data*, Journal of Monetary Economics, v, 57, 6, pp. 668-681, **TD No. 446 (July 2002).**

L. MONTEFORTE and S. SIVIERO, *The Economic Consequences of Euro Area Modelling Shortcuts*, Applied Economics, v. 42, 19-21, pp. 2399-2415, **TD No. 458 (December 2002).**

S. MAGRI, *Debt maturity choice of nonpublic Italian firms* , Journal of Money, Credit, and Banking, v.42, 2-3, pp. 443-463, **TD No. 574 (January 2006).**

R. BRONZINI and P. PISELLI, *Determinants of long-run regional productivity with geographical spillovers: the role of R&D, human capital and public infrastructure*, Regional Science and Urban Economics, v. 39, 2, pp.187-199, **TD No. 597 (September 2006).**

E. IOSSA and G. PALUMBO, *Over-optimism and lender liability in the consumer credit market*, Oxford Economic Papers, v. 62, 2, pp. 374-394, **TD No. 598 (September 2006).**

S. NERI and A. NOBILI, *The transmission of US monetary policy to the euro area*, International Finance, v. 13, 1, pp. 55-78, **TD No. 606 (December 2006).**

F. ALTISSIMO, R. CRISTADORO, M. FORNI, M. LIPPI and G. VERONESE, *New Eurocoin: Tracking Economic Growth in Real Time*, Review of Economics and Statistics, v. 92, 4, pp. 1024-1034, **TD No. 631 (June 2007).**

A. CIARLONE, P. PISELLI and G. TREBESCHI, *Emerging Markets' Spreads and Global Financial Conditions*, Journal of International Financial Markets, Institutions & Money, v. 19, 2, pp. 222-239, **TD No. 637 (June 2007).**

U. ALBERTAZZI and L. GAMBACORTA, *Bank profitability and taxation*, Journal of Banking and Finance, v. 34, 11, pp. 2801-2810, **TD No. 649 (November 2007).**

M. IACOVIELLO and S. NERI, *Housing market spillovers: evidence from an estimated DSGE model*, American Economic Journal: Macroeconomics, v. 2, 2, pp. 125-164, **TD No. 659 (January 2008).**

F. BALASSONE, F. MAURA and S. ZOTTERI, *Cyclical asymmetry in fiscal variables in the EU*, Empirica, **TD No. 671**, v. 37, 4, pp. 381-402 **(June 2008).**

F. D'AMURI, O. GIANMARCO I.P. and P. GIOVANNI, *The labor market impact of immigration on the western german labor market in the 1990s*, European Economic Review, v. 54, 4, pp. 550-570, **TD No. 687 (August 2008).**

A. ACCETTURO, *Agglomeration and growth: the effects of commuting costs*, Papers in Regional Science, v. 89, 1, pp. 173-190, **TD No. 688 (September 2008).**

S. NOBILI and G. PALAZZO, *Explaining and forecasting bond risk premiums*, Financial Analysts Journal, v. 66, 4, pp. 67-82, **TD No. 689 (September 2008).**

A. B. ATKINSON and A. BRANDOLINI, *On analysing the world distribution of income*, World Bank Economic Review , v. 24, 1 , pp. 1-37, **TD No. 701 (January 2009).**

R. CAPPARIELLO and R. ZIZZA, *Dropping the Books and Working Off the Books*, Labour, v. 24, 2, pp. 139-162 ,**TD No. 702 (January 2009).**

C. NICOLETTI and C. RONDINELLI, *The (mis)specification of discrete duration models with unobserved heterogeneity: a Monte Carlo study*, Journal of Econometrics, v. 159, 1, pp. 1-13, **TD No. 705 (March 2009).**

L. FORNI, A. GERALI and M. PISANI, *Macroeconomic effects of greater competition in the service sector: the case of Italy*, Macroeconomic Dynamics, v. 14, 5, pp. 677-708, **TD No. 706 (March 2009).**

V. DI GIACINTO, G. MICUCCI and P. MONTANARO, *Dynamic macroeconomic effects of public capital: evidence from regional Italian data*, Giornale degli economisti e annali di economia, v. 69, 1, pp. 29-66, **TD No. 733 (November 2009).**

F. COLUMBA, L. GAMBACORTA and P. E. MISTRULLI, *Mutual Guarantee institutions and small business finance*, Journal of Financial Stability, v. 6, 1, pp. 45-54, **TD No. 735 (November 2009).**

A. GERALI, S. NERI, L. SESSA and F. M. SIGNORETTI, *Credit and banking in a DSGE model of the Euro Area*, Journal of Money, Credit and Banking, v. 42, 6, pp. 107-141, **TD No. 740 (January 2010).**

M. AFFINITO and E. TAGLIAFERRI, *Why do (or did?) banks securitize their loans? Evidence from Italy*, Journal of Financial Stability, v. 6, 4, pp. 189-202, **TD No. 741 (January 2010).**

S. FEDERICO, *Outsourcing versus integration at home or abroad and firm heterogeneity*, Empirica, v. 37, 1, pp. 47-63, **TD No. 742 (February 2010).**

V. DI GIACINTO, *On vector autoregressive modeling in space and time*, Journal of Geographical Systems, v. 12, 2, pp. 125-154, **TD No. 746 (February 2010).**

S. MOCETTI and C. PORELLO, *How does immigration affect native internal mobility? new evidence from Italy*, Regional Science and Urban Economics, v. 40, 6, pp. 427-439, **TD No. 748 (March 2010).**

A. DI CESARE and G. GUAZZAROTTI, *An analysis of the determinants of credit default swap spread changes before and during the subprime financial turmoil*, Journal of Current Issues in Finance, Business and Economics, v. 3, 4, pp., **TD No. 749 (March 2010).**

A. BRANDOLINI, S. MAGRI and T. M SMEEDING, *Asset-based measurement of poverty*, Journal of Policy Analysis and Management, v. 29, 2 , pp. 267-284, **TD No. 755 (March 2010).**

G. CAPPELLETTI, *A Note on rationalizability and restrictions on beliefs*, The B.E. Journal of Theoretical Economics, v. 10, 1, pp. 1-11,**TD No. 757 (April 2010).**

S. DI ADDARIO and D. VURI, *Entrepreneurship and market size. the case of young college graduates in Italy*, Labour Economics, v. 17, 5, pp. 848-858, **TD No. 775 (September 2010).**

A. CALZA and A. ZAGHINI, *Sectoral money demand and the great disinflation in the US*, Journal of Money, Credit, and Banking, v. 42, 8, pp. 1663-1678, **TD No. 785 (January 2011).**

2011

S. DI ADDARIO, *Job search in thick markets*, Journal of Urban Economics, v. 69, 3, pp. 303-318, **TD No. 605 (December 2006).**

E. CIAPANNA, *Directed matching with endogenous markov probability: clients or competitors?*, The RAND Journal of Economics, v. 42, 1, pp. 92-120, **TD No. 665 (April 2008).**

FORTHCOMING

M. BUGAMELLI and A. ROSOLIA, *Produttività e concorrenza estera*, Rivista di politica economica, **TD No. 578 (February 2006).**

G. DE BLASIO and G. NUZZO, *Historical traditions of civicness and local economic development*, Journal of Regional Science, **TD No. 591 (May 2006).**

F. SCHIVARDI and E. VIVIANO, *Entry barriers in retail trade*, Economic Journal, **TD No. 616 (February 2007).**

G. FERRERO, A. NOBILI and P. PASSIGLIA, *Assessing excess liquidity in the Euro Area: the role of sectoral distribution of money*, Applied Economics, **TD No. 627 (April 2007).**

P. E. MISTRULLI, *Assessing financial contagion in the interbank market: maximun entropy versus observed interbank lending patterns*, Journal of Banking & Finance, **TD No. 641 (September 2007).**

Y. ALTUNBAS, L. GAMBACORTA and D. MARQUÉS, *Securitisation and the bank lending channel*, European Economic Review, **TD No. 653 (November 2007).**

M. BUGAMELLI and F. PATERNÒ, *Output growth volatility and remittances*, Economica, **TD No. 673 (June 2008).**

V. DI GIACINTO e M. PAGNINI, *Local and global agglomeration patterns: two econometrics-based indicators*, Regional Science and Urban Economics, **TD No. 674 (June 2008).**

G. BARONE and F. CINGANO, *Service regulation and growth: evidence from OECD countries*, Economic Journal, **TD No. 675 (June 2008).**

S. MOCETTI, *Educational choices and the selection process before and after compulsory school*, Education Economics, **TD No. 691 (September 2008).**

P. SESTITO and E. VIVIANO, *Reservation wages: explaining some puzzling regional patterns*, Labour, **TD No. 696 (December 2008).**

P. PINOTTI, M. BIANCHI and P. BUONANNO, *Do immigrants cause crime?*, Journal of the European Economic Association, **TD No. 698 (December 2008).**

R. GIORDANO and P. TOMMASINO, *What determines debt intolerance? The role of political and monetary institutions*, European Journal of Political Economy, **TD No. 700 (January 2009).**

F. LIPPI and A. NOBILI, *Oil and the macroeconomy: a quantitative structural analysis*, Journal of European Economic Association, **TD No. 704 (March 2009).**

Y. ALTUNBAS, L. GAMBACORTA, and D. MARQUÉS-IBÁÑEZ, *Bank risk and monetary policy*, Journal of Financial Stability, **TD No. 712 (May 2009).**

P. ANGELINI, A. NOBILI e C. PICILLO, *The interbank market after August 2007: What has changed, and why?*, Journal of Money, Credit and Banking, **TD No. 731 (October 2009).**

G. BARONE and S. MOCETTI, *Tax morale and public spending inefficiency*, International Tax and Public Finance, **TD No. 732 (November 2009).**

L. FORNI, A. GERALI and M. PISANI, *The macroeconomics of fiscal consolidations in euro area countries*, Journal of Economic Dynamics and Control, **TD No. 747 (March 2010).**

A. DI CESARE and G. GUAZZAROTTI, *An analysis of the determinants of credit default swap spread changes before and during the subprime financial turmoil*, in C. V. Karsone (eds.), Finance and Banking Developments, Nova Publishers, New York., **TD No. 749 (March 2010).**

G. BARONE, R. FELICI and M. PAGNINI, *Switching costs in local credit markets*, International Journal of Industrial Organization, **TD No. 760 (June 2010).**

G. GRANDE and I. VISCO, *A public guarantee of a minimum return to defined contribution pension scheme members*, Journal of Risk, **TD No. 762 (June 2010).**

P. DEL GIOVANE, G. ERAMO and A. NOBILI, *Disentangling demand and supply in credit developments: a survey-based analysis for Italy*, Journal of Banking and Finance, **TD No. 764 (June 2010).**

G. BARONE and S. MOCETTI, *With a little help from abroad: the effect of low-skilled immigration on the female labour supply*, Labour Economics, **TD No. 766 (July 2010).**

S. MAGRI and R. PICO, *The rise of risk-based pricing of mortgage interest rates in Italy*, Journal of Banking and Finance, **TD No. 778 (October 2010).**

A. ACCETTURO and G. DE BLASIO, *Policies for local development: an evaluation of Italy's "Patti Territoriali"*, Regional Science and Urban Economics, **TD No. 789 (January 2006).**