An investigation on the causal relationships between banking concentration and economic growth

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ABSTRACT

This paper explores the causality between concentration in the banking industry and economic growth. Two empirical tests are performed for Italy over the period 1991-2001: the first one is a standard Granger-Sims causality test, the second one studies the direction of causality by taking into account the impact of changes in banks' internal and external factors on their own market shares. The results show that in the short-run economic growth is predominantly caused by banking consolidation, while in the long-run a reverse causation direction emerges, so that economic expansions tend to reduce market shares and thus favour a stronger competition in the industry.

KEYWORDS: Banking; Causality; Economic growth; Market structure

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1. Introduction

In recent times, there has been an increasing stream of studies that aims to study the link between financial development and economic growth. They have generally established that greater financial development promotes growth, and also that the former is related to the institutional characteristics of the country.

However, minor attention has been devoted to the role of competition in the financial sector, especially the banking market, in spite of the fact that it can significantly influence efficiency, innovation and quality of the offered services. This is an important issue to be explored in Europe, where in the last decades the domestic banking industries have been characterised by notable transformations. Particularly, the elimination of restrictions to capital flows between countries has pushed banks to search for more efficient organisational solutions, so that a strong consolidation process occurred, with a significant decrease in the number of banks, and therefore an upward change of their average market shares. Given the decisive function of banks in contributing to employment and output expansion through the credit market, a careful consideration of the effects of this concentration course must be undertaken. On one side, on condition that less concentrated banking markets coincide with more competitive environments for banks, they may ease the provision of financing to firms,

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because of the reduced cost of loans. On the other side, it can be admitted that some market power (associated with larger banks and related to the need of coping with information asymmetries) increases financial stability, and thus helps economic growth over the long run.

This study focuses on the exploration of the role of concentration on economic growth at a local level, here considering the Italian regions. Actually, it seems there is a wide agreement in accepting the idea that banking concentration and macroeconomic performance are strongly linked. Nevertheless, while academics and policy-makers accept that competitive conditions among banks play a role in determining economic growth, few attention has been devoted to the possibility that causality runs from economic performance to banking concentration.

Starting from the evidence that in Italy there is a remarkable discrepancy in the value of economic indicators between Northern and Southern regions, we attempt to assess if these differences can be associated to the level of local banking concentration, and especially if they originate from or generate the process of consolidation of banks. For the purpose, we employ a Granger-causality test, and compare the results with those coming from another *ad hoc* causality test that takes into account how external (demand) and internal (cost) factors affect the concentration process of credit institutions. We will show that the findings of the two tests are coherent, and prove that a nexus of causality exists and differs according to the time length between observations.

The paper is organised as follows. Section 2 briefly recalls the different points of view characterising the literature on the links between financial and credit markets and the economy. In Section 3 we employ the Granger-Sims causality test to explore the link between banking competition and economic growth, while Section 4 suggests and illustrates our proposed alternative way to assess this causation direction, based on the relative importance of factors that are internal and external to banks. Section 5 concludes the paper.

2. Financial development, banking industry and macroeconomic performance

Regional and national economic growth is undoubtedly influenced by the activity of banks, given that they act as intermediaries between the supply of savings and the demand for loans, the latter coming from those who will turn them into productive capital. A widely accepted corollary to this statement is that competitive financial markets would improve the intermediation process and help economic growth: actually, banks would pay higher returns on deposits and ask for lower loan rates, thus inducing an increase of both savings and investments, with the result that countries would experience higher rates of economic growth (Carbo Valverde et al., 2003, p. 228; Cetorelli and Gambera, 2001, pp. 620-621). This also explains why governments and international organisations pay a particular attention to promoting a higher degree of efficiency and competitiveness in financial markets.

In economic literature, the most common view is that financial development is fundamental for the needs of any economy (e.g. Cameron, 1967; Goldsmith, 1969; McKinnon, 1973; Shaw, 1973), stressing that well-developed financial markets are essential to economic development and thus foreshadowing a causality running from finance to economic growth[1]. Actually, many theoretical and empirical contributions have been based on this belief.

King and Levine (1993) and Levine and Zervos (1998) try to measure the start-of-period degree of financial development, in order to evaluate how this initial state affects subsequent economic growth. Using cross-country regression analysis, King and Levine find that countries initially enjoying a larger credit sector experienced faster growth in the following thirty years, while Levine and Zervos show the joint, independent relevance for growth of both banks and capital markets.

[1] This perspective recalls the Joan Robinson's (1952) statement, according to which "where enterprise leads, finance follows" (p. 86).

Since many authors have argued that countries differing in the legal or cultural framework could have different performances in terms of corporate governance and firms' financing criteria (e.g. La Porta et al., 1998; Berkowitz et al., 2003), some studies have investigated the causality link between financial development and growth also introducing dummy variables associated to institutional factors. Rajan and Zingales (1998) find that industries that are more dependent on external finance grow faster in countries that are more financially developed, thus providing another evidence about the overall importance of financial development on growth. Similar results are provided by Levine (1998) and Carlin and Mayer (2003).

Levine et al. (2000) and Beck et al. (2000) employ a panel of 74 countries and averaged data (calculated over each of the seven five-year periods between 1961 and 1995). By means of the dynamic panel methodology proposed by Arellano and Bond (1991), they find out that financial intermediation is positively and robustly associated with economic growth. As Manning (2003) notes, although this appears to be a promising methodology in controlling for the presence of endogeneity, it must be recognised that the success of this approach is still dependent upon the correct model specification, as well as upon the introduction of time-varying institutional variables correlated with financial development.

To our purposes, it must be added that, in spite of this stream of analyses assuming that causality goes from financial sector to economic growth, other studies have discovered that the reverse causality could arise as well. For example, Rousseau and Sylla (2001) observe that in the long run (especially for mature economies) an expansion of the economic activity is able to generate demand for financial services, and therefore lead to an enlargement of the intermediating sector.

In this paper, we focus on the connections linking banking market structure and growth. Actually, the structure of the banking sector surely has a primary role in economic growth. When market power is high, banks can increase prices: this has negative effects on market

equilibrium, provoking inefficient resource allocation as well as reduced capital accumulation and growth. On the other hand, a monopolistic or oligopolistic banking structure allows to better face the lack of information about both the individuals asking for funds and the projects to be financed with the loans (which would give rise to problems of adverse selection and moral hazard).

The literature that investigates the relationship between bank structure and macroeconomic performance is characterised by two groups of models[2]: partial equilibrium models, and general equilibrium models. The first group focuses on particular aspects of the bank-borrower relationship, and is not concerned with the overall economic impact of the assumed banking industry structure; the second group takes into account also the deposit side of banking as well as the influence of the banking structure on the economy, but it sacrifices many details in the analysis of the relationship between banks and borrowers. With reference to the overall economic impact, the partial equilibrium models find that the influence of a monopolistic structure of the banking industry on the whole economy is beneficial, or at worst ambiguous, given that it ensures the stability of industry (Greenbaum and Thakor, 1995; Caminal and Matutes, 2002; Schnitzer, 1999); for the general equilibrium models, this influence is harmful, or at best ambiguous, because only a competitive banking system increases the level of economic activity and reduces the severity of the business cycle (Cetorelli, 1997; Smith, 1998; Guzman, 2000b).

Among the papers specifically studying the impact of the banking market structure on growth, Pagano (1993) shows that imperfect competition in credit markets introduces inefficiencies that could limit firms' access to credit, and then hinder growth. On the contrary, other studies prove that, in presence of monopoly power, banks are better motivated to

[2] Guzman (2000a) gives a wide review on the influence of the banking industry structure on economy and economic growth.

establish lending relationships with firms, thus facilitating the access to credit lines: Mayer (1988), Mayer (1990) and Petersen and Rajan (1995) move along this path[3]. Particularly, while analyzing credit availability for a cross-section of U.S. small businesses located in markets where different degrees of bank concentration exist, Petersen and Rajan find that firms are less credit constrained in more concentrated banking markets, and younger firms are charged lower loan rates. A contrasting result, again coming from cross-sectional U.S. data, is offered by Shaffer (1998), who finds evidence that household income grows faster in markets with a higher number of banks. Black and Strahan (2002) discover a negative relationship between banking concentration and the number of new firms in the U.S., while Dell'Ariccia and Bonaccorsi di Patti (2004), who use cross-industry and cross-provinces Italian data, show that firms operating in informationally opaque sectors grow more when banking markets are more concentrated.

Cetorelli and Gambera (2001) use an extension of the Rajan and Zingales data set, with both cross-industry and cross-country characteristics, and study whether, for a given size, the market structure of the banking sector has empirical relevance for economic growth. They find that the concentration in the banking sector determines a general deadweight loss which depresses growth, impacting all sectors and all firms indiscriminately. While studying Egypt's financial structure and its relation to total factor productivity, Bolbol et al. (2005) find that the banking system has a positive influence on growth only when associated with higher per-capita GDP.

It is necessary, however, to stress that higher concentration and lower competition are synonymous only if we accept the structure-conduct-performance (SCP) paradigm: it holds that there exists a trade-off between market concentration and the degree of competition, with

[3] In addition, Cetorelli and Gambera (2001) review some papers reporting historical evidences on the positive role of concentrated credit markets for economic development.

the latter being a direct function of the number of firms and an inverse function of the average market share[4]. Later, contestability theory (Baumol et al., 1982) has maintained that the perfect competition outcome can be ensured simply through both free entry into and free exit from the industry, regardless of the number of incumbent firms, since potential competition is able to reduce or even remove any monopoly power. In addition, in some markets high concentration and profits might derive from the higher efficiency of firms rather than from substantial market power.

As a matter of fact, considering the Italian context (the focus of our empirical analysis), in the last years the local Central Bank has favoured several mergers and acquisitions (in analogy with what has happened in other countries). Its viewpoint is that in the national banking industry there are still several small-scale banks, and hence there is room for exploiting wide scale economies. Moreover, it considers mergers as a beneficial solution to the problem of inefficient banks, since their exit would otherwise involve economic and social costs. Finally, the reduction in the number of banks could be successfully balanced by an increase in the number of branches (Coccorese, 2005, p. 1084).

For this reason, since our analysis concentrates on the search of causality links between banking concentration and local economic growth, in case one accepts the SCP paradigm the results we are going to show will be also useful in assessing whether banking competition and macroeconomic performance are connected.

As already stated, this paper parallels the empirical contributions pertaining financial intermediation and growth, and investigates the presence of a causality relationship between the observed level of local banking concentration and economic growth in the twenty administrative regions of Italy. This choice is motivated by the fact that this country

[4] These linkages were first formalised by Mason (1939) and then deepened by Bain (1951). See also Stigler (1964) and Scherer (1970).

experiences a persistent and sharp difference in the level of economic activity between North and South; particularly, data show that the economic performance generally worsens as we move from Northern to Southern regions. Our aim is to assess whether the economy grows more or less rapidly in areas where the banking sector is more concentrated, and whether these differences derive from or cause the level of local banking concentration. This will be done by employing a standard approach (the Granger-Sims causality test) joined to an original empirical analysis based on the role that external and internal factors play in the concentration process of banks. The results will show evidence of different causality directions according to the time spans between observations, which we interpret as short-run and long-run intervals.

3. Testing the causality between banking concentration and economic growth: the Granger-Sims approach

3.1 Methodology

Even if the existing literature is mainly based on the assumption of a causality direction going from the level of banking concentration to the overall economic growth, a more solid evidence is needed in order to feel more convinced about the above conjecture. In this paper, we make use of two different tests and join them to depict a more comprehensive picture of the issue.

We first employ the Granger-Sims causality test (Granger, 1969; Sims, 1972). According to this approach, in order to study the causality between banking concentration and economic growth, two pairs of equations must be estimated as follows (Pindyck and Rubinfeld, 1991):

a) current growth rates are regressed on lagged growth rates; then, lagged values of concentration ratios are added as explanatory variables to the previous equation;

b) current values of concentration ratios are regressed on lagged values of concentration ratios; then, lagged growth rates are added as explanatory variables to the previous equation.

If $\Delta\ln GDP_t^r$ is the real growth rate of region *r* at time *t* and $\Delta\ln CRn_t^r$ is the concentration ratio of the first *n* banks active in that regional market in the same period, the above pairs can be written as follows:

$$\Delta \ln GDP_t^r = \alpha_0 + \sum_{i=1}^{m} \alpha_i \Delta \ln GDP_{t-i}^r ; \quad (1)$$

$$\Delta \ln GDP_t^r = \alpha_0 + \sum_{i=1}^{m} \alpha_i \Delta \ln GDP_{t-i}^r + \sum_{i=1}^{m} \beta_i \Delta \ln CRn_{t-i}^r ; \quad (2)$$

$$\Delta \ln CRn_t^r = \gamma_0 + \sum_{i=1}^{m} \gamma_i \Delta \ln CRn_{t-i}^r ; \quad (3)$$

$$\Delta \ln CRn_t^r = \gamma_0 + \sum_{i=1}^{m} \gamma_i \Delta \ln CRn_{t-i}^r + \sum_{i=1}^{m} \delta_i \Delta \ln GDP_{t-i}^r . \quad (4)$$

Equations (1) and (3) are called restricted, equations (2) and (4) unrestricted.

We will say that banking concentration does not Granger-cause economic growth if

$$\beta_1 = \beta_2 = ... = \beta_m = 0 ; \quad (5)$$

similarly, we will say that economic growth does not Granger-cause banking concentration if

$$\delta_1 = \delta_2 = ... = \delta_m = 0 . \quad (6)$$

In case both the above relationships hold, the two phenomena are independent. When none of them is verified, it is likely that there are feedbacks between *GDP* growth and the level of concentration, or that some undetermined third factor is influencing both.

To check whether these conditions hold, a *F*-statistic must be used. It refers to each couple of equations; moreover, under the null hypothesis with normally distributed errors, it has a distribution with m numerator degrees of freedom and $n - 2m - 1$ denominator degrees of freedom, where m is the number of lagged periods and n the number of observations.

In our analysis we always consider first differences (so $m = 1$ in all equations). For this reason, since the independent variables are always lagged once, the test can be done by referring to the *t*-statistics of the unrestricted regressions rather than the *F*-statistics. Furthermore, in order to give a judgement on the time of influence of each variable on the other, we employ 1-year, 2-year and 3-year non-overlapping first differences (Blomstrom et al., 1996; Madsen, 2002; Calderon and Liu, 2003).

3.2 Data

The balanced panel of data refers to the twenty Italian regions[5], and covers the years from 1991 to 2001, a period during which the most intense wave of bank mergers and acquisitions has occurred[6]. The choice of analysing regions within the same country allows a better identification of the relationship under exam, since there is a substantial homogeneity of legal, historical, cultural and social factors that usually plays a significant role in influencing the

[5] According to the classification used by the Central Bank of Italy, they can be divided in four groups: North-West (Valle D'Aosta, Piemonte, Lombardia, Liguria); North-East (Veneto, Trentino Alto Adige, Friuli Venezia Giulia, Emilia Romagna); Center (Toscana, Umbria, Marche, Lazio); South and Islands (Abruzzi, Molise, Campania, Basilicata, Puglia, Calabria, Sicilia, Sardegna).

[6] The considered intervals are the following: 10 for the 1-year differences (1991-1992, 1992-1993, 1993-1994, 1994-1995, 1995-1996, 1996-1997, 1997-1998, 1998-1999, 1999-2000, 2000-2001), 5 for the 2-year differences (1991-1993, 1993-1995, 1995-1997, 1997-1999, 1999-2001), 3 for the 3-year differences (1991-1994, 1994-1997, 1997-2000).

macroeconomic performance of the areas, but that is hard to be identified in a cross-country framework[7].

As an indicator for economic growth, we employ the real per capita Gross Domestic Product (*GDP*). The data source is the Italian Statistical Institute (Istat). The choice of the variable representing the market concentration has revealed much harder. As Carbo Valverde et al. (2003) also note, unlike the US, information on the value of deposits, loans or assets at a regional level are not publicly available in most European countries, including Italy. In order to overcome this lack of disaggregated data, some authors use the regional distribution of branch offices (which is known), therefore presuming that a bank having 30% of branches in a market also holds a 30% share of deposits (or loans, or assets) market share. We have chosen to avoid any arbitrary calculation, and use the data directly provided by the Central Bank of Italy (Banca d'Italia), which reports the amount of loans of the eight largest banks (at a national level) for each administrative region. As a result, we compute the eight-bank loan concentration ratio (*CR*8):

$$CR8_t^r = \frac{\sum_{j=1}^{8} LO_{j,t}^r}{\sum_{j=1}^{n} LO_{j,t}^r}, \qquad (7)$$

where *LO* is the value of loans for bank *j* at the end of each year *t* (in 1995 figures): Therefore, the amount of loans held by the main eight banks in each region *r* at time *t* is divided by the total loans of all the *n* active banks of the same region (with *n* varying according to the region).

[7] See Levine *et al.* (2000). As a matter of fact, Khalifa Al-Yousif (2002), while studying the causality between financial development and economic growth in 30 developing countries, finds that the results are country-specific, and ascribes this outcome to differences in policies and institutions.

Actually, in Italy only eight banks can be considered as “national”, meaning that their reference market is the whole country (at least in the considered period of time), while the other banks generally have a much more limited area of business. Furthermore, we take into consideration bank loans because the competition among these larger banks (and also with the other little credit institutions) takes place especially on the demand for loans coming from families and firms.

3.3 Results

The coefficients of both the unrestricted regressions have been estimated by Generalised Least Squares (GLS). The results (based on first differenced data and considering each direction of causality) are presented in Table 1.

The *t*-statistics indicate a causation from bank concentration to economic growth in the 1-year and 2-year time lag regression (significant at the 1% level), and an opposite direction of causality in the 2-year and 3-year regressions (again significant at the 1% level).

If we agree to interpret the 1-year difference as a “short-run interval”, and the 3-year difference as a “long-run interval”, the above findings foreshadow different directions of causality during time: banking concentration has a significant impact on economic growth only in the short run, while variations of *GDP* influence the choices of aggregation of banks over the long run. Moreover, when we move from short to long run (2-year estimations), a two-way causality emerges, which could be defined as a transition effect[8].

From the regression results, we can also note that in both the causation directions the estimated coefficients (when significant) are always negative. This would prove that there is always an inverse relationship between banking concentration and economic growth, no matter what the direction of causality is. Accordingly, since we are studying regional areas

[8] It is worth noting that, according to Madsen (2002), the Granger-Sims causality test could be sensitive to time aggregation.

within the same country and the same period of time, the evidence is that in the long run a positive local macroeconomic performance limits the banking concentration process and thus allows the presence of several banks, with likely beneficial effects on the degree of competition of the market. Reversely, periods of depression drive banks toward a more concentrated structure. On the other hand, in the short-run smaller banks are compatible with a faster *GDP* growth, whereas banks' larger size seems to cause a *GDP* fall.

Anyway, a competitive banking industry (in terms of lower market shares for banks) appears to be compatible with an economic environment where notable increases in production and income have been obtained, while the banking concentration process (and hence a reduction of the competitive pressure) seems to be a reaction to a poor economic growth[9].

To our knowledge, the only empirical analysis that has tried to explore the causality links between banking market competition and economic growth through a Granger-causality test within the same country (in order to hold constant differences in legal and cultural environments) is the paper by Carbo Valverde et al. (2003). As a matter of fact, our framework differs from theirs under a variety of aspects. First, with reference to the local banking concentration, we employ aggregate data, while they use firm-level data. Second, we measure the industry concentration through a *CR*8 index, whereas they calculate five other measures of financial market concentration and competition. Third, even if both studies perform a Granger-causality test with one, two and three-period lags, we make use of non-overlapping differences, whilst they appear to consider overlapping periods[10]. Regarding the results, Carbo Valverde et al. (2003) do not find any evidence of the fact that their measures

[9] This conclusion also agrees with the findings of other authors who studied the Italian banking market at a regional level. See Cerasi et al. (1998), Angelini and Cetorelli (2003), and Coccorese (2004).

[10] Actually, the number of observation do not differ in the three estimations. See Carbo Valverde et al. (2003), p. 234.

of market concentration affect economic growth, concluding that for Spain financial market deregulation (which aimed to promote market competition) does not appear to have had a strong stimulative effect on regional growth[11]. The same conclusion applies for the reverse direction.

The paper by Cetorelli and Gambera (2001), which is another (cross-country) study focusing specifically on the banking industry, reports that bank concentration (measured through both the three-bank and the five-bank concentration ratio) has a negative impact on industrial growth. This finding is consistent with the theoretical prediction that higher bank concentration results in a lower amount of credit available in the economy as a whole (Cetorelli and Gambera, 2001, p. 646). In addition, the sign of this relationship matches with both our short-term and long-term results (they do not make a causality analysis), although they measure the long-run output growth of the economy as the average compounded rate of growth of real value added for the various industrial sectors between 1980 and 1990.

4. Testing the causality between banking concentration and economic growth: an alternative approach

4.1 Methodology

In order to better assess the link between banking concentration and economic growth, and so verify whether the Granger-Sims test is appropriate for the purpose, we now suggest a different test, which is based on the relative influence of some factors on the behaviour of banks.

We classify these factors into two groups, “external” and “internal”, and study the correlation between shocks coming from both of them and the banking concentration process.

[11] See Carbo Valverde et al. (2003), p. 234. The only exception occurs when economic growth causes the loan-deposit rate spread deflated by a cost-of-living index.

External shocks are to be intended as those related to the demand for loans and coming from clientele (families and firms), while internal shocks mainly consist in changes in costs. Our conjecture is that, if internal factors are the *sole* variable playing a decisive role for the level of concentration, the direction of the causality goes from banking concentration to economic growth; on the other hand, if concentration *only* depends on external shocks, it is caused by economic growth[12].

Let us briefly explain our assumptions. If banking concentration is causing economic growth, *and is also uncorrelated with external factor* (like those coming from aggregate demand), a positive shock on some internal factor (which has a beneficial effect on costs) will influence the strategic choices of banks: for example, new banks may emerge, or an enhanced competition between existing banks may take place. Their prices and optimal loan offer will change accordingly and the whole economy will be affected. The induced *GDP* variation is therefore caused by the new market structure, whereas (by assumption) there is no feedback from economic growth to banking concentration. Similarly, a negative shock will probably push banks to look for a bigger size in order to attain both scale and scope economies and so improve their overall efficiency. As a consequence, a reduction in the number of operating banks will happen. Once more, the *GDP* variation will be determined by the new conditions characterising the banking industry, without any feedback effect.

On the other side, if economic growth is causing banking concentration, *and is not correlated with internal factors*, a positive shock on some external factor (consumption or investment, for example) will surely have some effect on banks. Now the market structure will be influenced by the improvement in the macroeconomic conditions, without any return effect on economic growth.

[12] Our reasoning shares some theoretical features with the analysis by Madsen (2002), whose aim is nevertheless to study the causality between net investment and economic growth.

We therefore evaluate the sensitivity of the degree of concentration in the banking industry to changes in internal and external factors by using non-overlapping first differences again. Since we employ the *CR*8 value as a proxy for the level of concentration in the banking industry, concentration is supposed to cause economic growth if *CR*8 is correlated with internal factors but not with external factors, and vice versa.

4.2 Data

We still refer to the twenty Italian regions over the period from 1991 to 2001. Our estimated model is the following:

$$\Delta \ln CR8_t^r = a + b\Delta \ln C_t^r + c\Delta \ln I_t^r + d\Delta \ln BW_t^r + e\Delta \ln DC_t^r + fTIME + \varepsilon_t \qquad (8)$$

where *CR*8 is the loan market share of the eight Italian largest banks in region *r* (computed as before), *C* is the per capita consumption (measured by total consumption divided by the population), *I* is the per worker gross fixed investment (calculated as the ratio between gross fixed investment and the total number of workers), *BW* is the average labour cost of the banking sector (obtained by dividing the total amount of the wages paid in the banking sector by the total number of workers of the same sector), and *DC* is the per capita deposit cost (computed as the ratio between the total deposits costs of banks and the population size). A linear time trend (*TIME*) has been added in order to account for exogenous factors possibly affecting the concentration process of banks. Finally, ε is a disturbance term.

In equation (8), the first two variables of the right-hand side represent the external factors, the remaining two denote the internal factors. With respect to consumption and investment, a positive coefficient would imply that increasing demand from households and companies pushes banks toward a more concentrated structure, so that their size increases and their number falls, whereas a negative coefficient would mean that positive shocks from external factors reduce banks' market shares and hence increase competition among credit institutions.

Considering labour and deposit costs, we would expect a positive value of their coefficients if banks increase their dimension and market shares as a consequence of a negative internal factor shock, and vice versa.

Again, to check for short-run and long-run effects we estimate equation (8) using 1-year, 2-year and 3-year non-overlapping first differences, and employing the GLS method. This choice also allows a comparison with the results of the previous section. All economic figures (in euro) are expressed in 1995 values (sources: Banca d'Italia and Istat) and have been deflated by the Gross Domestic Product deflator.

4.3 Results

Table 2 exhibits the results of our estimations.

The coefficient of the consumption variable is never significant. As a result, this factor does not appear to have any impact on the decisions of banks related to consolidation. In the 1-year regression, the estimated coefficient of the per capita deposit cost is positive and significantly different from zero at the 1% level; in contrast, in the 2-year regression the significant and positive coefficient is the one related to the average labour cost, again at the 1% level. Finally, in the 3-year regression the only significant coefficient (at the 1% level) is the one related to the investment variable, whose sign is negative. The linear time trend is significant (at the 5% level) only in the first regression, where it captures a reduction in the consolidation trend during the considered years. The *F*-tests always reject the hypothesis that all the coefficients but the constant are jointly equal to zero, and therefore confirm the significance of the overall regressions.

These results appear to be highly coherent with the findings of the previous section. In the short-run (1-year difference lag), only an internal factor (particularly, the cost of deposits) influences the value of *CR*8: according to our description, this means that the direction of causality goes from banking concentration to economic growth. Furthermore, given that the

coefficient of *DC* is positive, negative shocks on internal factors drive toward a more concentrated structure of the banking industry. Coupling this result with the one obtained while studying the 1-year Granger-Sims causality, we get the confirmation that negative internal shocks, causing a higher level of concentration in the banking market, have a detrimental effect on economic growth.

In the long-run (3-year regression), the only significant variable is *I*, here representing an external factor, and therefore we argue that *CR*8 is caused by economic growth. The negative coefficient of this variable proves that positive shocks from the demand (external) side have a negative impact on the level of banking concentration, thus favouring competition among banks. This is just what we have ascertained when analysing the results of the Granger-Sims test on the 3-year first differences.

The only ambiguous result comes from the 2-year first difference regression. Here the significance of the variable *BW* would give support to a unidirectional causation going from concentration to economic growth, while the Granger-Sims test has validated both directions of causality. However, these partially conflicting results (obtained through different tests) could be merely due to the transition from the short-run effect to the long-run effect, when both causal relationships may mix and be hardly split.

5. Conclusions

The assessment of the direction of causality between banking concentration and economic growth within a country is crucial especially because the existence of possible relationships with the economic performance may soundly influence the Central Bank's policy toward banks' mergers.

In this paper, we have employed two separate tests in order to study the causality between the level of concentration in the banking industry and economic growth in Italy at a regional

level. Our results unambiguously show that in the short-run banking consolidation is predominantly driven by shocks on internal factors, and that an increase of the market share of banks has a one-way negative effect on the macroeconomic performance. In contrast, in the long-run economic growth appears to affect banking concentration, so that economic expansions tend to reduce the market shares of banks and thus help the achievement of a stronger competition among credit institutions.

Accordingly, this would mean that in Italy the strategic choices of banks toward consolidation do not have a decisive importance with reference to the impact on the whole economy, also when they are forced by the search for an improvement in the overall efficiency (e.g. cost reduction). Actually, if the country can count on government policies or periods of economic expansion which favour the demand side of the market and consequently increase the domestic product, the economy is spontaneously able to reduce the level of banking concentration. Under this point of view, the Italian Central Bank's policy of favouring a certain degree of consolidation in the banking industry has revealed to be an insightful choice. It would be extremely interesting to empirically investigate the same topic in other areas, for example in other European countries or even in the European Union as a whole, although the latter case has to be carefully studied because of the potential presence of heterogeneity among countries.

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Table 1 – Granger-Sims causality tests: results

(a) Dependent Variable: $\Delta\ln GDP_t$

	1-year difference	*2-year difference*	*3-year difference*
Constant	0.0150	0.0426	0.0527
	(9.06)**	(15.70)**	(31.43)**
$\Delta\ln CR8_{t-1}$	-0.0250	-0.0256	0.0056
	(-3.30)**	(-3.79)**	(0.74)
$\Delta\ln GDP_{t-1}$	0.1765	-0.0201	0.2452
	(2.47)*	(-0.28)	(10.18)**
Adj. *R*-squared	0.12	0.55	0.87
Obs.	180	80	40

(b) Dependent Variable: $\Delta\ln CR8_t$

	1-year difference	*2-year difference*	*3-year difference*
Constant	0.0083	0.1131	0.1485
	(1.48)	(10.17)**	(12.37)**
$\Delta\ln CR8_{t-1}$	-0.0002	-0.1222	-0.3907
	(-0.02)	(-2.65)**	(-4.56)**
$\Delta\ln GDP_{t-1}$	-0.1457	-2.5140	-0.8822
	(-0.55)	(-10.53)**	(-2.74)**
Adj. *R*-squared	0.00	0.31	0.47
Obs.	180	80	40

Generalised Least Squares panel estimations with cross section weights.
Numbers in parentheses denote White heteroskedasticity-adjusted *t*-statistics for the parameter estimates.

* Significance at 5% level
** Significance at 1% level

Table 2 – Alternative test for causality: results

Dependent Variable: $\Delta \ln CR8_t$

	1-year difference	*2-year difference*	*3-year difference*
Constant	0.0437	0.0699	0.0001
	(3.63)**	(2.06)*	(0.29)
$\Delta \ln C_t$	-0.0917	-0.8156	-0.9833
	(-0.25)	(-1.14)	(-1.00)
$\Delta \ln I_t$	0.0592	0.2219	-0.2959
	(0.81)	(1.48)	(-2.96)**
$\Delta \ln BW_t$	0.3200	3.0121	1.0250
	(1.29)	(7.39)**	(1.05)
$\Delta \ln DC_t$	0.0836	0.0557	-0.0048
	(3.18)**	(1.89)	(-0.01)
TIME	-0.0044	-0.0034	0.0346
	(-2.31)*	(-0.22)	(0.53)
Adj. *R*-squared	0. 05	0.28	0.06
Obs.	200	100	60
F-statistic	3.85**	13.19**	4.60**

Generalised Least Squares panel estimations with cross section weights.
Numbers in parentheses denote White heteroskedasticity-adjusted *t*-statistics for the parameter estimates.
The *F*-statistic tests the hypothesis that all of the slope coefficients (excluding the constant) are zero.

* Significance at 5% level
** Significance at 1% level