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Financial Stability as a Public Policy Goal to Increase Local Economic Development: an Empirical Investigation from Italian Labour Market Areas

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Abstract

Financial stability is a prerequisite for sustainable economic development. Assuming that financial stability is a public good, with a negative effect on social welfare and on economic development when risks are not properly controlled, will make regulators ensuring the smooth functioning of the system, promoting regional development and making the health of the financial institutions. This paper contributes to the literature on the relationship between financial stability and growth within the regions of one country, implying that institutional, legal and cultural factors are more adequately controlled and financial markets more accurately bounded. Using a rich sample of Italian banks over the 2001–2012 period, the paper addresses whether different measures of financial distress affect economic development of labour market areas in Italy. Results show that financial stability has a positive effect on local economic development mainly explained by the bank's return on average assets.

JEL Classification G21; G28; R11; C20

Keywords Banks; Local economic development; Financial stability; Labour market areas

Introduction

According to the European Central Bank, financial stability represents a condition in which the financial system – intermediaries, markets and market infrastructures – can withstand shocks without major disruption in financial intermediation and in the effective allocation of savings to productive investment (ECB, 2012). In other words, the financial system is stable when targets such as the transfer of resources from savers to investors, the assimilation of financial and real economic shocks and finally, the management of financial risks, could be reached. For many economists financial, stability is a prerequisite for sustainable economic performance (see Dudley 2011) and the core of the financial system – major banks, non-bank financial intermediaries, and financial market infrastructures – should be made more resilient to adverse shocks and less susceptible to runs. Indeed, the recent financial crises triggered policy makers and regulators to analyse whether the level of bank distress can influence economic development on the assumption that the financial system represents one of the main components of the economy which allows the transfer of money between savers (and investors) and borrowers. However, the openness of markets, the increase mobility of capitals, the growth of integration between countries and the complexity of the financial instruments make the financial markets more vulnerable to several risks. The governance of the banking system has been debated in the recent literature. On one hand, it is difficult to determine which source makes unstable the financial system, although among the main causes seem to be the risk-taking of banks. When financial institutions take more risks and allocate capital less efficiently, then the banking system is more vulnerable to economic shocks, producing negative effects for the economy as a whole. On the other hand, there are other risks faced by the financial institutions; one of them is that of credit which may depends on the discretion of managers, who could not play fair in the interest of the bank. According to Berger and DeYoung (1997), the existence of risky assets entails additional monitoring and screening costs that banks must sustain in order to quantify them. It follows that concentrated markets can count on a higher capital, part of which is invested in monitoring and screening processes in order to reduce the share of risk-taking. As showed by Zhu (2004), managers are often under pressure to improve the performances of their organization and one of the main factors that could affect the conduct of management is represented by the economic environment in which it operates.

In the European context, immediately after the United States crisis due to the failure of the Lehman Brothers occurred in the end of 2007, regulators tried to enforce the balance sheet to make banks more reliable (e.g. Basle II reform) and to allow much lasting relationships for both firms and households. In this phase, the grant of loans offsets the stability of the system. Indeed, banks must be cared to supply credits, given that firms can have a low degree of reliability and the lack of information plays a crucial role to allow the optimal functioning of the change in the banking market. Financial development induces a better and a smoother allocation of resources, mobilizes saving, reduces risks, facilitates transactions and ensures the emergence of innovative firms. In turn, economic performances can be improved by converting the liquidity from deposit and saving to long-term investment. It is also true that this mechanism could also create damages if deregulation and the presence of information asymmetries encourage banks to take more risks.

However, it is very difficult to underline the role played by financial stability only across countries with different backgrounds; it could be, instead, more appropriate to focus on local territories within a single country where history, institutions and legal framework are more homogenous and where the interaction between financial intermediaries, households and firms are more accurately declined. Therefore, this paper investigates the direct effect of financial stability on economic development of labour market areas (LMAs) in order to study, from a sub-regional perspective, the effect of bank soundness and financial stability on local economic development. In order to capture this local perspective, we rely upon highly territorially disaggregated data such as Italian labour

market areas – a deeper territorial disaggregation than NUTS 3 level subdivisions corresponding to sub-regional geographical areas where the bulk of the labour force lives and works, and where establishments can find the largest amount of the labour force necessary to occupy the offered jobs (see Section 3.2. for more details on the LMAs). To capture, instead, the financial vulnerability of banks and to predict their distress, bank soundness is firstly calculated through the Z-score (the number of standard deviations by which returns would have to fall from the mean to wipe out all equity in the bank) and then making use of the accounting-based CAMELS variables (which stand for Capital, Asset quality, Management, Earnings, Liquidity and Sensitivity to market risk). Using a two-step system GMM estimator with Windmeijer (2005) corrected standard error in dynamic panel specification developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998), over the period 2001–2012, the empirical evidence shows that the stability of financial system promotes and positive predicts high level of economic development mainly explained by the bank's return on average assets, revealing the presence of virtuous circles characterized by stable banks, located in the territories that grow more, which in turn stimulate to reach higher levels of operations.

The rest of the paper is organized in the following way. Section 2 considers financial stability as a public good, Section 3 overviews the literature on the relationship between financial stability and economic development and the relative channels, highlighting the importance of a local perspective in the analysis; Section 4 describes the empirical approach, the measures of financial stability and the data used in the analysis. Section 5 shows the main findings, underlying the accuracy of different sources of financial stability affecting economic development, as well as some robustness checks. Finally, Section 6 concludes.

1. Financial Stability as Public Good

Financial stability is a condition in which mechanisms for pricing, allocating and managing financial risks (credit, liquidity, counterparty, market, etc), are functioning well enough to contribute to the performance of an economy (Schinasi, 2004), requiring that the key institutions are stable and meet the contracted obligations. As far as the financial intermediaries are concerned, the failure of few (big) banks could generate losses to the banks expose to it in the settlement system and in case of bank bankruptcy, also other banks exposed or close in business with the failed institution might also go bankrupt. Therefore, instability in the banking sector might lead to a systematic contagion in the entire financial system and the potential costs of protecting depositors and trouble institutions is very relevant.

Higher competition might compromise the solvency of some institutions, thus hampering the stability of the banking system at aggregate level. Banks, consequently and in order to keep their profits unaltered, could take riskier policies increasing the likelihood of failure. In more concentrated systems, banks tend to be larger, better diversified and less fragile. Indeed, fewer banks means also an easier monitoring procedure and a more effective supervision which in turn will make the risk of contagion and systematic crisis less pronounced (see Allen and Gale, 2004; Beck et al. 2006). On the other hand, bank market power in the deposit market induces banks to increase the cost of borrowing for entrepreneurs; their default risk will increase as a consequence of the fact that entrepreneurs are hindered to undertake more risky projects. The higher default risk of entrepreneurs shifts on the financial institutions and weakens bank financial security (Boyd and De Nicolò, 2005). In other words, in more concentrated markets, banks will charge higher interest rates, boosting the risk-taking behaviour of borrowers, leading therefore to an increase in the probability of default.

As a public good, financial stability is used by everyone without being excludable (since no one can be deproved of its use) and it is rival (since its use does not prevent someone else from the

same use (Creel et al. 2015). This means that the provision of financial stability cannot be ensured only by private decisions and requires regulation and supervision of a common agency to deliver it. As a consequence, financial institutions should not take financial stability for granted and should not take excessive risks as, in order to wipe out bank distress, often markets have to wait for the intervention of the public sector such as the provision of liquidity to banks. Assuming that financial stability is a public good, with a negative effect on social welfare and on economic development when risks are not regularly and properly controlled, would make policy makers paying attention to the fact that financial instability can affect the lives of people around the world. Regulators will ensure the smooth functioning of this system, guaranteeing social welfare, promoting regional development and making the health of the financial system a public policy goal in order to avoid that instability generates important externalities.

2. Financial Stability and Economic Development: A Regional Perspective

2.1. Financial Soundness-Growth Nexus: A Theoretical and Empirical Background

Stability of the financial sector can be an engine of growth. Indeed, until recently, the literature highlighted a positive relationship between financial development and economic growth (Bumann et al., 2013), drawing on cross-country (King and Levine, 1993), time series (Arestis et al. 2001) and panel studies (Beck and Levine, 2004), due to a better allocation of resources, risks and transactions. Several measures of financial development, defined as the policies, factors and institutions that lead to efficient intermediation and effective financial markets (WEF, 2012), have been used. The size of financial intermediaries has been considered such as the proportion of liquid liabilities (King and Levine, 1993) and the ratio of bank deposit liabilities to gross domestic product (Demetriades and Hussein, 1996) along with the depth of financial institutions proxied by the amount of liquid liabilities (Huang, 2011). The importance of the banking sector has also been taken into consideration by using the ratio of credit issued to the private sector to liquid liability (Saci and Holdied, 2008). Proxies for banking sector development include bank deposits over gross domestic product, banks' overhead costs, banks' concentration, banks' net interest margins (Antzoulatos and Thanopoulos, 2008).

Despite the above mentioned measures of performances and activities of financial institutions, the importance of making the financial system stable has to be underlined. How should changes in banking sector soundness affect economic development? More financial stability of the system means that banks hold high level of capital and have high profitability, being able to use these levels to ensure a greater distribution of loans to households and firms. In turn, higher borrowing levels increase investment projects, with a wider dissemination of knowledge helping to ensure higher growth levels. Therefore, one important channel is that of credit. Since Schumpeter, research and development activities, likewise patents, could be considered as newideas and pieces of knowledge that may turn into innovation when commercially exploited (Schumpeter, 1934, 1942). Entrepreneurs need credit to finance their innovations, and banks as well as financial markets could facilitate this mechanism. Bank based systems (differently from marked based systems) could create more stable relationships and convince entrepreneurs to invest in innovation (Stiglitz, 1985).

In this prospect, the relationship between finance and growth may depend on the firm's reliance on external funds (De Serres et al. 2006; Guiso et al. 2005), on the ability of firms to better capture growth opportunities thanks to the funding for investment (Fisman and Love, 2004) as well as on

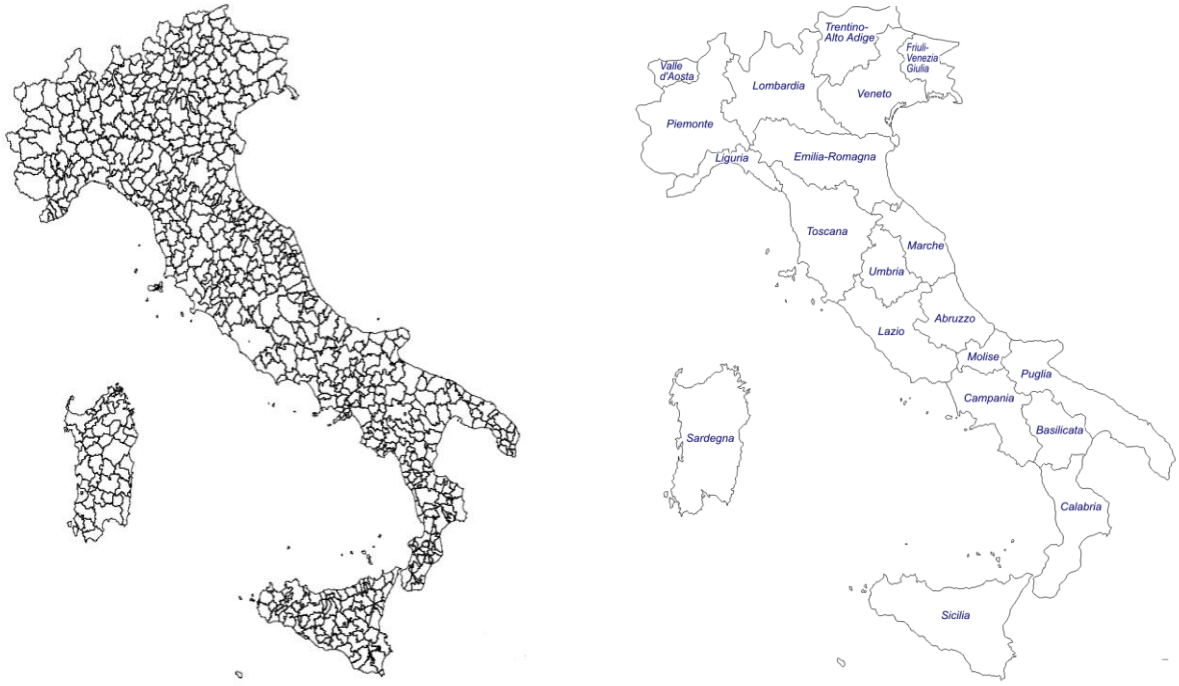
the firm probabilty of entry and survival in the market (Beck et al. 2008; Aghion et al. 2007). An improvement in the borrowing conditions due to more favourable credit standards could help the realization of a more friendly environment for savers and investors and a more efficient allocation of resources (Lown et al. 2000). A positive effect on economic development are expected in case financial institutions keep their minimum credit standards balanced, making easier for borrowers to get their funding. Another way through which financial stability can lead to an increasing economic development is a decrease in cost for firms and households of financing spending. A more stable banking system may help decreasing interest rates on business and consumer debt, leading firms and households to favour their spending. Reversely, uncertainty due to financial instability of the banking system make firms more careful about their investment as well as household decrease their spending, since uncertainty affects the expected value of their future wealth. This negatively affect the economic development (Bauducco et al. 2008; Carlson et al. 2009; Hakkio and Keeton, 2009). Financial intermediaries can promote economic development also by monitoring the investment projects as borrowers need to be monitored in order to prevent moral hazard ex post. There is evidence that in more concentrated markets, management efficiency generates a decrease in risk-taking behaviour with respect to the partially competitive markets, consistently with the idea that banks with less local competition are able to increase their profits by indulging more freely in rent-seeking behaviour, minimizing their risk-taking and, consequently, improving the quality of their assets through additional screening processes (Barra et al. 2016a).

2.2. The Relevance of a Intra-Regional Approach in Financial Market Research: The Case of Italy

It is specifically at regional or even sub-regional level that factors related to the location of financial intermediaries and economic actors may also affect the relationship between financial stability and economic development. Financial intermediaries strategically open branches to offer services at local level where they could better serve households and small business (Williams and Gardner, 2003; Dow and Rodriguez-Fuentes, 1997) and may even contribute more successfully to increase the social level of territories (Fuller and Jonas, 2002). Borrowers might also be preferring local solutions to build their borrowing relationship (Zazzaro, 1997) as local banks are better informed on local economic conditions. Moreover, at this level, monetary, legal and cultural environments, where not observed, could be more safely be assumed to be homogenous. Valverde and Fernandez (2004) analyze financial deepening and banks dependence, taking into account banks' lending specialization, and strongly suggest that this relationship is likely to be more adequately evaluated at regional level. Usai and Vannini (2004), within the contex of Italy's regional economic growth, show that the financial sector has a weak impact on growth having cooperative banks and special credit institutions, instead, an important role. Valverde et al. (2007) show that produce service deliver innovations contribute positively to regional gross domestic product. Hasan et al. (2009) show evidence of banks' abilities to provide financial services and products efficiently from cost and profit perspectives on regional growth. The nexus between financial development and economic growth relying upon territorially disaggregated data has been also underline by Destefanis et al. (2014) suggesting that both qualitative and quantitative proxies of financial development have a positive and significant impact on gross domestic product per worker.

To take into account the importance of measuring the financial stability-economic development relationship at sub-national level, we rely on labour market areas (LMAs) being sub-regional geographical areas where the bulk of the labour force lives and works, and where establishments can find the largest amount of the labour force necessary to occupy the offered jobs (see also Destefanis et al. 2014). More specifically, LMAs stand for a group of municipalities - akin to the UK's Travel-to-Work-Areas - adjacent to each other, geographically and statistically comparable,

characterized by common commuting flows of the working population. According to the Italian Statistical Office (ISTAT), they represent the place where the individuals live and work and, above all, where their economic and social relationships take place. They respond to the need for meaningfully comparable sub-regional labour market areas for the reporting and analysis of statistics. LMAs are defined on a functional basis, the key criterion being the proportion of commuters who cross the LMA boundary on their way to work. Nearly half of the LMAs (314, equal to 47.7% of the total) stands in the size class from 10 up to 50 thousand inhabitants, whereas the highest density of the population (3957.2 per square kilometer) lives in the LMAs of Naples. Rome is the biggest LMA in Italy; Sicilia is the region with the highest number of LMAs in Italy (77) followed by Lombardia (58) and Campania (54). On the contrary, Molise and Valle d'Aosta, showing 9 and 3 LMAs respectively, are those with the smallest number of areas. See Figure 1a and Figure 1b for a graphical representation of the LMAs' and regions' territorial location in Italy, respectively and Table 1 for some labour market areas characteristics by regions and territorial loation.



A *B*

Figure 1 Territorial location of labour market areas and regions in Italy – Year 2011

Regions (NUTS 2 level)	Labour market areas	Municipalities	Resident Population	Individual working in LMAs	Individual living and working in LMAs
Piemonte	37	1204	4223735	1462895	1448909
Valle d'Aosta	3	78	123803	44553	44906
Lombardia	58	1531	9003080	3284776	3298014
Trentino-Alto Adige	33	341	946446	334425	334678
Veneto	34	581	4502412	1613435	1609156
Friuli-Venezia Giulia	11	217	1196720	411966	412921
Liguria	16	237	1558790	462621	465877
Emilia-Romagna	41	356	4025358	1472306	1476901
Toscana	53	290	3512420	1174511	1172133
Umbria	17	90	823603	261501	256947
Marche	33	248	1467679	492586	492622
Lazio	25	381	5115887	1547496	1554765
Abruzzo	19	302	1255603	359708	359601
Molise	9	138	324175	83176	83709
Campania	54	548	5693038	1143501	1138064
Puglia	44	254	4016240	896000	890954
Basilicata	19	128	588476	142598	148761
Calabria	58	410	2017408	409916	408888
Sicilia	77	390	4968991	1014431	1014588
Sardegna	45	377	1631880	410411	410418
North-West	*114*	3050	1.49e+07	5254845	5257706
North-East	*119*	1495	1.07e+07	3832132	3833656
Centre	*128*	1009	1.09e+07	3476094	3476467
South	*203*	1780	1.39e+07	3034899	3029977
Island	*122*	767	6600871	1424842	1425006
Italy	686	8101	5.70e+07	1.70e+07	1.70e+07

Table 1 Labour market areas characteristics by regions and territorial location

To be more precise, in our dataset we cover almost half of the labour market areas of the country as we concentrate the analysis only on the labour market areas where at least one bank branch is present (see Section 4 for more details on the construction of the dataset). More specifically, in our dataset we include almost 46% of the labour market areas of the North-West area of the country, around 63%, 47% and around 28% of the labour market areas of the North-East, Centre and South of Italy, respectively (see Table 2).

Macro-areas of the country	Labour market areas covered in our sample 2001-2012	Labour market areas in Italy in 2001	Labour market areas in Italy in 2001-2012	Our coverage (%)
North-West	626	114	1368	45.76%
North-East	898	119	1428	62.88%
Centre	726	128	1536	47.26%
South	1111	325	3900	28.49%
Italy	3361	686	8232	41.93%

Table 2 – Number of Labour market areas in the sample and in Italy by territorial location

The Italian financial context fits perfectly with our research question, as important differences regarding the competitivness of the markets and the efficiency of the financial intermediaries are present among different geographical areas. As a consequence, the quality of the credit provided to firms and households may be consistently different according to the area where banks are located (see Table 3 for some descriptives on credit market structural indicators for Italy). Interestingly, when it comes to a market concentration index - higher in the South than in the North, descriptives show the present of a tight oligopoly in the former area and of loose oligopoly in the latter.

Regions (NUTS 2)	GDP per branch	Credits per branch	Deposits per branch	Branch density	Credits density	Deposits density	Branch per capita	Credits per capita	Deposits per capita	Market Concentration
Piemonte	33.502	22.218	14.374	0.119	3.320	2.116	0.0006	0.015	0.009	0.580
Valle d'Aosta	39.049	15.140	16.597	0.030	0.457	0.501	0.0006	0.009	0.010	0.583
Lombardia	34.605	32.235	15.456	0.277	17.305	7.432	0.0007	0.022	0.010	0.661
Trentino-Alto Adige	23.185	21.577	9.478	0.063	1.667	0.746	0.0011	0.021	0.009	0.551
Veneto	31.727	26.943	13.884	0.206	6.806	3.290	0.0007	0.020	0.010	0.599
Friuli-Venezia Giulia	31.012	22.454	16.594	0.238	5.865	5.804	0.0007	0.017	0.012	0.454
Liguria	37.875	24.024	16.989	0.229	6.229	4.392	0.0006	0.014	0.010	0.740
Emilia-Romagna	30.471	31.883	16.597	0.234	8.372	4.242	0.0008	0.026	0.013	0.427
Toscana	32.475	29.538	15.081	0.142	5.307	2.559	0.0007	0.020	0.010	0.763
Umbria	32.494	24.146	14.095	0.079	2.226	1.207	0.0006	0.015	0.008	0.651
Marche	28.664	25.334	13.216	0.183	5.617	2.776	0.0007	0.018	0.009	0.640
Lazio	42.887	20.823	16.526	0.088	4.092	2.704	0.0004	0.009	0.007	0.708
Abruzzo	34.400	21.375	15.384	0.086	2.365	1.438	0.0005	0.010	0.007	0.712
Molise	28.289	10.361	9.049	0.028	0.300	0.265	0.0004	0.004	0.003	0.904
Campania	41.611	17.328	16.839	0.185	5.236	5.077	0.0003	0.005	0.004	0.839
Puglia	42.547	19.164	19.048	0.087	1.980	1.758	0.0003	0.006	0.006	0.757
Basilicata	36.330	15.280	13.222	0.027	0.559	0.447	0.0004	0.006	0.005	0.871
Calabria	47.443	19.035	15.878	0.040	0.957	0.787	0.0002	0.005	0.004	0.786
Sicilia	31.328	15.246	13.034	0.083	2.034	1.541	0.0004	0.005	0.004	0.817
Sardegna	39.505	26.165	16.568	0.042	1.564	0.949	0.0004	0.009	0.005	0.682
North-West	33.518	27.697	15.250	0.214	11.102	5.173	0.0007	0.019	0.010	0.640
North-East	27.789	25.580	13.009	0.155	5.059	2.728	0.0009	0.021	0.010	0.527
Centre	34.232	25.968	14.891	0.130	4.731	2.480	0.0006	0.016	0.009	0.710
South	38.216	17.699	15.377	0.088	2.306	1.955	0.0003	0006	0.005	0.797
Italy	33.695	23.641	14.605	0.139	5.135	2.911	0.0006	0.015	0.008	0.677

Table 3 Credit market structural indicators in Italy

Notes Our elaboration; GDP per branch: grosso domestic product/number of branches; Credits per branch; aggregate credits/number of branches; Deposits per branch; aggregate deposits/number of branches; Branches density; number of branches/square kilometre; Credits density; aggregate credits/square kilometre; Deposits density; aggregate deposits/square kilometre; Branches per capita: number of branches/total population at LMA level; Credits per capita: aggregate credits/total population at LMA level; Deposits per capita: aggregate deposits/total population at LMA level; Market concentration: loans/total loans at LMA level, where total loans refer to total bank loans grouped at LMA level because it is reasonable that banks compete with other intermediaries operating in the surrounding areas as indeed might be the municipality (see, for more details about the market concentration measurement, Barra and Zotti 2017a, 2017b).

3. Empirical Strategy and Data

3.1 Investigating Stability-Growth Nexus: The Advantage of a Sub-Regional Approach

In order to analyse the relationship between the stability of financial system and local economic development, we specify the following dynamic panel model:

$$ln\,GDPC_{i,t} = \alpha_1 lnGDPC_{i,t-1} + \beta_1\, lnFS_{i,t} + \gamma_1 LG_{i,t} + \gamma_2 lnTPC_{i,t} + \gamma_3 lnBD_{i,t} + \gamma_4 TIME_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

where ln is the natural logarithm, $GDPC$ is gross domestic product per capita (measured as the sum of the gross values added of all units divided by workers)[1] explained by $GDPC_{t-1}$ (its lagged value), FS is the financial stability indicator (see Section 4.2 for more details on the variables used to proxy bank distress); LG is the labour growth defined as the number of employed individual at time t minus the number of employed individual at time $t-1$); TPC is the technology proxy controlling for local state of technology and industry structure measured as the ratio between service workers and the sum of industry plus service workers all divided by the population in each area); BD is the branch density controlling for distribution of banks on the territory measured as the ratio between branches and square kilometre; TIME is time variable controlling for time-specific effects or unobservable shocks; μ is the unobserved area-specific effect and finally ε are the disturbance errors. Subscripts i and t refer to the area of our analysis (LMA) and time periods (years), respectively. In order to take into account the characteristics of banks, the percentage of cooperative and commercial banks are included (popular banks as benchmark group); macro areas are also included (southern region used as benchmark group) to control for geographic effects. As already specified above, we have a highly detailed spatial stratification allowing us to capture the differences between local territories and to obtain more accurate estimates. Indeed, the analysis is fully conducted on a local basis to accurately capture the contribution of banks to the economic development of a small geographic area. Moreover, working at local level means also that legal and regulatory exogenous factors on financial development are more likely to be similar.

To eliminate μ_i, the unobserved area-specific effect, in the dynamic panel specification of the model (where the areas' effects can change over time), we use the two-step system GMM estimator with Windmeijer (2005) corrected standard error in dynamic panel specification developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). Moreover, in order to deal with suspected endogeneity problem between the stability of the financial system and economic development (i.e. for instance changes in the economic conditions could lead to an increase in the demand or supply of loans) we instrument FS including lagged levels and differences. As usual, we check the correctness of the model through the Sargan test of over-identifying restrictions for validity of the instruments, while the Arellano-Bond test is, instead, used for testing the autocorrelation between the errors terms over-time. See Table 4 for a description of the variables. In estimating the GMM model we rely on STATA 13.

[1] GDP per worker is constructed by updating the LMA value-added data from ISTAT through the period of 2006 to 2012 with data from the Bureau van Dijk AIDA data set (AIDA is a database providing balance sheets and other information about Italian firms with a turnover of at least one million euro. See for further information: http://aida.bvdep.com/). (see also Destefanis et al. 2014; Barra et al. 2016a, 2016b).

Variables	*Symbol*	*Description*
Dependent variable		
Local economic development	**GDPC**	Sum of the gross values added of all units divided by workers
Measures of Financial Stability- Z-score ROA		
Bank distress	**ZROA**	(Ratio of total equity to total assets+ Equity to total assets ratio)/ Standard deviation of profitability measured by the return on assets
Capitalisation	**ETA**	Equity to total assets ratio
Return on average assets	**ROA**	Ratio of total equity to total assets
Standard deviation of return on average assets	**SD_{ROA}**	Standard deviation of profitability measured by the return on assets
Measures of Financial Stability - Z-score ROE		
Bank distress	**ZROE**	(1+Ratio of total equity to total assets)/ Standard deviation of profitability measured by the return on equity
Return on average equity	**ROE**	Ratio of profit to total equity
Standard deviation of return on average equity	**SD_{ROE}**	Standard deviation of profitability measured by the return on equity
Measures of Financial Stability - CAMELS		
Capitalisation	**ETA**	Equity to total assets ratio
Asset quality	**NPLL**	Non performing loans to total loans ratio
Management	**CTA**	Cost to total asset ratio
Earning (1)	**ROA**	Ratio of total equity to total assets
Earning (2)	**ROE**	Ratio of profit to total equity
Liquidity	**LD**	Loans to deposit ratio
Sensitivity	**SR**	Services to revenue ratio
Controls		
Labour growth	**LG**	Number of employed individuals at time t minus the number of employed individuals at time t-1
Technological progress	**TPC**	Ratio between service workers and the sum of industry plus service workers divided by the population in each area
Branch density	**BD**	Number of branches per square kilometre
Timing	**TIME**	Time trend

Table 4 Description of the variables

Notes Our elaboration

3.2. Measure of Financial Stability

A widely used indicator of bank soundness and financial instability is the Z-score (see among others Laeven and Levine, 2009; Hesse and Cihak, 2007; Unde and Heimeshoff, 2009; Chiaramonte et al. 2015). More specifically, in order to proxy bank insolvency risk, we use two types of Z-score measures based on either the return on assets or the return on equity, represented by $ZROA$ or $ZROE$, respectively. For each bank i and time t, $ZROA$ and $ZROE$ are defined as follows:

$$ZROA_{i,t} = \frac{ETA_{i,t} + ROA_{i,t}}{\sigma ROA_{i,t}} \tag{2}$$

$$ZROE_{i,t} = \frac{1 + ROE_{i,t}}{\sigma ROE_{i,t}} \tag{3}$$

where ETA is the level of capitalisation of the bank (i.e. Equity to Total Assets), ROA denotes the ratio between profit and total assets (i.e. Return on Assets), ROE indicates the ratio between profit and total equity (i.e. Return on Equity), σROA and σROE are the standard deviation of the ROA and ROE, respectively, in the period analysed[2]. Following Agoraki et al. (2011) and Soedarmono et al. (2013), σROA and σROE at time t are both calculated on the basis of observations of ROA and ROE, respectively, from time t to $t-2$ (a three period-based rolling window). Both the measures are considered as good proxies of bank's distance to the defaults (Rojas-Suarez, 2001) and they do not require strong assumptions about the distribution of the return on assets (Strobel, 2011). Both combine banks' buffers (capital and profits) with the risks they face (measured by the standard deviation of returns); more specifically, they reflects the number of standard deviation by which returns would have to fall from the mean in order to wipe out equity. A higher value of Z-score implies a lower probability of insolvency risk (Unde and Heimeshoff, 2009) and greater stability (e.g. inverse of the probability of defaults), providing a direct measure of the banking system stability. The Z-score will then increase with the banks' profitability and capital ratio and, instead, decrease with increases in the conditional volatility. Therefore, we expect a positive sign for the relationship between Z-scores (ZROA and ZROE) and economic development.

As alternative to the Z-score, in order to capture financial vulnerability of banks and to predict their distress, we use CAMELS variables (see for instance Poghosyan and Čihák, 2011; Chiaramonte et al. 2015) which are related to specific bank characteristics such as **C**apital, **A**ssett quality, **M**anagement; **E**arning, **L**iquidity and **S**ensitivity to market risk. It is an indicator of bank soundness dependent of financial accounting values, assuming that accounting data are a good proxy of bank quality as well as, of bank's financial vulnerability. The first component of the CAMELS variable is a proxy of bank's capital measured by the ratio of total equity to total assets (ETA). Higher values of ETA means that banks are more resilient to shocks (e.g. low leverage); so we expect a positive sign for the relation between ETA and economic development. A proxy of asset quality is the second covariate inside the CAMELS variable, being the ratio of non-performing loans to total loans (NPLL). The higher is the ratio, the lower is the quality of the bank's loan portfolio and the higher is the probability of bank distress. Therefore, we expect a negative sign between NPLL and economic development. Managerial quality (third component) is proxied by the ratio of cost to total assets (CTA). Higher values of this ratio indicate low managerial quality and a higher probability of distress. We expect a negative sign between CTA and economic development. As for Earning, the fourth component, it is measureed through either the return on average assets (ROA) or the return on average equity (ROE). An increase in profitability reduces the likelihood of a distress event,

[2] Due to its skewness, we use a log transformation of the z-score.

therefore we expect a positive sign between both ROA and ROE and economic development. Liquidity, the fifth component, is measured by the net loans to deposit ratio (LD). Higher liquidity may better satisfy firms and households demand for financial services. On the other hand higher liquidity may also lead to a higher probability of distress as banks that finance large portions of their loan portfolios with short term liabilities are more exposed to refinancing problems in adverse scenarios. We expect a positive sign between LD and economic development in the former case and a negative sign in the latter. Finally, the sixth component of the CAMELS variable corresponds to the sensitivity to market risk proxied by the services to revenue ratio (SR). Diversification could lead to a reduction of risks and therefore to a lower probability of insolvency and to a greater bank stability. It is also true that a higher dependence from the market related income may, instead, decrease bank's stability especially in time of financial market crises. Therefore, we expect a positive sign between SR and economic development in the former case and, instead, a negative sign in the latter case.

3.3. Data

Data on financial intermediaries were collected from BilBank 2000 database distributed by ABI (Associazione Bancaria Italiana) having a large time extension and being rich of information on bank balance sheets over the 2001-2012 period (see Table 4 for more details on the definition of the variables)[3]. We focus on the Italian context being a promising field of analysis, especially in the European landscape, due to the territorially highly disaggregated data availability, the financial reforms (privatization and Second Banking Directive) occurred after 1990 and the integration of markets.

The sample of banks consists on cooperative, commercial and popular banks, a less than other branches of banks located abroad. In particular, we use a sample of Italian banks classified by the Bank of Italy as: major (average funds intermediated more than 65 billion euro), large (average funds intermediated between 27 and 65 billion euro), medium (average funds intermediated between 9 and 27 billion euro), small (average funds intermediated between 1.3 and 9 billion euro) and minor (average funds intermediated less than 1.3 billion euro). We can account on a highly disaggregated spatial stratification than enables us to capture the differences between geographical areas, obtaining more accurate estimates (LMAs). For comparison check, notice that there are nowadays in Italy 110 *province* (the NUTS3 category) while 686 LMAs have been identified by the Italian Statistical Office (ISTAT, 2005) highlighting remarkable differences in economic performance across the Italian territory. All monetary aggregates are in thousands of deflated 2005 Euros.

Employment is from the ISTAT LMA data set. Also the technology proxy (the ratio between service workers and the sum of industry plus service workers) comes from that data set. GDP per worker is constructed by updating the LMA value-added data from ISTAT through the period of 2006 to 2012 with data from the Bureau van Dijk AIDA data set (AIDA is a database providing balance sheets and other information about Italian firms with a turnover of at least one million euro. See for further information: http://aida.bvdep.com/) (see also Destefanis et al. 2014; Barra et al. 2016a, 2016b; Barra and Zotti 2017a, 2017b). LMA-level data for branches, deposits and loans are from the Bank of Italy data set (Bollettino Statistico). Table 5 describes the sample used in the analysis by year and geographical location, taking the average of variables for LMA-level.

[3] We do not have information on some of the variables used in the analysis at LMA level for years before 2001 and after 2012.

	GDPC	ZROA	ETA	ROA	SD_{ROA}	ZROE	ROE	SD_{ROE}	NPLL	CTA	LD	SR	LG	TPC	BD
North-West	0.050	23.454	0.131	0.010	0.008	19.505	0.092	0.067	0.013	0.038	1.547	0.231	0.008	0.663	0.158
(29 %)	0.007	9.723	0.034	0.005	0.006	6.258	0.050	0.038	0.010	0.010	0.370	0.092	0.024	0.114	0.176
North-East	0.051	18.295	0.121	0.010	0.011	16.277	0.101	0.088	0.016	0.041	1.465	0.252	0.004	0.650	0.205
(15 %)	0.008	9.504	0.034	0.007	0.008	7.119	0.007	0.055	0.013	0.013	0.394	0.088	0.650	0.137	0.257
Centre	0.047	19.739	0.120	0.011	0.010	18.444	0.106	0.078	0.018	0.042	1.315	0.235	0.007	0.705	0.123
(21 %)	0.007	9.389	0.030	0.007	0.008	7.283	0.065	0.052	0.013	0.010	0.393	0.058	0.029	0.108	0.116
South	0.044	23.296	0.132	0.010	0.008	19.575	0.091	0.067	0.024	0.041	0.965	0.218	0.001	0.705	0.130
(35 %)	0.009	11.107	0.043	0.008	0.006	6.420	0.066	0.042	0.017	0.010	0.396	0.074	0.031	0.111	0.200
Italy	0.047	22.182	0.128	0.011	0.009	0.071	0.096	0.071	0.018	0.040	1.283	0.227	0.005	0.683	0.139
(N=3361)	0.008	10.520	0.038	0.007	0.007	0.046	0.060	0.046	0.015	0.010	0.468	0.079	0.029	0.121	0.169

Table 5 Descriptive Statistics of Variables used in the Analysis

Notes Our elaboration (mean values on 2001-2012 period)

4. Empirical Evidence

4.1 Financial Stability-Economic Development Nexus at Labour Market Areas Level

The GMM estimates of the local economic growth model are presented in Table 6 (Models 1-9). All estimates are carried out on the full sample period (2001-2012). The results of the Arellano-Bond test confirm the appropriateness of the 2nd order autoregressive specification while the Sargan test is always insignificant, corroborating the validity of instruments and the correctness of the model.
First of all, the lagged value of GDP per capita (GDPC) has a significant coefficient with positive sign in all the models. The log of the Z-score is positive and statistically significant, as predicted, both when the ZROA (Table 3, Column 1) and when the ZROE is used (Table 6, Column 2). The positive relationship between the Z-score and local economic development means that greater bank stability (lower probability of insolvency risk as proxied by higher values of Z-scores) fosters economic development of labour market areas, through a direct channel of influence. The higher is the stability of the system in term of risk (capitalization and profitability in order to cover possible risks) and ability to allocate resources into good investments or projects, the higher is the rate of economic performance of a certain labour market area. To take into account whether the socio-economic environment plays a role in shaping the relationship between bank stability and economic development, we control for a measure of the job market (LG), for the local state of technological and industry structure (TPC) and for a measure of the bank presence on the territory (BD). Estimates, for all models, show a positive and significant relationship between both technology and bank presence on the market and local economic development. Indeed, a high level of technology in the industry sector brings up local economic development. The higher density of branches means meeting more customers and also more operations that bring more profit, burdening a positive effect on economic development.

	(1) ln(GDPC)	(2) ln(GDPC)	(3) ln(GDPC)	(4) ln(GDPC)	(5) ln(GDPC)	(6) ln(GDPC)	(7) ln(GDPC)	(8) ln(GDPC)	(9) ln(GDPC)
$ln(GDPC)_{t-1}$	**0.850*** **	**0.863*** **	**0.859*** **	**0.787*** **	**0.860*** **	**0.797*** **	**0.863*** **	**0.793*** **	**0.798*** **
	(0.0301)	(0.0297)	(0.0330)	(0.0447)	(0.0296)	(0.0438)	(0.0298)	(0.0433)	(0.0428)
ln(ZROA)	**0.0121*** **								
	(0.00350)								
ln(ZROE)		**0.0130*** **							
		(0.00399)							
ln(ETA)			0.00687					-0.00988	
			(0.00928)					(0.00843)	
ln(ROA)				**0.0153*** **				**0.0163*** **	
				(0.00315)				(0.00316)	
$ln(SD_{ROA})$					**-0.00494*** **			**-0.00545*** **	
					(0.00168)			(0.00162)	
ln(ROE)						**0.0157*** **			**0.0158*** **
						(0.00310)			(0.00309)
$ln(SD_{ROE})$							-0.00279		**-0.00501** **
							(0.00215)		(0.00217)
LG	**-0.0613***	**-0.0700** **	**-0.0802** **	**-0.0946*** **	**-0.0676***	**-0.0991*** **	**-0.0735** **	**-0.0768** **	**-0.0808** **
	(0.0347)	(0.0351)	(0.0353)	(0.0367)	(0.0349)	(0.0364)	(0.0359)	(0.0373)	(0.0369)
ln(TPC)	**0.0202*** **	**0.0214*** **	**0.0258*** **	**0.0276*** **	**0.0207*** **	**0.0263*** **	**0.0238*** **	**0.0234*** **	**0.0250*** **
	(0.00566)	(0.00532)	(0.00532)	(0.00627)	(0.00538)	(0.00617)	(0.00546)	(0.00648)	(0.00619)
ln(BD)	**0.0225*** **	**0.0195*** **	**0.0213*** **	**0.0285*** **	**0.0208*** **	**0.0258*** **	**0.0208*** **	**0.0253*** **	**0.0245*** **
	(0.00529)	(0.00504)	(0.00561)	(0.00729)	(0.00505)	(0.00693)	(0.00520)	(0.00708)	(0.00696)
CONST	**-0.407*** **	**-0.378*** **	**-0.332*** **	**-0.482*** **	**-0.394*** **	**-0.488*** **	**-0.349*** **	**-0.542*** **	**-0.515*** **
	(0.0880)	(0.0870)	(0.0913)	(0.117)	(0.0856)	(0.120)	(0.0841)	(0.117)	(0.118)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.620	0.890	0.907	0.909	0.730	0.884	0.982	0.794	0.968
Sargan	0.371	0.345	0.345	0.371	0.339	0.393	0.349	0.139	0.249
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Obs	2984	2984	2984	2955	2984	2955	2984	2955	2955

Table 6 Effect of financial stability on local economic development – Using Z-score and its components as a measure of financial stability

*Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01;*

Notes AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.

In order to explore whether different sources of financial stability contribute the most to economic development, we decompose the financial stability indicator and regress, individually, the variable for economic development on the three components of the ZROA such as such as profitability (return on assets), capitalization (equity of total assets) and volatility of profitability (standard deviation of return on assets) and on the two components of the ZROE such as the ratio between profit and total equity (return on equity) and volatility of profitability (standard deviation of return on equity). When using the components of ZROA, results, presented in Table 6, Columns 3, 4 and 5) show that the positive relationship between bank stability and economic development of labour market areas is largely explained by the bank's return on average assets (ROA). The empirical evidence shows the same pattern also when we decompose the ZROE where return on equity (ROE) seems to be the only variable explaining the relationship between stability and GDP per capita (Table 6, Columns 6-7). Results are also confirmed when the individual components of both ZROA and ZROE are jointly used (see Table 6, Columns 8-9).

4.2. Do CAMELS Related Covariates Influence Economic Development of Labour Market Areas?

Although the Z-score is a recognized measure of bank stabilty in the literature (see among other Houston et al. 2010; Beck et al. 2012; Fiordelisi and Mare, 2014; Chiaromonte et al. 2015), it has also been criticized due to its high dependence on the quality of the accounting framework. Indeed, as banks may smooth the accounting data, the Z-score turns out to be as positively overlook of bank financial stability (Leaven and Majnemi, 2003) as well as a poor measure of bank distress (Poghsoy and Cihak, 2011). Therefore, we also present the results by using CAMELS variables as a measure of bank financial stability.

Table 7, Columns 1-7, shows that the asset quality measure (NPLL), the proxy for managerial quality (CTA) and the earnings variables (ROA and ROE) are statistically significant with the expected sign. The ratio of non-performing loans to toal loans (NPLL) is negative, confirming that the higher is the ratio, the lower is the quality of the bank's portfolio and the higher is the probability of bank distress, having negative effects on local economic development. The cost to total assets ratio (CTA) is also negative, confirming that part of the financial stability-economic development nexus goes through the managerial quality of the banks. Indeed, financial institutions with a higher value of cost to total asset ratio have a low managerial quality and a higher probability of distress, having a negative effect on local economic development. The return on average assets (ROA) is positive; as expected, the relationship between financial stability and economic development seems to be related to the level of bank profitability. Indeed, an increase in profitability reduces the likelihood of distress having a positive effect on local economic development. The same positive relationship has also been found when the return on equity has been used (ROE). The proxy for liquidity, loans to deposit ratio (LD), has a positive sign, meaning that higher liquidity leads to more investments and therefore to a higher local economic development. With regard to the last CAMELS variable, the proxy for the sensitivity to market ratio (SR), the empirical evidence shows that services to market ratio is positive and statistically significant, confirming that the relationship between financial stability and local economic development also depends on the bank diversification of risk which could lead to a lower probability of insolvency and to a greater bank stability, having positive effects on local economic development. The results are confirmed when the CAMELS variables are jointly used (see Table 7, Columns 8-9). Finally, as for the socio-economic environmental characteristics, results confirm a positive and significant relationship between technology (TPC) and bank presence on the market (BD) and local economic development.

	(1)	(2)	(3)	(4)	(5)	()	(7)	(8)	(9)
	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)
$ln(GDPC)_{t-1}$	**0.859***** (0.0330)	**0.802***** (0.0424)	**0.845***** (0.0308)	**0.787***** (0.0447)	**0.797***** (0.0438)	**0.841***** (0.0343)	**0.857***** (0.0411)	**0.792***** (0.0408)	**0.798***** (0.0412)
ln(ETA)	0.00687 (0.00928)							-0.00712 (0.00864)	0.00286 (0.00876)
ln(NPLL)		**-0.0120***** (0.00354)						**-0.00751***** (0.00240)	**-0.00782***** (0.00232)
ln(CTA)			**-0.0284***** (0.00564)					**-0.0247***** (0.00597)	**-0.0253***** (0.00605)
ln(ROA)				**0.0153***** (0.00315)				**0.0143***** (0.00294)	
ln(ROE)					**0.0157***** (0.00310)				**0.0138***** (0.00290)
ln(LD)						**0.0422***** (0.0112)		**0.0253***** (0.00767)	**0.0237***** (0.00750)
ln(SR)							0.00448 (0.00666)	**0.0188***** (0.00574)	**0.0183***** (0.00560)
LG	**-0.0802**** (0.0353)	**-0.0662*** (0.0339)	**-0.0498** (0.0366)	**-0.0946***** (0.0367)	**-0.0991***** (0.0364)	**-0.0862**** (0.0358)	**-0.0695**** (0.0352)	-0.0556 (0.0377)	-0.0562 (0.0377)
ln(TPC)	**0.0258***** (0.00532)	**0.0244***** (0.00568)	**0.0203***** (0.00562)	**0.0276***** (0.00627)	**0.0263***** (0.00617)	**0.0293***** (0.00553)	**0.0259***** (0.00526)	**0.0204***** (0.00646)	**0.0193***** (0.00630)
ln(BD)	**0.0213***** (0.00561)	**0.0274***** (0.00658)	**0.0216***** (0.00515)	**0.0285***** (0.00729)	**0.0258***** (0.00693)	**0.0174***** (0.00523)	**0.0200***** (0.00594)	**0.0191***** (0.00591)	**0.0181***** (0.00613)
CONST	**-0.332***** (0.0913)	**-0.565***** (0.134)	**-0.476***** (0.0835)	**-0.482***** (0.117)	**-0.488***** (0.120)	**-0.400***** (0.0994)	**-0.351***** (0.126)	**-0.585***** (0.121)	**-0.586***** (0.123)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.907	0.994	0.913	0.909	0.884	0.969	0.809	0.976	0.966
Sargan	0.345	0.327	0.370	0.371	0.393	0,349	0.352	0.479	0.513
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Obs	2984	2973	2984	2955	2955	2984	2984	2947	2947

Table 7 Effect of financial stability on local economic development – Using CAMELS variables as a measure of financial stability

*Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01;*

Notes AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.

4.3 A Further Exploration of the Results

We performed a number of tests to further explore the results. Firstly, we examine whether the results depend on the distribution of the financial stability by focusing on the banks above and below the median value of the financial distress proxy used in the analysis. The idea is to verify whether the main results are driven by banks with a high or low level of stability. More specifically, we repeat the analysis firstly by using the ZROA and its components such a measure of financial stability (see Table 8, Columns 1-10), for the banks with a value of financial distress above the median (Table 8, Columns 1, 3, 5, 7 and 9) and for those below (Table 8, Columns 2, 4, 6, 8 and 10). Results are generally confirmed, and starting from the models when the ZROA is taken into account (see Table 8, Columns 1-2), we still find that the proxy of financial stability of banks has a direct positive and significant effect on local economic development especially when those with a value of stability below the median have been considerd (Table 8, Column 2). When the ZROA is decomposed and each of its components is jointly used, the empirical evidence confirms that the positive relationship between bank stability and local economic development is largely explained by the bank's return on average assets when banks with a value of stability both above and below the median have been considered (Table 8, Columns 9-10). We also repeat the analysis by using the ZROE and its components such a measure of financial stability (see Table 9, Columns 1-8), for the banks with a value of financial distress above the median (Table 9, Columns 1, 3, 5 and 7) and for those below (Table 9, Columns 2, 4, 6).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)
$ln(GDPC)_{t-1}$	**0.795***** (0.0508)	**0.895***** (0.0348)	**0.863***** (0.0320)	**0.834***** (0.0536)	**0.937***** (0.0266)	**0.734***** (0.0690)	**0.880***** (0.0334)	**0.781***** (0.0586)	**0.741***** (0.0614)	**0.917***** (0.0326)
ln(ZROA)	-0.00764 (0.00714)	**0.0191***** (0.00435)								
ln(ETA)			0.0170 (0.0145)	-0.00853 (0.0134)					-0.0127 (0.0123)	0.00808 (0.0100)
ln(ROA)					**0.0110***** (0.00302)	0.00341 (0.00318)			**0.0175***** (0.00400)	**0.00751**** (0.00294)
$ln(SD_{ROA})$							**-0.0118***** (0.00216)	0.00255 (0.00296)	0.00160 (0.00340)	**-0.00687***** (0.00230)
LG	-0.0588 (0.0467)	-0.0598 (0.0551)	-0.0160 (0.0449)	**-0.118**** (0.0583)	-0.0885* (0.0479)	-0.0863 (0.0646)	-0.0961 (0.0628)	-0.0560 (0.0465)	-0.0657 (0.0515)	-0.0885 (0.0552)
ln(TPC)	**0.0395***** (0.0101)	**0.00925*** (0.00538)	**0.0484***** (0.0116)	**0.0191***** (0.00663)	**0.0150*** (0.00831)	**0.0201**** (0.00907)	0.0114 (0.00783)	**0.0266***** (0.00952)	**0.0422***** (0.0117)	0.00804 (0.00533)
ln(BD)	**0.0301***** (0.00964)	**0.0130***** (0.00497)	**0.0260***** (0.00702)	**0.0289***** (0.00858)	-0.000647 (0.00423)	**0.0296***** (0.0102)	0.00759 (0.00536)	**0.0296***** (0.0101)	**0.0340***** (0.0116)	**0.00844*** (0.00491)
CONST	**-0.496***** (0.133)	**-0.318***** (0.106)	**-0.288***** (0.0890)	**-0.419***** (0.152)	-0.0925 (0.0780)	**-0.722***** (0.195)	**-0.443***** (0.106)	**-0.540***** (0.152)	**-0.608***** (0.154)	**-0.216**** (0.0978)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.681	0.354	0.597	0.140	0.249	0.100	0.887	0.696	0.681	0.420
Sargan	0.297	0.627	0.745	0.557	0.526	0.517	0.676	0.201	0.121	0.344
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Obs	1586	1398	1447	1537	1561	1394	1367	1617	1570	1385

Table 8 Effect of financial stability on local economic development – Using values below and above the median of financial distress variable (ZROA) and its components

*Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01;*

Notes AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.

Columns (1), (3), (5), (7), (9) are associated to banks with a level of financial distress proxy above the median. Columns (2), (4), (6), (8), (10) are associated to banks with a level of financial distress proxy below the median.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)
$ln(GDPC)_{t-1}$	**0.764***** (0.0664)	**0.797***** (0.0349)	**0.888***** (0.0331)	**0.717***** (0.0707)	**0.810***** (0.0366)	**0.695***** (0.0722)	**0.753***** (0.0658)	**0.801***** (0.0362)
ln(ZROE)	**-0.0517***** (0.0185)	**0.0480***** (0.00486)						
ln(ROE)			**0.0130***** (0.00311)	**0.00715**** (0.00329)			**0.0117***** (0.00360)	0.00267 (0.00301)
$ln(SD_{ROE})$					**-0.0254***** (0.00248)	**0.0297***** (0.00773)	0.00751 (0.00781)	**-0.0255***** (0.00246)
LG	-0.0878 (0.0583)	-0.0621 (0.0427)	**-0.101**** (0.0464)	-0.0288 (0.0497)	**-0.0953**** (0.0434)	-0.0668 (0.0591)	-0.0783 (0.0658)	-0.0532 (0.0430)
ln(TPC)	-0.0169 (0.0443)	**0.0161**** (0.00642)	**0.0250***** (0.00763)	**0.0168*** (0.00998)	**0.0145**** (0.00640)	0.00309 (0.0599)	0.0198 (0.0433)	**0.0156**** (0.00639)
ln(BD)	**0.0230**** (0.00929)	**0.0213***** (0.00524)	**0.0131***** (0.00506)	**0.0268***** (0.00976)	**0.0208***** (0.00485)	**0.0288***** (0.0110)	**0.0228**** (0.00987)	**0.0204***** (0.00551)
CONST	**-0.516***** (0.177)	**-0.665***** (0.104)	**-0.224**** (0.0938)	**-0.787***** (0.205)	**-0.624***** (0.112)	**-0.698***** (0.198)	**-0.616***** (0.187)	**-0.649***** (0.103)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.513	0.431	0.580	0.289	0.549	0.788	0.652	0.454
Sargan	0.443	0.255	0.591	0.758	0.715	0.152	0.111	0.411
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Obs	1497	1487	1581	1374	1491	1493	1484	1471

Table 9 Effect of financial stability on local economic development – Using values below and above the median of financial distress variable (ZROE) and its components

*Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01;*

Notes AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.

Columns (1), (3), (5), (7) are associated to banks with a level of financial distress proxy above the median. Columns (2), (4), (6), (8) are associated to banks with a level of financial distress proxy below the median.

Secondly, we examine whether the results depend on the distribution of the measure of the economic development used in the analysis by dividing the areas according to the gross domestic product per capita (GDPC) in values above and below the median (see Tables 10-11). The idea is to further explore whether the main results are driven by the fact that some banks are located in area characterized by a high level of economic development while other are positioned in areas with a low level of economic development. Specifically, we repeat the analysis first using the sub-sample of banks in areas with a GDP per capita above the median value, that is, taking into consideration the areas which grow the most (see Table 10, Columns 1, 3, 5, 7, 9; Table 11, Columns 1, 3, 5, 7) and then we use those with a GDP per capita below the median value, that is, taking into account those areas with low economic development (see Table 10, Columns 2, 4, 6, 8, 10; Table 11, Columns 2, 4, 6, 8). Results show that financial stability of banks has a direct positive and significant effect on local economic development, especially when banks located in area characterized by a high level of economic development have been taken into account (Table 10, Clumn 1; Table 11, Column 1). This reveals the presence of virtuous circles characterized by stable banks, located in the territories that grow more, which in turn stimulate to reach higher levels of operations. Again, when the financial stability proxies have been decomposed, the positive relationship between bank stability and local economic development is largely explained by the bank's return on average assets (or bank's return on equity) for banks located in area characterized by both a high and a low level of economic development (Table 10, Columns 9 and 10; Table 11, Columns 7 and 8).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)
$ln(GDPC)_{t-1}$	**0.550***** (0.0531)	**0.879***** (0.0321)	**0.577***** (0.0562)	**0.884***** (0.0290)	**0.503***** (0.0641)	**0.832***** (0.0338)	**0.561***** (0.0539)	**0.877***** (0.0289)	**0.495***** (0.0580)	**0.858***** (0.0304)
ln(ZROA)	**0.0152***** (0.00355)	0.00674 (0.00659)								
ln(ETA)			-0.00138 (0.00943)	0.00840 (0.0127)					-0.00712 (0.0102)	-0.00836 (0.0108)
ln(ROA)					**0.0151***** (0.00462)	**0.0141***** (0.00216)			**0.0156***** (0.00444)	**0.0150***** (0.00225)
$ln(SD_{ROA})$							**-0.00643***** (0.00173)	-0.00256 (0.00290)	**-0.00641***** (0.00180)	-0.00427 (0.00285)
LG	0.0111 (0.0464)	-0.0557 (0.0517)	-0.00651 (0.0507)	-0.0722 (0.0488)	-0.0569 (0.0529)	-0.0725 (0.0468)	0.0000396 (0.0475)	-0.0558 (0.0489)	-0.0527 (0.0569)	-0.0815* (0.0486)
ln(TPC)	**0.0304***** (0.00948)	**0.0132*** (0.00738)	**0.0363***** (0.00864)	**0.0160**** (0.00662)	**0.0385***** (0.0105)	**0.0126*** (0.00750)	**0.0327***** (0.00955)	0.0116 (0.00708)	**0.0351***** (0.0109)	0.00895 (0.00747)
ln(BD)	**0.0114**** (0.00563)	0.00702 (0.00526)	**0.0117**** (0.00545)	**0.00915*** (0.00514)	**0.0124*** (0.00651)	**0.0135**** (0.00612)	**0.0117**** (0.00489)	0.00520 (0.00545)	**0.0120*** (0.00635)	0.00879 (0.00549)
CONST	**-1.319***** (0.158)	**-0.359***** (0.102)	**-1.190***** (0.160)	**-0.300***** (0.0952)	**-1.336***** (0.172)	**-0.407***** (0.102)	**-1.304***** (0.160)	**-0.376***** (0.0915)	**-1.437***** (0.158)	**-0.387***** (0.1000)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.857	0.464	0.369	0.522	0.586	0.432	0.903	0.469	0.913	0.368
Sargan	0.395	0.310	0.386	0.357	0.382	0.494	0.415	0.507	0.774	0.616
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Obs	1567	1417	1567	1417	1562	1393	1567	1417	1562	1393

Table 10 *Effect of financial stability on local economic development – Using Z-Score variables as a measure of financial stability (ZROA) and values of GDPC below and above the median*

*Standard errors in brackets; * p < 0.10, ** p < 0.05, *** p < 0.01;*

Notes *AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.*

Columns (1), (3), (5), (7), (9) are associated to banks with a level of GDPC above the median. Columns (2), (4), (6), (8), (10) are associated to banks with a level of GDPC below the median.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)	ln(GDPC)
$ln(GDPC)_{t-1}$	**0.548***** (0.0549)	**0.884***** (0.0298)	**0.501***** (0.0611)	**0.845***** (0.0335)	**0.561***** (0.0553)	**0.881***** (0.0307)	**0.490***** (0.0547)	**0.863***** (0.0311)
ln(ZROE)	**0.0279***** (0.00495)	0.00280 (0.00633)						
ln(ROE)			**0.0151***** (0.00468)	**0.0142***** (0.00227)			**0.0157***** (0.00454)	**0.0147***** (0.00241)
$ln(SD_{ROE})$					**-0.00962***** (0.00269)	0.00193 (0.00311)	**-0.0110***** (0.00284)	-0.000853 (0.00278)
LG	0.00238 (0.0467)	-0.0582 (0.0484)	-0.0635 (0.0531)	**-0.0851*** (0.0486)	-0.000386 (0.0477)	-0.0652 (0.0484)	-0.0444 (0.0558)	**-0.0928**** (0.0455)
ln(TPC)	**0.0305***** (0.00941)	**0.0151**** (0.00675)	**0.0372***** (0.0108)	0.0128 (0.00777)	**0.0328***** (0.00945)	**0.0152**** (0.00685)	**0.0333***** (0.0106)	**0.0126*** (0.00709)
ln(BD)	**0.0106**** (0.00523)	**0.00756** (0.00514)	**0.0112*** (0.00665)	**0.0115*** (0.00621)	**0.0115**** (0.00545)	0.00639 (0.00512)	**0.0101*** (0.00597)	0.00911 (0.00563)
CONST	**-1.365***** (0.164)	**-0.329***** (0.0909)	**-1.374***** (0.169)	**-0.395***** (0.100)	**-1.293***** (0.160)	**-0.323***** (0.0929)	**-1.477***** (0.151)	**-0.348***** (0.0959)
TIME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AB(2)	0.768	0.501	0.547	0.420	0.610	0.553	0.752	0.402
Sargan	0.435	0.464	0.357	0.507	0.440	0.484	0.221	0.330
Period	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012	2001-2012
Observations	1567	1417	1562	1393	1567	1417	1562	1393

Table 11 *Effect of financial stability on local economic development – Using Z-Score variables as a measure of financial stability (ZROE) and values of GDPC below and above the median*

*Standard errors in brackets; * p < 0.1, ** p < 0.05, *** p < 0.01;*

Notes *AB(2): test for autocorrelation (second order) between error terms over time (H0: no autocorrelation); Sargan: test of over-identifying restrictions for validity of instruments (H0: validity of instruments); p-value reported for AB(2) and Sargan test; percentage of cooperative and commercial banks included in all models (popular banks as benchmark group); macro areas included in all models (south region used as benchmark group); See Tables 1 and 2 for the description of the variables used in the analysis.*

Columns (1), (3), (5), (7) are associated to banks with a level of GDPC above the median. Columns (2), (4), (6), (8) are associated to banks with a level of GDPC below the median.

5. Summary and Concluding Remarks

Since financial markets are more properly defined at local level as well as legal and institutional information are more homogenous when the analysis is performed within the territories of one country, the paper empirically addresses the relationship between financial stability of the banking system and economic development of labour market areas in Italy. Although the idea that the financial system could contribute to the social economic and cultural development of the area in which banks are located has been discussed in the literature, only a few quantitative estimates regarding the impact of the banking system's level of distress on the community are present and, to the best of our knowledge, our study is the first to explore the finance stability–growth nexus at a territorially very disaggregated level such as labour market areas.

We justify our approach by considering that more stable banks can exert a positive role in the territory in several ways such as improving the efficiency in the allocation of savings across investment loans, producing better information through long and strong lending relationship, financing entrepreneurs engaging in research and development activities and decreasing the costs for firms and households of financing spending. To shed more light upon this relevant topic, we have focused on the Italian experience and tried to quantify the impact of the financial stability of banks on local economic development, using sub-regional geographical areas where the bulk of the labour force lives and works.

Based on a rich sample of Italian banks over the 2001–2012 period, and using a two-step system GMM estimator, our empirical results highlight that a higher degree of stability in the banking system is associated with an increase in economic development of labour market areas and therefore promotes and positive predicts high level of economic performance. Results are stable to different indicators of bank soundness and financial instability; the positive relationship between bank stability and local economic development is mainly and largely explained by the bank's return on average assets. A higher ratio between profit and total assets is related to a higher level of capitalization and therefore of economic development. Moreover, a higher level of bank's return on average assets increase the ability to allocate resources into good investments or projects (e.g. helping firms and households in financing spending), positively affecting the rate of economic development of a certain area. Several components capturing banks' financial stability such as asset quality (non-performing loans to total loans ratio), managerial quality (cost to total assets), a measure of earnings (return on average assets), liquidity (loans to total deposit ratio) and the sensitivity to market risk (services to revenue ratio) have important effects on local economic development.

Financial stability, occurring when the banking system works in terms of health and governance, may ensure social welfare and promote regional and sub-regional development. When the financial system is healthy and stable, financial intermediaries can grant loans to households and businesses more easily in order to increase investments in the area, producing an increase in the volume of goods and services that, in turn, improves economic development. Financial stability may indeed be considered as a public good, having a negative effect on social welfare and economic growth when risks are not regularly checked; this leads to the conclusion that it won't be provided if left solely to the market and that policy makers and regulators need to ensure the smooth functioning of the banking system in order to promote local economic development. This suggests that an effort is a necessary step towards the regulation of the financial institutions, to monitor systematic risks and to make the stability of the banking system an important prerequisite for sustainable economic growth.

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