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Growth without finance, finance without growth

Paolo Coccorese · Damiano Bruno Silipo

Abstract The international comparative evidence on the nexus between finance and growth is ambiguous, owing to the many difficulties in isolating finance, separating its growth effect from that of the other factors. To overcome this problem, we study the effects of financial development on growth from 1960 to 2010 in one country—Italy. Thus, we have the same political, legal and regulatory framework but also sharply differing development conditions between regions. After World War II, Italy achieved an "economic miracle" similar to what China and India are now experiencing, followed by a lengthy phase of decline. Accordingly, we can distinguish the effect of financial development on growth from other potential causal factors while also considering regions with sharply different economic conditions. Our results show that from 1960 to 1980, when the Italian "economic miracle" was still under way, finance played no significant role in favouring the surge in economic growth, which most likely depended on internal consumption. Between 1980 and 2010, by contrast, the great expansion of Italian financial markets and institutions did have a positive effect on regional economic performance, but overall growth rates were nevertheless low. Although our empirical evidence supports the view that finance is more important for growth in less highly developed regions, it also shows that financial development has not helped to overcome the Italian economic divide.

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1 Introduction

The contribution of finance to economic growth is still controversial, both theoretically and empirically. Schumpeter (1912) and Robinson (1952), for instance, hold opposite views on the theoretical nexus between finance and growth.[1] Similarly, while there is ample empirical evidence that the financial system does influence long-run economic growth (King and Levine 1993; Levine and Zervos 1998; Rajan and Zingales 1998; Beck et al. 2000; Rousseau and Wachtel 2000; Beck and Levine 2004), a number of analysts have questioned the actual importance of this relationship (Demetriades and Hussein 1996; Favara 2003; Manning 2003; Fisman and Love 2004; Rousseau and Wachtel 2009). In particular, Manning (2003), Favara (2003) and Rioja and Valev (2004) find that the effects of financial development differ considerably across countries, with no clear pattern in relation to location, level of economic development or institutional characteristics. As an example, they find evidence that the relationship between finance and growth varies with a country's level of economic development: specifically, the impact of finance is disproportionately greater in less developed economies.[2] At the same time, excessive financial deepening and over-indebtedness may have even more severe repercussions on growth than an underdeveloped financial system, as has been indicated by the latest financial crisis.[3]

Most of this literature is based on cross-country data, but since a number of factors other than finance affect growth, standard growth regressions such as those of Levine et al. (2000) and many others may suffer from misspecification. So the considerable ambiguity that marks the relationship between financial development and economic growth may simply reflect the generally close interconnection, in any given country, between financial, institutional, legal and geographical factors, which makes it very difficult to isolate the actual influence of finance alone.

To overcome these difficulties, we study the impact of finance on growth in one country—Italy. Italy has been united, from the political and regulatory standpoint, for 150 years, and has a perfectly integrated capital market and, for the last two decades, a liberalized banking system. Despite this homogeneous legal, institutional and political framework, the country's twenty regions differ sharply in degree of development, with

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[1] Schumpeter maintains that banks promote growth by selecting the entrepreneurs with the most innovative and productive projects, whereas Robinson contends that enterprise leads and finance follows. For recent surveys on the question, see Pagano (1993), Levine (1997, 2004), Trew (2006), Papaioannou (2007).

[2] Papaioannou (2007) provides evidence that even the mechanism whereby finance affects growth differs with degree of development: in underdeveloped and emerging countries, financial development fosters aggregate growth mainly by lowering the cost of capital, in advanced economies by raising total factor productivity.

[3] Recent contributions on the effects of financial crisis on growth are Reinhart and Rogoff (2009) and Rousseau and Wachtel (2009).

a sharp divide between North and South.[4] This dualism (Eckaus 1961; Lutz 1962) can serve as a sort of natural experiment for examining the impact of finance on growth in areas at very different levels of development but a uniform institutional framework. Our inquiry, that is, is less likely than international comparative studies to be distorted by misspecification and heterogeneity.

Starting in the mid-1950s, further, Italy underwent one of the most remarkable bursts of economic growth ever recorded (the "Italian economic miracle"), comparable only to the current performance of China and India. But since the end of the 1970s, Italy has been mired in prolonged decline, which coincides with a loss of world export market shares. We accordingly address a series of relevant questions. Did finance play a significant role either in the "miracle" or in the decline of the Italian economy? To what extent did financial conditions play a role in creating the economic divide? Is finance more relevant for growth in the less developed regions?

To this purpose, we take an approach analogous to Rajan and Zingales (1998). They tested the hypothesis that well-developed financial markets increase the growth rates of the industries that are dependent on external funds and accordingly regress industrial sectors' real rates of growth in a number of countries on an interaction term that comprises a proxy for financial development and an indicator of external financial dependence. We employ a similar methodology to determine whether level of financial development affected growth rates in the various Italian regions. We expect the more financially dependent sectors to have had higher growth rates in the regions with more developed financial markets.

Although limited to a single country, our inquiry covers a time span (1960–2010) that allows us to capture the effects of finance both on economic growth and on economic decline, as well as on convergence among areas characterized by sharply differing economic conditions. Both aspects make this a useful benchmark for assessing the effects of finance on growth in other countries with similar characteristics.

Our main finding is that finance neither spurred the economic miracle after World War II nor helped to avert the decline of the Italian economy over the past few decades. Consumption demand was the main factor in the rapid-growth stage. And while finance does appear to have been more important for growth in less developed regions, it did not serve to narrow the regional disparity that still marks the Italian economy.

The paper is organized as follows. Section 2 gives a historical account of the Italian economy in the second half of the last century. Section 3 presents the methodology, and Sects. 4 and 5 discuss the econometric results. Some concluding remarks are provided in the last section.

2 The evolution of the Italian economy in historical perspective

After a long period of protectionism, at the end of the World War II Italy adopted sweeping trade liberalization policies, and the economy experienced unprecedented

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[4] The South of Italy includes some of the poorest regions in all of Europe, while in the North, we find many of the richest. Throughout this paper, for brevity, we group all the regions not in the South of Italy, ordinarily defined as "Center", "North-West" and "North-East", together as "North". Likewise, "South" and "Islands" are called collectively "South".

growth in industrial production and exports from the mid-1950s to the mid-1970s. Italian products were exported mostly to Germany and other European countries with higher per capita income than Italy. Thus, during the "economic miracle", Italy shaped its industrial output to satisfy the demand of the more affluent European consumers, not domestic demand.

In any case, real GDP growth rates were always positive and high. Between 1951 and 1963, the economy grew at an average annual rate of 5.4 % and exports at 13.1 %. The expansion continued in the next decade with rates of 5 and 9.9 %, respectively, from 1963 to 1973.[5] Over the next couple of decades, from 1974 to 1990, both GDP and export growth rates were cut in half, to average annual values of 2.9 and 5.2 %, respectively. The worsening Italy's competitive position is even more marked between 1990 and 2000, when the average annual growth rate was about 1.6 %, and export expansion, though fluctuating, showed a trend path similar to that of the previous decade (see Fig. 1). Anyway, from 1990 to 2008, Italy's share of world exports fell from 4.5 to 2.7 % (Onida 2010).[6] In the 2000–2010 decade, due to also the world financial crisis, the annual GDP growth rate was even worse, amounting to 0.7 %.

Due to central bank regulation, between 1961 and 1986, the Italian banking system underwent relatively little change. In that quarter-century, the number of bank branches increased by just 4,400 (47.5 or 1.5 % per year). In 1993, however, a new Banking Law was enacted, radically overhauling regulations and the Italian banking industry. The whole system was liberalized, and the main banks were privatized and listed in the stock market. As a result, between 1986 and 2011, banks opened some 20,000 new branches (an increase of 146 or 3.7 % a year), even as the number of banks declined sharply (see Fig. 2).

One consequence of these institutional changes was an increase in bank lending. During the period of strongest economic growth (1960–1975), the ratio of loans to GDP rose from 29.5 to 44 %, then falling to 34.5 % in 1985.[7] After liberalization, the

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[5] Some economists (e.g. Graziani 1969) see this export-led characteristic as crucial to the Italian economic success of the postwar period, but this is not the only explanation of the "economic miracle". Others argue that the main role was played by domestic demand (Ciocca et al. 1975; Zamagni 1992; Onofri et al. 1994). While Ciocca et al. (1975) ascribe the growth between 1950 and 1957 mainly to government housing policy (the "Fanfani plan"), Zamagni (1992) maintains that in the 1960s, most Italian households had no durable goods such as TV, refrigerator and washing machine, and therefore had a powerful drive towards the American pattern of consumption, although with some selectivity and ponderation. This shift of demand towards consumer durables had positive effects on the expansion of domestic industries (Zamagni 1992, pp. 204–205). Onofri et al. (1994) offer a similar argument, suggesting that the adoption of new consumption patterns from abroad may have been a vehicle of growth, while technology appears to have followed the changing patterns produced by international integration (Onofri et al. 1994, p. 60).

[6] The slowdown of the Italian economy over recent decades appears to have both external and domestic causes. The former consist essentially in the rise of new industrializing and industrial countries—at first such relatively small nations as South Korea, Taiwan and Singapore, more recently such emerging giants as China, India and Brazil—which drastically undermined the competitive position of the Italian economy. Among the domestic factors in the decline, many economists include the structure of the Italian production system (unfit to take advantage of technological innovations), the slowdown in productivity growth, the labour market and lack of R&D investment (Orsi and Turino 2010).

[7] The decline was due to both demand and supply effects. On the demand side, economic growth slowed down, while on the supply side, the monetary authorities set lending ceilings for banks in order to curb inflation.
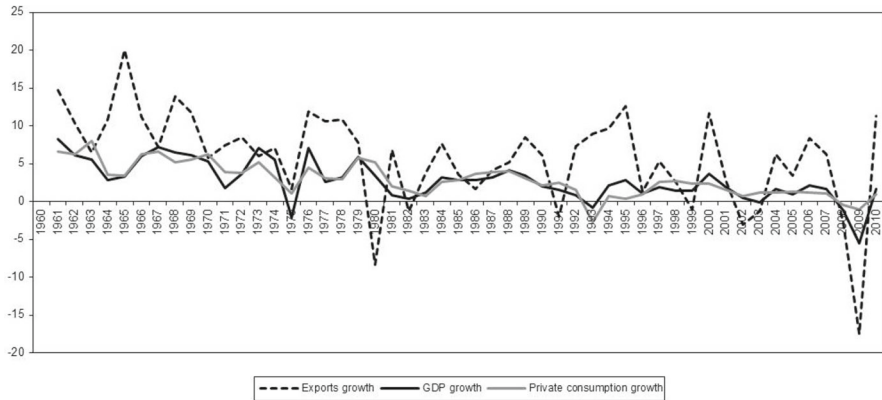
Fig. 1 Percentage growth rates of exports, GDP and private consumption in Italy (1960–2010)
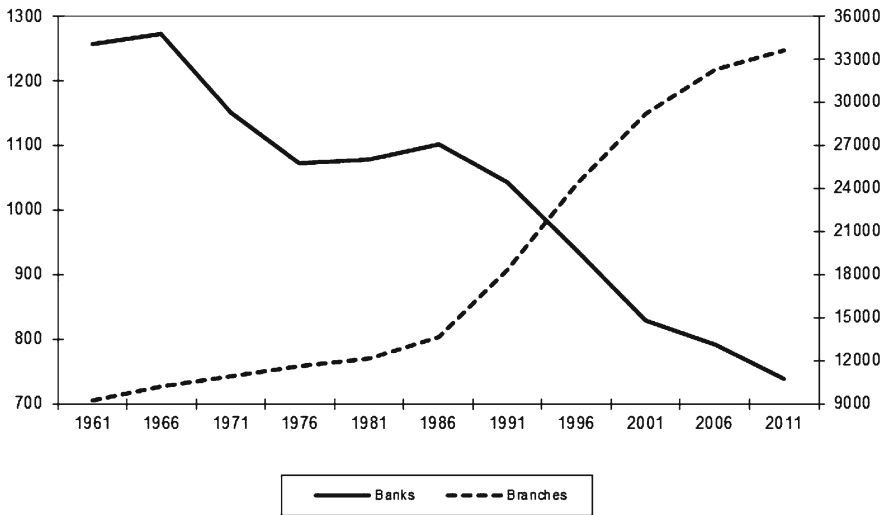

Fig. 2 Number of banks and branches in Italy (1961–2011)

ratio jumped to 109 % by 2010 (see Fig. 3). The rise can be attributed both to the increase in loans, thanks to more liberal regulation, and to the decline in GDP growth (see Fig. 1).

In any case, what emerges from the data is that the Italian economy's period of the greatest expansion (1960–1975) was not characterized by comparable development of the financial system, while the years of rapid financial expansion (1986–2010) saw the longest stagnation of the real economy since World War II.[8]

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[8] Indeed, the Italian economic miracle started in the 1950s, but, since detailed data are not available at regional level for this decade, our investigation—starting in 1960—does not fully capture this phenomenon. In addition, it is useful to note that in 1999, Istat (the Italian Statistical Institute) introduced a new system of national and regional accounts—SEC95—in accordance with the guidelines
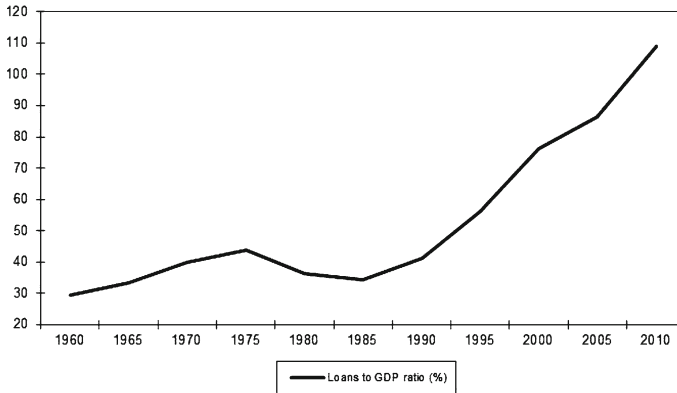
Fig. 3 Loan/GDP ratio in Italy (1960–2010)

According to Graziani (1969), the export dependency of the postwar Italian economy was also the source of the economic divide, since the economic miracle came mostly in the North, producing among other things massive migration from the South. In 1960, the value added of industry was equal to 78.1 billion euro in the Northern part of Italy and just 16.7 billion euro in the South (at 1995 prices). Similar conclusions hold for other variables. In 1960, per capita GDP in the South (€3,600 at 1995 prices) was barely over half that of the North (€6,600), while values added per worker in the two areas were €9,600 and €13,500 respectively; the unemployment rate was 6.7 % in the South and 5 % in the North, and the ratio of non-workers to workers was 1.8 in the South and 1.3 in the North.

Between 1960 and 2010, real value added of the industry grew by 158.3 % in the North and by 147.2 % in the South, so that the industrial output gap increased after fifty years. From 1960 to 2010, per capita GDP in the Centre-North over the correspondent variable in the Southern regions decreased only from 1.83 to 1.74. A similar trend characterized value added per worker. In the same period, the average annual growth in value added came to 1.5 % in the South, slightly higher than the North (1.4 %). This was due to higher investment in the South throughout the period (see Table 1). In overall, the ratio of value added per worker in the Centre-North with respect to those of the South decreased from 1.4 to 1.2 in the same period.

A similar divide characterized the financial sector in 1960. The share of the workforce engaged in the financial sector in the South was half that of the North (0.40 and 0.87 per hundred workers, respectively), while the loan/GDP ratio was 18.7 % in the South and 32.9 % in the North. After fifty years, the divide in the financial structure between the two areas was 1.51, when measured by the ratio of the share of the work force in the two areas, and 2.26 with respect to the ratio of the loan/GDP ratio between the Centre-North and the South. However, financial development was always lower in

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Footnote 8 continued

of the new ESA95. Hence, for the last decade (2000–2010), our data on value added growth are based on the new accounting system.

Table 1 Investment intensity, value added and value added growth across macro-sectors and areas

	Investment intensity			Value added			Value added growth		
	North	South	Whole country	North	South	Whole country	North	South	Whole country
Agriculture									
Whole sample	0.3269	0.3332	0.3294	1.66	1.71	1.68	−0.0123	−0.0098	−0.0113
Before 1980	0.3046	0.2561	0.2852	1.80	1.90	1.84	0.0032	0.0131	0.0071
After 1980	0.3418	0.3846	0.3590	1.57	1.59	1.58	−0.0227	−0.0251	−0.0236
Industry									
Whole sample	0.2022	0.2972	0.2402	14.37	5.00	10.62	0.0190	0.0211	0.0198
Before 1980	0.1858	0.3422	0.2483	9.27	3.28	6.87	0.0505	0.0607	0.0546
After 1980	0.2132	0.2671	0.2347	17.77	6.14	13.12	−0.0021	−0.0053	−0.0034
Services									
Whole sample	0.2854	0.3305	0.3034	23.52	13.07	19.33	0.0355	0.0332	0.0346
Before 1980	0.3609	0.3796	0.3684	11.02	6.35	9.15	0.0582	0.0562	0.0574
After 1980	0.2350	0.2977	0.2601	31.85	17.54	26.13	0.0204	0.0179	0.0194
All sectors									
Whole sample	0.2715	0.3203	0.2910	13.18	6.59	10.55	0.0140	0.0148	0.0144
Before 1980	0.2837	0.3260	0.3006	7.36	3.84	5.96	0.0373	0.0433	0.0397
After 1980	0.2633	0.3165	0.2846	17.06	8.42	13.61	−0.0015	−0.0041	−0.0025

Investment intensity (*INVVA*) is calculated as the ratio between total investment and total value added (beginning-period ratios). Values are averages over 10-years periods and regions

Value added (*VA*) is expressed in billions of 1995 euro (beginning-period figures) and is averaged over 10-year periods and regions

Value added growth (*GROWTH*) is calculated as the average rate of growth of sectors' real value added. Figures are the averages over 10-years periods and sectors

Table 2 Financial development across regions

Region	FINWORK			LOANSGDP		
	Whole sample	Before 1980	After 1980	Whole sample	Before 1980	After 1980
Piedmont	0.0165	0.0080	0.0222	0.4036	0.3411	0.4453
Valle d'Aosta	0.0072	0.0030	0.0100	0.1907	0.1450	0.2211
Lombardy	0.0216	0.0113	0.0284	0.6418	0.4775	0.7513
Trentino Alto Adige	0.0136	0.0068	0.0181	0.3741	0.2169	0.4789
Veneto	0.0133	0.0067	0.0176	0.3739	0.2599	0.4498
Friuli Venezia Giulia	0.0175	0.0089	0.0232	0.4092	0.3258	0.4649
Liguria	0.0194	0.0100	0.0257	0.4667	0.4775	0.4595
Emilia Romagna	0.0158	0.0084	0.0208	0.4693	0.3754	0.5319
Tuscany	0.0171	0.0093	0.0223	0.4442	0.3218	0.5258
Umbria	0.0129	0.0061	0.0175	0.3523	0.2592	0.4143
Marche	0.0126	0.0057	0.0173	0.3830	0.2807	0.4512
Lazio	0.0267	0.0179	0.0326	0.6248	0.4687	0.7289
Abruzzo	0.0094	0.0045	0.0127	0.2524	0.1884	0.2951
Molise	0.0089	0.0027	0.0131	0.1646	0.0391	0.2483
Campania	0.0110	0.0056	0.0146	0.2326	0.1804	0.2674
Puglia	0.0092	0.0038	0.0128	0.2517	0.1713	0.3053
Basilicata	0.0086	0.0031	0.0122	0.2068	0.1099	0.2714
Calabria	0.0093	0.0036	0.0131	0.2129	0.1956	0.2245
Sicily	0.0120	0.0058	0.0162	0.3251	0.3371	0.3172
Sardinia	0.0100	0.0049	0.0135	0.2519	0.2033	0.2843
North	0.0162	0.0085	0.0213	0.4278	0.3291	0.4936
North-West	0.0162	0.0081	0.0216	0.4257	0.3603	0.4693
North-East	0.0150	0.0077	0.0199	0.4066	0.2945	0.4814
Center	0.0173	0.0097	0.0224	0.4511	0.3326	0.5300
South	0.0098	0.0042	0.0135	0.2373	0.1781	0.2767

The financial development measures are: the ratio between the units of workers employed in the financial sector (credit and insurance) and the total number of workers (*FINWORK*, beginning-period ratios); the ratio between total loans and GDP (*LOANSGDP*, beginning-period ratios)

The reported values are averages over 10-year periods and sectors

the South than in North (see Table 2).[9] But, even in 1960, the two areas had comparable levels of human capital (17.7 and 18 % of 15–19 years old were enrolled in high schools in South and North, respectively).

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[9] Of course, it is difficult from these data to draw conclusions on the relative efficiency of banking institutions throughout the fifty years of our investigation as well as between the two areas of the country. As examples, due to technical progress or institutional changes (e.g. public versus private banks or commercial versus universal banks), the production function of credit institutions changed along our sample period. In addition, relative efficiency of the banks in the North and South may be affected by the different sizes and risks of the borrowers in the two areas of the country.

Notwithstanding the economic miracle, then, Italy's economic dualism persisted in both the real and the financial sectors.

3 Financial development, investment and growth: methodology and data

By now there is an abundant literature on the relationship between financial development and economic growth.[10] There are two principal approaches: cross-country (cross-industry) growth regressions and dynamic panel models. Cross-country models are subject to omitted variables, reverse causality and multi-collinearity, which prevent capturing the direct impact of finance on growth. To isolate this effect, Rajan and Zingales (1998) use a cross-country, cross-industry panel (42 countries and 36 industries), for the period 1980–1990. The thesis is that the industries with greater need for external finance are likely to draw greater benefit from financial development. The specification accordingly captures the effect on growth in each industry of the interaction between industries' external financing needs and countries' level of financial development, regressing the initial values of the independent variables on subsequent growth indicators, in order to establish causality, and controlling also for country and industry fixed effects, to make sure that the results do not depend on non-financial national characteristics. The coefficient for the interaction variable is positive and significant. That is, the authors find that more highly developed financial markets do improve the subsequent growth rates of industries that are more dependent on external funds.

Our method here is patterned after that approach. We seek to determine how much the rate of growth of the economy in the different Italian regions was affected by the degree of local financial development. We consider the main sectors (agriculture, industry and services) but also disaggregate by sectors of industry in alternative specifications. We do this for two reasons. First, differently from Rajan and Zingales, who consider only one decade, we are interested in the effects of finance on the long-run growth and decline of the economy. Second, more granular data on the Italian economy are not available for this very large period of investigation. The estimates use an interaction term between a sectorial characteristic (the need for funds for investment[11]) and a regional characteristic (financial development), together with region and sector indicators. To isolate the effect of financial development on the macro-sectors, we control for inter-regional and intra-regional differences. We also include a temporal

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[10] See Sect. 1 for some references.

[11] It is necessary to briefly address here two issues: to what extent investments proxy the demand for loans, and which is the role of regional loans in the supply of finance to the firms belonging to that specific region. Broadly speaking, firms can finance investments through the capital market and the loan market. However, Italian firms are generally found to be undercapitalized, and the Italian financial system is widely recognized to be bank-based. Moreover, also government-financed investments were funded by the banking system. Regarding the supply of finance, although firms close to the regional border may rely also on banks located in other regions, Alessandrini et al. (2005) have shown that geographic closeness to the headquarter of the bank is a relevant issue for Italian firms even in recent years, suggesting that cross-border finance may not be a relevant issue. However, according to the Bank of Italy, the relevant local market for loans in Italy is the regional market.

dimension, dividing our panel data into five 10-year intervals from 1960 to 2010. This enables us to capture and isolate the evolution of local economies and their characteristics. Finally, we regress the initial values of the independent variables on the average growth rates for each decade.

We estimate the following equation for the three macro-sectors (agriculture, industry and services) and the twenty Italian regions[12]:

$$GROWTH_{j,r,t} = \alpha_1 \, INITSHARE_{j,r,t} + \alpha_2 \, INVVA_{j,r,t} \times FINDEV_{r,t}$$
$$+ \, \beta \, Z_{r,t} + \gamma_j + \tau_r + \phi_t + \varepsilon_{j,r,t}, \tag{1}$$

where *GROWTH* is the average compound rate of growth of real value added in each 10-year period t for each region r and each sector j; *INITSHARE* is sector j's share in region r of total value added at the beginning of period t; *INVVA* is the ratio of total investment to total value added for industry j in region r at the beginning of period t (a proxy of each sector's need for funds); *FINDEV* is a proxy for financial development in region r at the beginning of period t; and $Z_{r,t}$ is a vector of control variables (to be discussed below). Finally, γ_j and τ_r are sector and region dummies (with $j = 1, 2, 3$ and $r = 1, \ldots, 20$), while ϕ_t are period dummy variables ($t = 1, \ldots, 5$) and $\varepsilon_{j,r,t}$ is the error term.

Our *INVVA* variable represents a measure of investment intensity (Hayo and Uhlenbrock 2000; Dedola and Lippi 2000; Peersman and Smets 2002): sectors that are more in need of capital for investment projects are assumed to be more sensitive to the availability of funds, which is assumed in turn to depend on the degree of development of financial institutions and markets.[13] Summary statistics on this variable can be found in Table 1.

We proxy financial development by two separate indicators: the ratio of workers employed in the financial sector (credit and insurance) to all workers in region r at the beginning of period t (*FINWORK*); and the initial value of the loan/GDP ratio at regional level (*LOANSGDP*).[14] It is worth noting that these two indicators of financial development are based on different data sources (respectively, Istat—the Italian Sta-

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[12] Piedmont, Valle D'Aosta, Lombardy, Liguria, Veneto, Trentino Alto Adige, Friuli Venezia Giulia, Emilia Romagna, Tuscany, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicily and Sardinia. We take the regional level for lack of more disaggregated data, but it is worth noting again that the Bank of Italy considers the region as the relevant market area for bank lending.

[13] Our measure of investment intensity is highly similar to that used by Rajan and Zingales (1998) for robustness tests on their measure of dependence on external finance (Rajan and Zingales 1998, p. 583).

[14] Even though the loan/GDP ratio and the number of workers in the financial sector are widely used in the literature as financial development indicators, they are not without problems. Total loans are affected by monetary policy as well as by the demand for loans, which may be external to banking behaviour. Moreover, the number of workers in the financial sector may not fully capture the contribution of finance to growth if there is technical progress, which significantly increases workers' productivity in the banking and financial sectors. Taking account that our data involve half a century, this is certainly the case. Therefore, the conclusions derived later are based on problematic indicators. Nonetheless, our results show that these variables are significant in the decades in which technical progress was more effective.

tistical Institute—and the Bank of Italy), so they permit a robustness check.[15] Table 2 provides some statistics on both variables.

We expect that the sectors that need more financing will have relatively higher growth rates in the regions with more highly developed financial markets. If this holds (after correcting for sector and region and period effects using the dummy variables), then the coefficient α_2 in Eq. (1) should be positive and significant.[16]

Various specifications of Eq. (1) are estimated.[17] First, by means of the interactive dummies, we estimate values of α_2 in addition to that for the entire period. We estimate the interaction term for the intervals 1961–1980 and 1981–2010, for the decades 1961–1970, 1971–1980, 1981–1990, 1991–2000 and 2001–2010, for each macro-sector and for the four main Italian macro-areas[18] (North-West, North-East, Center, South).

We supplement the dummies with other control variables. A first set of regressors comprises the ratio of high school students to the population aged 15–19 in region r at the beginning of period t (*EDUCATION*); the growth rate of population of region r in period t (*POPGROWTH*); and the inflation rate of region r in period t, calculated as the change in the regional GDP deflator (*INFLATION*). These variables are very often considered in inquiries into the sources of growth (Beck et al. 2000; Romero Avila 2007; Hesse 2008). The variable *EDUCATION* is used as an indicator of the human capital stock and should have a positive impact on local growth. *POPGROWTH* should have a negative sign, because regions with higher population growth rates tend to have lower rates of income growth (Mankiw et al. 1992). The inflation rate is expected to have a negative impact on growth, because it should induce a substitution of leisure for goods, and hence lower utilization of human capital, lower return to capital and lower growth (Gillman and Kejak 2005).

In order to take account of other possible sources of growth that economic theory has envisaged for Italy, our regressions also include the ratio of private consumption to GDP (*CONSGDP*); export specialization (*EXPSPEC*), measured by the ratio of exports to GDP in region r at the beginning of period t divided by the national ratio; and natural log of per capita public consumption (*lnCONSPUBPERCAP*). The variable *CONSGDP* is added to control for the role of households' consumption, hence to check the possibility that economic growth in Italy may have been driven by domestic demand. Similarly, *EXPSPEC* should account for the role of exports: a value greater than 1 indicates that the importance of exports for the region is greater than the national average. Finally, *lnCONSPUBPERCAP* aims at capturing the role of public expendi-

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[15] Nevertheless, we consider *FINWORK* to be a more reliable indicator of financial development; *LOANS-GDP* is weakened by occasional changes in the way of banks' loans were recorded in the accounts, at the instructions of the Bank of Italy.

[16] This is also one of the findings of Rajan and Zingales (1998): industries that invest heavily grow faster in countries with more highly developed financial markets (p. 583).

[17] We ran all the regressions for five-year periods as well, but the results are practically identical, so we do not report them here (they are available upon request).

[18] We follow the classification used by Bank of Italy. Hence, "North-West" comprises Piedmont, Valle D'Aosta, Lombardy and Liguria; "North-East" covers Veneto, Trentino Alto Adige, Friuli Venezia Giulia and Emilia Romagna; "Center" is Tuscany, Umbria, Marche and Lazio; "South" comprises Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicily and Sardinia.

ture.[19] We expect all these variables to show positive coefficients, as long as private consumption, exports and public expenditure play a significant role in growth.[20]

As Rajan and Zingales (1998) also point out, our approach is less open to criticism for omitted variable bias or poor model specification. Further, our framework provides a straightforward way of identifying the relationship between growth and financial development. Finally, as noted, our field of study comprises local areas that share a common institutional and macroeconomic environment, so can deal more easily with the problems of heterogeneity that commonly afflict cross-country studies. However, focusing on regional comparisons does not remove all the problems connected to multi-country studies: actually, differences in industry composition and financial structure at regional level may imply asymmetric effects of finance on growth also among regions.[21] Our claim is that heterogeneity within a country is lower than heterogeneity between countries.

Most empirical studies have found a positive and significant correlation of financial development with economic growth, but the concern over possible endogeneity of finance and reverse causality is ever-present (Manning 2003). And this holds for the present work as well. At least, though, we do not need to instrument financial development with legal and institutional dummies (La Porta et al. 1998), since we are dealing with a single country. Moreover, using start-of-period measures of financial development can capture the impact of the initial state on subsequent economic growth and should, therefore, avoid endogeneity[22] (King and Levine 1993; Levine and Zervos 1998; Rajan and Zingales 1998).

Nevertheless, we have addressed these problems in two ways. First, following Cetorelli and Gambera (2001), we test for potential endogeneity by instrumental variable (IV) estimations. Specifically, we have selected as instruments the (current and lagged) initial values of GDP and population, which proxy for the region's market size. A larger market presumably calls for more banking and financial intermediaries, and thus favours local financial development. In addition, in line with Guiso et al. (2004), we consider that the level and regional distribution of bank branches in 1936—when the Banking Law to protect banks against stability and market failures by strict entry controls was enacted—constitute a viable instrument for capturing the exogenous variation in the supply of credit at the regional level. Therefore, as instrumental variables, we take the 1936 values of regional number of bank branches per million inhabitants,

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[19] We were obliged to use collective consumption rather than public works spending (probably a better proxy for the role of government intervention) for lack of data prior to 1970. In any event, for the thirty years in which both data series are available, the two are quite closely correlated.

[20] Exports and consumption are commonly not included in theoretical growth models. However, we incorporate them in the econometric specification because the main literature related to the Italian economic growth (e.g. Ciocca et al. 1975; Graziani 1969) holds that these two variables were the main sources of the Italian development since World War II (see also Sect. 2). Moreover, we aim to test their role as alternative sources of growth.

[21] As examples, Carlino and DeFina (1999) find evidence of asymmetric regional transmission of Fed monetary policy shocks, and Clausen and Hayo (2006) show that there are significant differences in the impact of ECB monetary policy shocks on national output of EMU member countries.

[22] However, the use of start-of-period values as an instrument to avoid endogeneity fails in the presence of forward-looking expectations.

fraction of branches owned by local versus national banks, number of savings banks per million inhabitants and number of cooperative banks per million inhabitants (Guiso et al. 2004, pp. 940–947).

For each regression, we perform a Durbin–Wu–Hausman (DWH) test of overidentifying restrictions (Davidson and MacKinnon 1993, pp. 237–242), which verifies the null hypothesis that the introduction of the instrumental variables has no effect on the estimates, and hence that endogeneity among the regressors will not have adverse effects on least squares estimates. If this hypothesis is rejected, then the effects of endogenous regressors on the estimates are significant, and instrumental variables are required. We instrument the interaction of *INVVA* and *FINDEV*, and apply the DWH test. The *F*-statistic is reported at the bottom of each table. In all the regressions, the null hypothesis is not rejected at the 10 % level: therefore, the interaction term including the financial development indicator is not subject to endogeneity.[23]

Second, to explore possible causal links between our measures of financial development and regional growth, we ran a Granger causality test (Granger 1969), which entails estimating two pairs of equations (Pindyck and Rubinfeld 1991):

 (a) current values of the financial development index are regressed on lagged values of that index; then lagged growth rates are added to the previous equation as explanatory variables; if this coefficient is statistically indistinguishable from zero, then the economic growth does not "Granger-cause" financial development;
 (b) current growth rates are regressed on lagged growth rates; then, lagged values of the financial development index are added as explanatory variables; if this coefficient is statistically indistinguishable from zero, then financial development does not "Granger-cause" economic growth.

We apply this test to the entire sample and to each of the three macro-sectors. Obviously, we consider both of our financial development proxies (*FINWORK* and *LOANSGDP*). The results are shown in Table 3. The only significant coefficients (at least at the 5 % level) appear in the regression testing whether finance (as measured by the *FINWORK* variable) causes growth. Therefore, we can confidently rule out any evidence of reverse causality from growth to finance for our panel of regions.[24]

Our data come from different sources. For value added, investment, labour units, GDP, education, population and GDP deflator, we used both the CRENoS database on the Italian regions (Paci and Saba 1998) and information released by Istat. Regional lending data were kindly provided by the Bank of Italy. Monetary variables (in euro) have been converted to constant 1995 values using the regional GDP deflators.[25]

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[23] We have also checked whether our instruments are weak (i.e. whether they are weakly correlated with the endogenous variables). For the purpose, among the various tests suggested by Stock et al. (2002), we have used the Anderson-Rubin statistics (Anderson and Rubin 1949), whose null hypothesis is that the coefficients of the endogenous regressors in the structural equation are jointly equal to zero. Since in our estimations the null hypothesis is rejected at the 1 % level (with a chi-square value of 21.28), our instruments can be regarded as valid under this respect.

[24] It should be noted that a Granger causality test does not resolve conclusively the issue of the causation link between finance and growth, which is more complex and needs a thorough understanding of the relationships between the main economic variables.

[25] A better time horizon for our investigation would have been 1950–2010, but no region-level data are available before 1960.

Table 3 Granger causality tests

	F-test	*p* value		*F* test	*p* value
FINWORK Granger-causes GROWTH			*LOANSGDP Granger-causes GROWTH*		
Whole sample	1.73	0.19	Whole sample	0.04	0.84
Agriculture	4.40**	0.04	Agriculture	0.44	0.51
Industry	0.44	0.51	Industry	0.32	0.57
Services	7.17***	0.01	Services	0.06	0.80
GROWTH Granger-causes FINWORK			*GROWTH Granger-causes LOANSGDP*		
Whole sample	2.56	0.11	Whole sample	0.70	0.40
Agriculture	0.99	0.32	Agriculture	3.01*	0.09
Industry	2.69	0.11	Industry	0.00	0.98
Services	0.66	0.42	Services	1.42	0.24

We regress each variable x_t on lagged values of both itself, x_{t-1}, and the other variable, y_{t-1} (number of lags = 1)

The null hypothesis is that the coefficient of the other lagged variable, y_{t-1}, is zero

All estimations consider 10-years periods

*** Significant at the 1 % level; ** significant at the 5 % level; * significant at the 10 % level

Descriptive statistics of the sample are shown in Table 4.

4 The effects of finance in the development and decline of the Italian economy

We can now turn to the empirical evidence of the estimations of Eq. (1). We will first consider the regressions using *FINWORK* together with control variables (see Table 5).

The dummy variables for regions, macro-sectors and time intervals controls for all those specific effects, so the remaining coefficients identify the sign and magnitude of effects that vary with area, sector and time. One is the coefficient of the sector's share of total value added at the beginning of each period. It is significant at least at the 5 % level, and its sign is always negative. That is, we detect a sector-specific convergence effect: sectors that have grown rapidly in the past are likely to grow more slowly in the future. This pattern is quite common in growth regressions for countries or industrial sectors.

For the whole sample (first column), the coefficient of the interaction variable is positive and significant at the 5 % level.[26] As Rajan and Zingales (1998) observe, this term is akin to a second derivative, so we can explain the meaning of the magnitude in the following way. For the entire sample, the sector that most needs funds for investment appears to be agriculture, as its average *INVVA* is 0.3294 (see Table 1), while

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[26] In our estimation, we include only the interaction between the investment intensity and financial development variables, in line with previous studies on similar topics (e.g. Rajan and Zingales 1998; Manning 2003; Fernandez de Guevara and Maudos 2009; Laeven and Valencia 2013; Fernandez et al. 2013). When we also add *INVVA* and *FINWORK* as separate variables, it comes out that none of them exhibits a significant coefficient (both individually and jointly); at the same time, the $INVVA \times FINWORK$ term loses its significance. Considering *LOANSGDP* in place of *FINWORK* leads to the same result.

Table 4 Sample descriptive statistics

Variable	Mean	SD	Min	Max	Median	Obs.
GROWTH	0.0144	0.0344	−0.0944	0.0905	0.0086	300
GROWTH (1961–1980)	0.0397	0.0313	−0.0426	0.0905	0.0485	120
GROWTH (1981–2010)	−0.0025	0.0246	−0.0944	0.0513	−0.0008	180
INITSHARE	0.3333	0.2289	0.0139	0.8117	0.3169	300
INVVA	0.2910	0.1338	0.0985	1.1876	0.2609	300
INVVA (1961–1980)	0.3006	0.1554	0.1011	1.1876	0.2860	120
INVVA (1981–2010)	0.2846	0.1174	0.0985	0.8241	0.2477	180
FINWORK	0.0136	0.0086	0.0018	0.0378	0.0109	300
FINWORK (1961–1980)	0.0068	0.0037	0.0018	0.0193	0.0062	120
FINWORK (1981–2010)	0.0182	0.0078	0.0046	0.0378	0.0182	180
LOANSGDP	0.3516	0.1932	0.0342	1.2194	0.3208	300
LOANSGDP (1961–1980)	0.2687	0.1311	0.0342	0.5836	0.2339	120
LOANSGDP (1981–2010)	0.4068	0.2081	0.1488	1.2194	0.3557	180
EDUCATION	0.5294	0.2395	0.0965	0.9280	0.5239	300
POPGROWTH	0.0240	0.0446	−0.1068	0.1865	0.0192	300
INFLATION	0.0723	0.0494	0.0194	0.1614	0.0412	300
CONSGDP	0.6893	0.1284	0.3554	1.0706	0.6691	300
EXPSPEC	0.6899	0.5437	0.0042	1.8895	0.5353	300
CONSPUBPERCAP	2.1039	1.1216	0.5568	6.2316	1.9696	300

All figures refer to 10-year periods

GROWTH average rate of growth of sectors' real value added, *INITSHARE* sectors' initial share of total value added, *INVVA* total investment/total value added (beginning-period ratios), *FINWORK* units of workers employed in the financial sector (credit and insurance)/total number of workers (beginning-period ratios), *LOANSGDP* total loans/Gross Domestic Product (beginning-period ratios), *EDUCATION* people attending the high school/population aged 15–19 (beginning-period ratios), *POPGROWTH* regional growth rate of population (during each period), *INFLATION* average inflation rate (calculated on the GDP deflator), *CONSGDP* private consumption/Gross Domestic Product (beginning-period ratios), *EXPSPEC* regional export-to-GDP ratio/national export-to-GDP ratio (beginning-period ratios), *CONSPUBPERCAP* public consumption/population (thousand 1995 euro, beginning-period ratios)

industry has the lowest *INVVA* (0.2402). At the same time, the region at the 75th percentile in terms of financial development is Tuscany (0.0171: see Table 2), while at the 25th percentile, we have Calabria (0.0093). If we set each macro-sector's initial share of value added at the sample mean (i.e. 0.3333), then our estimate of the interaction term (2.550) suggests that the annual growth differential between agriculture (with the greatest need for funds for investment) and industry (with the least) is 0.18 percentage points greater in Tuscany (75th percentile of financial development) than in Calabria (25th percentile). Given that the average sector growth is 1.44 % a year, a differential of 0.18 percentage points cannot be considered particularly large (it is about one eighth of overall growth). Therefore, although significant, financial development does not appear to have had a dominating influence on the growth of Italian macro-sectors between 1960 and 2010.

Table 5 Financial development, investment and growth in Italy (1960–2010): estimations with *FINWORK*

	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
INITSHARE	−0.026**	−2.21	−0.031***	−2.69	−0.029**	−2.45	−0.045***	−3.51	−0.026**	−2.22
INVVA × FINWORK (whole sample)	2.550**	2.34	–		–		–		–	
INVVA × FINWORK—1961–1980	–		−1.390	−0.76	–		–		–	
INVVA × FINWORK—1981–2010	–		2.779**	2.46	–		–		–	
INVVA × FINWORK—1961–1970	–		–		−2.488	−0.91	–		–	
INVVA × FINWORK—1971–1980	–		–		1.007	0.42	–		–	
INVVA × FINWORK—1981–1990	–		–		5.706***	3.20	–		–	
INVVA × FINWORK—1991–2000	–		–		5.592***	3.10	–		–	
INVVA × FINWORK—2001–2010	–		–		1.593	1.39	–		–	
INVVA × FINWORK—Agriculture	–		–		–		2.256**	2.09	–	
INVVA × FINWORK—Industry	–		–		–		−0.700	−0.50	–	
INVVA × FINWORK—Services	–		–		–		4.523***	3.40	–	
INVVA × FINWORK—North-West	–		–		–		–		2.156**	2.12
INVVA × FINWORK—North-East	–		–		–		–		2.963	1.62
INVVA × FINWORK—Center	–		–		–		–		2.462	1.38
INVVA × FINWORK—South	–		–		–		–		2.997**	2.15
EDUCATION	0.111**	2.45	0.096**	2.10	0.093**	2.07	0.114**	2.55	0.118***	2.59
POPGROWTH	−0.005	−0.12	0.022	0.55	0.065	1.38	−0.006	−0.15	−0.004	−0.09
INFLATION	−0.175	−0.44	−0.265	−0.67	−0.240	−0.59	−0.138	−0.35	−0.154	−0.39
CONSGDP	0.072***	3.10	0.080***	3.30	0.084***	3.42	0.076***	3.27	0.076**	3.13
EXPSPEC	−0.007	−1.51	−0.005	−0.93	−0.006	−1.24	−0.007	−1.61	−0.008	−1.58
lnCONSPUBPERCAP	−0.011	−0.51	−0.007	−0.33	−0.014	−0.63	−0.011	−0.50	−0.013	−0.54

Table 5 continued

	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
R^2	0.799		0.802		0.810		0.809		0.799	
Durbin–Wu–Hausman χ^2 test	0.708 (0.400)		2.702 (0.259)		7.138 (0.211)		2.107 (0.551)		2.791 (0.593)	
Wald F test on the joint significance of control variables	4.51 (0.000)***		3.70 (0.002)***		3.22 (0.005)***		4.82 (0.000)***		4.29 (0.000)***	
Observations	300		300		300		300		300	

The dependent variable is the average compounded rate of growth of real value added in each 10-year period for each region and each sector (*GROWTH*)

The measure of financial development is the ratio between the units of workers employed in the financial sector (credit and insurance) and the total number of workers (*FINWORK*)

All regressions include dummy variables for sectors, periods and regions (coefficient estimates are not reported)

t-statistics are based on robust Huber–White standard errors

The null hypothesis of the Durbin–Wu–Hausman test is that the use of instrumental variables does not change the estimation outcome (*p* value in parentheses)

The null hypothesis of the Wald test on the joint significance of control variables is that their coefficients are simultaneously equal to zero (*p* value in parentheses). Instruments are total real GDP, total population (current and lagged initial regional values), branches per million inhabitants, fraction of branches owned by local banks, savings banks per million inhabitants and number of cooperative banks per million inhabitants (1936 regional values)

*** Significant at the 1 % level; ** significant at the 5 % level; * significant at the 10 % level

As Tables 1 and 4 show, in Italy, regional growth in value added is quite dissimilar as between 1961–1980 and 1981–2010, with average annual rates of 3.97 and -0.25 %, respectively, for the two periods. In both, however, our two indicators of regional financial development increased in magnitude. It is, therefore, interesting to investigate whether financial markets had a significant role in sectors' growth. For this purpose, we modify our basic model by considering two interaction terms $INVVA \times FINWORK$, each multiplied by a dummy variable taking the value 1 either for the period 1961–1980 or for the period 1981–2010, and zero otherwise.[27] The results of the new estimations are given in the second column of Table 5. Here, the interaction term is significantly different from zero only for the second period, when the rates of growth were notably lower; conversely, it appears that the financial markets were not a factor in the strong growth of the Italian regions in the first period.

The conclusion implied by these results is that between 1960 and 2010, the Italian economy first experienced a period of "growth without finance", followed by one of "finance without growth". In the years 1961–1980, no significant inter-regional difference in growth rates of value added can be ascribed to the differences in local financial development. But for 1981–2010, this is not the case. Again, let us quantify the differential in real growth rates. From Tables 1 and 2, we observe that the average values of *INVVA* for agriculture and industry are 0.3590 and 0.2347, respectively, and that the regions at the 75th and the 25th percentiles of financial development are Tuscany (0.0223) and Molise (0.0131). In this case, the coefficient of the interaction term (2.779; see Table 5, second column) implies that the difference in the annual growth rate between agriculture and industry is 0.32 percentage points higher in Tuscany than in Molise. Since the yearly average sector growth in the period 1981–2010 was -0.25 %, a differential of 0.32 points is substantial, underscoring the contribution of well-developed financial markets to local growth.

We have run an additional regression for the interaction term for each decade (third column of Table 5), finding that its coefficient is significantly different from zero only in the 1980s and 1990s, thus confirming our earlier results and the remarkable difference in the role played by financial development between our first twenty-year and second thirty-year periods.

Regarding the macro-sectors, the fourth column of Table 5 shows that the impact of more developed local financial markets is significant for the growth of agriculture and services, negligible for industry. In terms of geographical areas (fifth column), the interaction term is significant at the 5 % level for the North-West and the South.

With reference to the control variables, *EDUCATION* and *CONSGDP* have the expected positive (and significant) coefficient, while *POPGROWTH*, *INFLATION*, *EXPSPEC* and *lnCONSPUBPERCAP* are never statistically different from zero. In other words, apart from finance, the only factors affecting growth rates at regional level have been the quality of human capital and households' propensity to consume.

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[27] Figure 1 shows that the trend lines for the GDP growth rate in Italy before and after 1980 are sharply different.

To assess the role of regional financial development more thoroughly, we also estimated Eq. (1) for combinations of sectors and macro-areas. Although we do not report the results here,[28] there is no evidence that for 1961–1980, sectorial value added could have grown more if the level of financial development had been higher. For 1981–2010, we find confirmation that, by and large, higher rates of growth in agriculture and services, but not in industry, were found significantly in the more financially developed regions.

The strong evidence that well-developed financial institutions do not enhance growth in the industrial sector certainly demands further exploration. Accordingly, we estimate our basic equation for some industrial sub-sectors. Lack of comparable data restricts this exercise to the period 1970–2000 and just eight sub-sectors. We find that few industrial sub-sectors were affected by local financial market development: wood products, rubber products and construction appear to grow faster where financial institutions are more highly developed (we do not present the complete set of results for space reasons).

All the regressions discussed above were run again, replacing *FINWORK* with our other measure of financial development, the ratio of bank loans to gross product (*LOANSGDP*). We report these results in Table 6. They are robust under several respects. Essentially, we again find the interaction term to be significant only in the period 1981–2010, and only for agriculture (although at a lower confidence level) and services.

Specifically, in the years 1981–2010, the differential in real growth rates between Trentino Alto Adige (75th percentile of financial development) and Basilicata (25th percentile) was only 0.25 percentage points. This value is only very slightly different from that calculated for the same period using the *FINWORK* variable (0.32). The main differences when *LOANSGDP* is used in lieu of *FINWORK* are geographical. It turns out that growth is significantly related to financial market development only in the South. However, additional estimations (here omitted) show that for 1981–2010, the interaction term is again significant for both North and South when we estimate Eq. (1) for the various sector–area combinations, and that for industrial sub-sectors financial development was never decisive for growth.

To conclude, we investigate the possible factors other than finance that may have had a hand in the Italian economic miracle. We estimated our model after interacting both the term $INVVA \times FINWORK$ and the control variables with two dummy variables, equal to 1 either for the "miracle" years 1961–1980 or for 1981–2010 and 0 otherwise. As Table 7 shows, the only variable that shows a significant impact on growth in both sub-periods is private consumption. Education is significant and positive only between 1981 and 2010.

5 Finance and Italian economic dualism

Some studies (Favara 2003; Manning 2003) have shown that the impact of financial development on growth is greater in the less developed than in the more developed

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[28] All the unreported estimation tables of the paper are available upon request.

Table 6 Financial development, investment and growth in Italy (1960–2010): estimations with LOANSGDP

	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
INITSHARE	−0.028**	−2.43	−0.034****	−3.03	−0.030**	−2.53	−0.031***	−2.65	−0.029***	−2.51
INVVA × LOANSGDP (whole sample)	0.073**	1.99	–		–		–		–	
INVVA × LOANSGDP—1961–1980	–		−0.050	−1.05	–		–		–	
INVVA × LOANSGDP—1981–2010	–		0.098**	2.23	–		–		–	
INVVA × LOANSGDP—1961–1970	–		–		−0.073	−0.93	–		–	
INVVA × LOANSGDP—1971–1980	–		–		−0.013	−0.23	–		–	
INVVA × LOANSGDP—1981–1990	–		–		0.219***	3.06	–		–	
INVVA × LOANSGDP—1991–2000	–		–		0.369***	4.27	–		–	
INVVA × LOANSGDP—2001–2010	–		–		0.059	1.56	–		–	
INVVA × LOANSGDP—Agriculture	–		–		−0.073	−0.93	0.074*	1.85	–	
INVVA × LOANSGDP—Industry	–		–		–		0.017	0.39	–	
INVVA × LOANSGDP—Services	–		–		–		0.110**	2.49	–	
INVVA × LOANSGDP—North-West	–		–		–		–		0.029	1.16
INVVA × LOANSGDP—North-East	–		–		–		–		0.101*	1.81
INVVA × LOANSGDP—Center	–		–		–		–		0.057	1.03
INVVA × LOANSGDP—South	–		–		–		–		0.165**	2.23
EDUCATION	0.119**	2.57	0.100**	2.19	0.085*	1.95	0.120**	2.57	0.124***	2.74
POPGROWTH	−0.025	−0.66	−0.015	−0.40	0.016	0.39	−0.022	−0.60	−0.020	−0.51
INFLATION	−0.104	−0.26	−0.242	−0.61	−0.110	−0.28	−0.089	−0.22	−0.108	−0.27
CONSGDP	0.073***	3.06	0.077***	3.09	0.077***	3.02	0.076***	3.16	0.080***	3.32
EXPSPEC	−0.007	−1.41	−0.002	−0.39	−0.004	−0.76	−0.007	−1.46	−0.009*	−1.91
lnCONSPUBPERCAP	−0.001	−0.03	0.011	0.48	−0.007	−0.28	−0.002	−0.10	−0.012	−0.50

Table 6 continued

	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
R^2	0.798		0.804		0.818		0.800		0.803	
Durbin–Wu–Hausman χ^2 test	0.003 (0.958)		2.476 (0.290)		7.823 (0.166)		0.587 (0.900)		2.216 (0.696)	
Wald F test on the joint significance of control variables	4.51 (0.000)***		3.99 (0.001)***		2.59 (0.019)**		4.41 (0.000)***		5.06 (0.000)***	
Observations	300		300		300		300		300	

The dependent variable is the average compounded rate of growth of real value added in each 10-year period for each region and each sector (*GROWTH*)

The measure of financial development is the ratio between loans and gross domestic product (*LOANSGDP*)

All regressions include dummy variables for sectors, periods and regions (coefficient estimates are not reported)

t-statistics are based on robust Huber-White standard errors

The null hypothesis of the Durbin–Wu–Hausman test is that the use of instrumental variables does not change the estimation outcome (*p* value in parentheses)

The null hypothesis of the Wald test on the joint significance of control variables is that their coefficients are simultaneously equal to zero (*p* value in parentheses). Instruments are total real GDP, total population (current and lagged initial regional values), branches per million inhabitants, fraction of branches owned by local banks, savings banks per million inhabitants, and number of cooperative banks per million inhabitants (1936 regional values)

*** Significant at the 1 % level; ** significant at the 5 % level; * significant at the 10 % level

Table 7 Financial development, investment and growth in Italy (1960–2010): pre- and post-1980

	FINDEV = FINWORK		FINDEV = LOANSGDP	
	Coefficient	t	Coefficient	t
INITSHARE	−0.031***	−2.63	−0.034***	−2.88
1961–1980				
INVVA × FINDEV	−1.795	−0.83	−0.061	−1.21
EDUCATION	0.085	1.35	0.078	1.24
POPGROWTH	0.031	0.65	0.006	0.15
INFLATION	−0.456	−0.83	−0.530	−0.97
CONSGDP	0.087***	2.62	0.084**	2.51
EXPSPEC	−0.004	−0.66	−0.001	−0.14
lnCONSPUBPERCAP	−0.003	−0.10	0.009	0.31
1981–2010				
INVVA × FINDEV	2.931**	2.38	0.116**	2.20
EDUCATION	0.102*	1.92	0.102*	1.96
POPGROWTH	0.033	0.55	−0.030	−0.51
INFLATION	−0.090	−0.15	0.069	0.12
CONSGDP	0.102**	2.55	0.111***	2.67
EXPSPEC	−0.004	−0.76	−0.001	−0.08
lnCONSPUBPERCAP	−0.014	−0.47	−0.001	−0.02
R^2	0.803		0.806	
Observations	300		300	

The dependent variable is the average compounded rate of growth of real value added in each 10-year period for each region and each sector (*GROWTH*)

Measures of financial development (*FINDEV*) are: the ratio between the units of workers employed in the financial sector (credit and insurance) and the total number of workers (*FINWORK*); the ratio between loans and Gross Domestic Product (*LOANSGDP*)

All regressions include dummy variables for sectors, periods and regions (coefficient estimates are not reported)

t-statistics are based on robust Huber-White standard errors

*** Significant at the 1 % level; ** significant at the 5 % level; * significant at the 10 % level

countries. Due to the Italian economic divide, we can address this issue in Italy at a regional level. At the outset of the period under investigation here, the South was at a lower level of development, both financially and economically, than the rest of Italy. We should, therefore, expect the contribution of finance to economic growth to have been greater than in the North. The results—as reported in Tables 5 and 6— support this prediction. For the entire sample, the interaction term is always significant for the growth of Southern regions. We also find that even for each of the two sub-periods, finance is relevant. In addition, between 1960 and 1980, finance did not have a significant effect for the growth of any sector, while, after 1980, when the level of financial development was higher throughout the country (Table 2), finance was relevant to value added growth in both agriculture and services in both parts of the country, but without beneficial effects on economic growth or convergence among Italian regions.

Most important, in all cases in which the interaction term is significant, its coefficient is much higher in the South, suggesting that, other things equal, growth is more sensitive to financial development in this area than in the rest of the country. This supports the thesis that financial development is more relevant for growth in less developed areas, and also the finding of Guiso et al. (2004) that local financial development in Italy does matter for growth.

Table 1 also shows that value added growth was generally higher in the South than in the North of Italy before 1980, the contrary after that date. Some analysts (Paci and Saba 1998; Mauro and Podrecca 1994) have shown that there was a convergence process between Southern and Northern regions from 1960 to 1975; thereafter, the divide widened again.

In order to gauge the impact of finance on inter-regional economic disparities in Italy, we again split the sample into two sub-periods, before and after 1980. Our financial development indicators do not produce clear-cut conclusions for the two areas. If we consider our workforce variable *FINWORK*, in the 1960s and 1970s, then the financial sector expanded more in the North than in the South (see Table 2, last rows); the reverse is the case for the 1980s, 1990s and 2000s. Using the *LOANSGDP* variable, however, financial development in the North was always faster than in the South. On this basis, we should expect some convergence due to financial development to have occurred in the last two decades, but in reality, we find it only before 1980, when value added growth in agriculture was much faster in the South than in the North (1.3 as against 0.3 % per year; see Table 1), and industrial growth was also faster (6.1 against 5.1 % per year), although financial development is never significant for the latter. Table 1 shows that convergence was also favoured by a higher level of investment in the Southern regions, thanks above all to government programmes.

Between 1980 and 2010, when both *FINWORK* and *LOANSGDP* increased more rapidly in the South, value added variation was -0.15 % in the North and -0.41 % in the South. That is, finance did not help narrow the North–South gap; other factors are presumably important to an understanding of the Italian economic divide in the last two decades.

All in all, the implication is that even though financial development is more relevant for growth in the less developed part of the country, the thesis that financial development may not generate more economic growth still holds. For one thing, in both South and North when financial development accelerated, the growth rate decreased. Moreover, from 1981 to 2010, financial development in the Southern regions was faster than in the North, but value added growth was slower. The geographical divided was aggravated.

6 Concluding remarks

The starting point of this article was the ambiguity of the results that have been attained in the literature on the effects of finance on economic growth, ascribed to the difficulty of isolating finance from other factors in cross-country regressions. We consequently elected to examine the role of financial development in growth in a single country—Italy—that has a uniform political, legal and regulatory framework but sharply diverse

development conditions inter-regionally. In addition, the country has dramatically contrasting economic performance: the "economic miracle" after World War II gave way to a lengthy phase of decline. These two features enabled us to investigate the impact of financial development on growth in a relatively homogeneous context.

Our results imply that financial development did not play a significant part in the extremely rapid growth of the early postwar decades. During those years, the economy appears to have been driven by domestic demand. Nor has comparatively rapid financial development been able to halt the decline of the Italian economy in the last three decades. And while the empirical evidence does support the thesis that finance is more relevant for growth in less developed areas, it also indicates that the expansion of the financial sector did not help overcome the economic disparities between the two parts of Italy.

Overall, we find that the Italian financial system does not appear to have played the role hypothesized by Schumpeter in spurring economic development. It would be interesting to see whether these conclusions can be extended to other countries having some features and characteristics similar to those of Italy.

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