How functional and geographic diversification affect bank profitability during the crisis

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Highlights

1. Functional and geographic diversification strategies affect bank profitability.
2. The impact of diversification on bank performance is markedly different for mutual banks.
3. Financial and Sovereign Debt Crises produce different effects on bank risk.
4. Bank profitability post financial crisis strictly relates to non-interest income components.
5. Geographically diversified banks show more stable risk-adjusted financial performance.

HOW FUNCTIONAL AND GEOGRAPHIC DIVERSIFICATION AFFECT BANK PROFITABILITY DURING THE CRISIS

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ABSTRACT

Using bank-level data on 491 Italian banks over the period 2006-2012, we investigate the impact of functional and geographic diversification on bank performance during 2008's financial and 2010's sovereign debt crises. Both scenarios negatively affect bank profitability while discordant effects emerge in case of the Z-Score analysis. Italian banks' risk stays unaffected by the 2008's episode, while the sovereign debt crisis increases such risk. Results differ for the sample of mutual and not-mutual banks being the different banking groups characterised by different size and business models.

JEL classification codes: G20; G21

Keywords: Financial crisis; Bank heterogeneity; Diversification; Geography; Panel data.

1. Introduction

On what activities should banks focus on? Deregulating initiatives, which took place both in Europe and in the U.S. during the last decades, have resulted in an expansion of the scope of bank activities and a shift from traditional to non-traditional sources of income. At the same time, banks became wider spreading their operations across many geographical markets. The implications of such changes on bank performance have been broadly addressed in the literature, but no consensus has been reached at this stage.

Theoretically, the literature on bank diversification has analysed the benefits and costs associated with the type of strategy developed. The positive effects of the revenue diversification strategy are usually associated with the exploitation of economies of scope due to the joint production of a wide range of financial services (Teece, 1982) and the cross-selling of various (fee-based) financial products alongside traditional lending-based services (Herring and Santomero, 1990) with the reduction of information asymmetry (Diamond, 1984; Stein, 2002), the lessening of agency costs of managerial discretion (Stulz, 1990) and the creation of an internal capital markets (Stein, 2002). Alongside the positive effects, adverse implications on performance have been identified (Mazur and Zhang, 2015). Diversification on the one hand can intensify agency problems between corporate insiders and small shareholders (Stulz, 1990), while on the other, increasing the size and scope of a bank's activities introduces the "cost of complexity", which at some point may dominate the benefits that can be achieved (Rajan et al., 2000). As for geographical diversification in banking, the literature suggests that geographic diversity will enhance efficiency (Berger et al., 1999), spread idiosyncratic risk (Diamond, 1984), and reduce agency costs, boosting corporate valuations. Conversely, theories of corporate governance by Jensen and Meckling (1976) suggest that if small shareholders find it difficult to monitor and govern geographically dispersed corporations then corporate insiders will have greater a propensity to extract private benefits from geographically diversified firms with adverse effects on firm valuations. Moreover, when a bank expands geographically it can generate higher risks to the extent that the incumbent intermediaries abandon the riskiest and least profitable customers (Salas and Saurina, 2002) while the increasing distance between branches and headquarters can heighten distance-related agency conflicts and harm firm value (Deng and Elyasiani, 2008).

Despite extensive research on the economic consequences of diversification, the empirical literature does not provide clear evidence as to whether diversification generates net benefits or costs; this could be linked to the fact that it is extraordinarily difficult to unequivocally measure economies of scope or agency problems empirically. As a result, a more recent strand of empirical literature, rather than attempting to measure economies of scope and agency problems directly, has emerged to investigate whether the range of activities and the spreading of operations across markets conducted by financial institutions influences bank performance.

In terms of revenue diversification, Chiorazzo et al. (2008) find that non-interest activities are often associated with profitability gains but also with higher risk because of their unstable nature. Campa and Kedia (2002) and Baele et al. (2007), found net benefits linked to increased bank stability. Stiroh (2004), Laeven and Levine (2007), Mercieca et al. (2007) and Lepetit et al. (2008), conclude that the cost of diversification outweighs its benefit arguing that, in the case of banks that have over expanded into industries with higher competition or lack of expertise, diversification may worsen risk-adjusted performance – this has found to be particularly true for small banks (Goddard, 2008). Acharya et al. (2006) and Chiorazzo et al. (2008) find that income diversification increases the volatility of bank earnings and makes banks more vulnerable to financial distress improving the risk/return trade off.

In relation to the empirical literature on geographic diversification, Hirtle (2007) shows how the increase in the size of the branch network engenders a downturn in bank performance. Deng and Elyasiani (2008) find that geographic diversification is associated with bank holding company (BHC) value enhancement and risk reduction. When controlling for the distance between the headquarters and branches they find that an increased distance is associated with firm value reduction and risk increase. Goetz et al. (2012) find that increases in geographic diversity reduced BHC valuations consistently with the view that an exogenous increase in complexity allows corporate insiders to extract larger private rents with adverse implications on firm value.

As for bank performance and diversification strategies during the financial crisis, Dietrich and Wanzenried (2011) show that banks heavily dependent on interest income are less profitable than more diversified banks. DeYoung and Torna (2013), suggest that non-traditional banking activities had economically meaningful effects on the probability of bank failure during the crisis. As for the Italian case, Vallascas et al. (2012)

show that banks diversified within a narrow range of activity classes exhibited the largest decline in performance because of the financial crisis. They demonstrate that diversification across broader business lines, such as lending and capital market activities, was not linked to underperformance during the crisis. The reason for such a result is that performance losses in traditional banking activities were only weakly correlated with performance losses in investment banking activities during the crisis.

The goal of this paper is to contribute to the literature dedicated to the impact of diversification on bank profitability and risk, investigating whether two types of diversification strategies, i.e. revenue and geographic diversification, may differently affect bank performance. Moreover, in our empirical analysis we investigate whether certain types of institutions are better able to reap the benefits of the two types of diversification, focusing on performance implications both for large and small banks for which diversification appears to be a major issue. In this sense, the Italian banking system represents an ideal experimental setting since it is characterised by a homogenous group of banks – the namely mutual banks. Mutual banks are typically small banks showing a comparative advantage in developing close customer relationships at shorter distances but with limited ability to exploit economies of scale and of scope; in this sense, they offer an alternative business model to traditional commercial banks. Finally, we control for different types of crises, i.e. the 2008 financial crisis and the 2010 sovereign debt crisis.

To address these issues, we use a comprehensive dataset of 491 Italian banks over the period 2006–2012. We show that revenue and geographic diversification play a role in determining bank performance. The relative effects appear, however, to be different between mutual and non-mutual banks suggesting different business strategies for different banks, and with regard to the explicit inclusion of the financial crisis structural break. While the dummy variables representing the two crises unequivocally affect bank profitability in negative way, different effects emerge in the case of the risk analysis. In coherence with anecdotal evidence, Italian banks' risk doesn't appear to be influenced by the first wave of the crisis; conversely, the sovereign debt crisis increased bank risk. This result is shown to be robust for alternative measures of diversification, for different performance measures and also for alternative sub-samples used.

The paper is structured as follows. Section 2 discusses measures of banks' diversification and performance. Section 3 presents the econometric methodology and the data used. Section 3 describes and discusses the robustness of the results. Finally, section 4 concludes the paper.

2. Measures of banks' diversification and performance

To assess the degree of revenue diversification we use income-based measures. As in Brighi and Venturelli (2014), in order to mitigate the problem of overestimation, we disaggregate fee income in relation to the type of activities developed. Traditional income (TRADT) is defined as the sum of gross interest revenues (INT) and Traditional Banking Commissions (TBC). TBC aggregates commissions that are more linked to the traditional banking business (income from guarantees, collection and payment services, factoring, tax collection services, current accounts, etc.). Then we specify non-traditional income (NON_TRADT) as the sum of: 1. gross market and trading commissions (MKT) that comprise fees and commissions revenues from credit derivatives, trading operations of financial instruments and foreign exchange, custody and administration of securities, underwriting operations, servicing of securitisation, placement of securities and financial structure consultancy services; 2. asset management commissions i.e. commissions from portfolio management services, depositary bank services and investment consultancy services (AM); 3. fee-based revenues from the distribution of third-party products and services (DIS). Finally, total operating revenue (TOP) is the sum of traditional income (TRADT) and non-traditional income (NON_TRADT). In relation to the income diversification measure, following the literature (Acharya et al., 2006; Stiroh and Rumble, 2006; Mercieca et al., 2007; Elsas et al., 2010) we use an adjusted Herfindahl–Hirshman Index (HHI) to account for diversification between major activities. As the HHI rises, the bank becomes more concentrated and less diversified. To have a direct measure of diversification (DIV_REV) the sum of squared revenue shares have been subtracted from unity so that DIV_REV increases in the degree of revenue diversification.

Geographical diversification (and indirectly, the level of concentration) is measured using an index of the average degree of the bank concentration (HHI_GEO). This index based on the similar Herfindahl-Hirschman Index proposed by Acharya et al. (2006) and Alessandrini et al. (2009), accounts for the distribution of the branches of an individual bank throughout the country, considering the home province as the reference market. In investigating the effect of geographic characteristics on bank efficiency, another measure of the spatial bank distribution is considered. Similar to Bernini and Brighi (2012), we introduce a

measure of functional distance between bank branches and the headquarters (DISTANCE) constructed at the municipal level.

To investigate the relation between diversification and bank performance, in this paper we propose alternative proxies of bank performance. We first use the bank income statement return on average assets (ROA) and construct a risk-adjusted profitability measure, SHROA, following Stiroh (2004), Chiorazzo et al. (2008) and Brighi and Venturelli (2014). SHROA is defined as the ratio of net results from ordinary activities to total assets for a given year divided by the standard deviation of ROA over the entire sample period. Finally, as in Stiroh 2004, we introduce a measure of insolvency risk computed in terms of the Z-score which is a measure widely used in empirical research (Stiroh 2004; Mercieca et al., 2007; Laeven and Levine, 2008; Lepetit and Strobel, 2015). The Z-score measures how many standard deviations profits must fall below the mean to bankrupt the firm. It is a measure that is related to the probability of failure. Higher values of SHROA and Z-Score are desirable as they indicate higher bank risk-adjusted profitability and lower insolvency risk.

To capture the effect of the financial and sovereign debt crisis, we introduce two dummy variables into the analysis. The first one, termed FIN_CRISIS - introduced in order to capture the effect of the financial crisis - is equal to one for the years 2008 and 2009 and equal to zero otherwise . The choice of 2008 as the starting year of the crisis in Italy was first justified by Gambacorta and Mistrulli (2014), who clearly demonstrate that the effects of the crisis began during the third quarter of 2008. The other dummy variable named SOVER_CRISIS is equal to one for the years 2010 and 2011 and equal to zero otherwise. It is introduced because the crisis did not end in 2009 as it did in other countries; Italy experienced the second wave of the financial crisis, the sovereign debt crisis, which began in 2010. The sovereign debt crisis affected Italian banks in terms of a reduced availability of credit and higher borrowing costs on markets, due to sovereign risk and tightening capital ratios (Cosma and Gualandri, 2014).

3. Methodology and data

Data are taken from the consolidated and unconsolidated balance sheets of BHCs and individual Italian banks submitted to the Bank of Italy, and collected by the Italian Banking Association over the period 2006–2012. The starting date for our dataset is 2006 since Italian banks began to report unconsolidated accounting

data based on IAS/IFRS standards from that date. We exclude banks with missing data on basic accounting variables, including assets, loans, deposits, equity, interest income, non-interest income, commissions and trading revenues. Since we have an unbalanced panel, we choose only banks that have data for at least four continuous balance-sheet years (Baltagi, 2005). Moreover, for each dependent and independent variable, we eliminate outliers. The final dataset includes 3,549 bank yearly observations, corresponding to an average of 491 banks covering 87.3 per cent of the total number of Italian banks and 79.6 per cent of total assets. We use information on GDP at the provincial level provided by ISTAT (the Italian National Institute of Statistics) and by Istituto Tagliacarne. The number of branches (relating to each bank at the municipal level) is taken from the Bank of Italy.

In terms of empirical specification, we use a general panel model with fixed effects. We estimate the following equation:

$$y_{i,t} = \alpha_{i,t} + \beta_1 DIV\_REV_{i,t} + \beta_2 MKT\_TOP_{i,t} + \beta_3 AM\_TOP_{i,t} + \beta_4 DIS\_TOP_{i,t} + \beta_5 DIV\_GEO_{i,t} + \beta_6 DISTANCE\_G\ EO_{i,t} + \sum_{s=7}^{15} \beta_s \lambda_{i,t} + \varepsilon_{i,t}$$

where Y = [ROA, SHROA, Z-Score]; i identifies the individual bank-observation belonging to the sample; t expresses the time variable; βs are the parameters to be estimated; and λ is a matrix of control variables. Both the constant and the error terms are inserted into the model. DIV_REV measures revenue diversification; MKT_TOP is the ratio of gross market and trading commissions to total operating revenue; AM_TOP is the share of asset management commissions on total income; and DIS_TOP is the fraction of fee-based revenues from the distribution of third party products and services in total operating revenue. The other variables, distinguishing between bank specific and external determinants, control for factors that potentially affect the level and volatility of profits. The coefficients calculated on the individual component of revenue shares, measure the effect of a shift from the omitted category of the component share into an alternative one – this is the case since a component share has to be excluded to avoid perfect collinearity. Table 1 shows a list of the variables used.

[Table 1 around here]

4. Empirical Results

In line with Goddard et al. (2008) the main results suggest that revenue diversification (DIV_REV) implies a negative effect on bank profitability measured in terms of Return on Assets (Table 2 - Models 1 & 3). This suggests that for a bank, at least in terms of profitability, it is more convenient to focus on traditional or on non-traditional activities. Differently, in terms of risk, results suggest that greater functional diversification implies lower risk for banks especially when controlling for financial and sovereign debt crisis (Table 2 - Model 9).

In terms of the share of the different type of non-interest components, the positive sign suggests, in line with Stiroh and Rumble (2006), that for bank profitability it is important to invest more in the non-interest component. Different results emerge because of the financial crisis break. As for risk-adjusted profitability, the distribution of third party products and services play no role in fostering SHROA except when controlling for the crisis when the effect becomes evident (SHROA – Table 2 Model 6). In the after crisis period, bank profitability is in fact strictly related to the non interest component, as the interest margins become largely nil with drastically reduced volumes. Among the different business lines, the role of the asset management commission components is quite straightforward. Considering the model that contains the two crises dummies we find that investing more in the asset management business implies less risk with greater risk-adjusted profitability (Table 2 - Models 3&6&9). As for the pre-crisis period, our results are in line with those of Stiroh (2004), Stiroh and Rumble (2006) and Mercieca et al. (2007).

The geographical diversification (DIV_GEO) variable does not appear to play a relevant role in affecting both risk and profitability except for risk-adjusted profitability analysis (Table 2 - Models 5&6). A greater geographical diversification implies higher risk-adjusted profitability in particular during the post-crisis period. This result is coherent with the literature on bank risk diversification suggesting that banks that are more geographically diversified are better able to absorb local systemic risk (Bhattacharya and Gale, 1987). As for distance, results suggest that in the post-crisis period operating further from the head-quarter implies greater difficulties in terms of screening and monitoring; in coherence with the literature on geographical distance (Alessandrini et al., 2009) the risk-adjusted profitability decreases in this scenario. In this respect, our results suggest that, especially in the post-crisis period, banks that are more geographically diversified have been less penalized in terms of risk-adjusted profit (Table 2 - Models 2&5&6). However greater

distance from the bank head-quarters could exacerbate the screening evaluations strategy of the bank with negative effects on bank profitability and risk (Table 2 - Models 5-6 & 8-9).

With regard to size, results are in line with the literature (DeYoung et al., 2004) suggesting that bank size has generally a positive impact on bank profitability. A direct relation between volumes and profitability holds for all the models over the 2006-2012 investigated period. As for risk, results are quite interesting indicating that as soon as we take into account the crisis breaks, size becomes statistically significant, positively affecting the Z-Score index. In the post crisis period smaller banks appear to be riskier, being more exposed to local environmental shocks, strictly linked to traditional interest bearing activities and less geographically diversified.

[Table 2 around here]

As size appears to play an important role both in profitability determination and in the post-crisis risk analysis, we investigate whether certain types of institutions are better able to reap the benefits of diversification. This is a major issue regarding diversification that can effectively be analysed in the context of the Italian banking system. In this sense, the Italian banking system represents an ideal experimental setting since it is characterised by a homogenous group of banks - the mutual ones. Mutual banks are typically small banks with total assets below one billion. They offer an alternative business model to traditional commercial banks in the sense that they are typically oriented toward local lending and primarily dedicated to satisfying their members' needs. For this reason, we further investigate the effect of size splitting our sample between two sub-samples stratified between mutual and non-mutual banks.

Analysing the revenue diversification strategy (DIV_REV), results appear to be different between mutual and non-mutual banks (Table 3). Greater functional diversification implies a positive impact on the risk-adjusted profitability for non-mutual banks, while results for mutual banks are in line with the full sample - they are not statistically significant and present the same expected sign. Several reasons can be proposed to justify these differences. First, mutual banks are subject to a series of statutory restrictions that limit their operations in the capital markets, i.e. they cannot freely operate in the speculative financial trading sector. Second, commercial banks have more ability to distribute third party products and services as their higher branch density enables them to distribute third party products and services to a greater extent than mutual

banks. Moreover, in line with Brighi and Venturelli (2014) results for large non-mutual banks suggest that these banks are better equipped to manage the risk-earning components, as in case of asset management activities. All results are in line with Mercieca et al. (2007), indicating that, especially for smaller banks, the higher volatility of non-interest income outweighs diversification benefits.

Geographical diversification (DIV_GEO) plays a relevant role in affecting risk-adjusted profitability only for mutual banks. For mutual banks, that are typically concentrated in lending activities at the local level, diversifying their activities is found to enable them to better absorb local systemic risk which in turn increases profitability as also underlined by Bhattacharya and Gale (1987).

[Table 3 around here]

4.1. Robustness checks

In this section we investigate the likely impact of an alternative measure of diversification; namely, we introduce the variable DIV_NON (Table 1), which is equal to 1 minus the sum of the squared revenue shares, where revenue shares are equal to traditional revenues and non-traditional revenues (MKT + AM + DIS) on total operating income. Table 4 shows that our major empirical findings remain qualitatively unchanged.

[Table 4 around here]

5. Conclusions

With respect to previous research on bank diversification, our paper represents one of the first attempts to directly assess the relative role of product and geographic diversification on bank performance. It also analyses these variables separately in relation to the first and second wave of the financial crisis. As for revenue diversification, evidence suggests that greater diversification among different fee and commission components decreases bank risk and increases risk-adjusted profitability. This was found to be particularly true in the post crisis period. As for risk-adjusted profitability, before the crisis the distribution of third party products and services plays no role in fostering risk adjusted profitability, while after the crisis, the effect is seen to be evident. In the after crisis period, bank profitability is, in fact, strictly related to the non interest

component as the interest margins become largely nil with drastically reduced volumes. Among the different business lines, the role of the asset management commission components is clear.

Geographical diversification does not appear to play any relevant role in affecting both risk and profitability, except in the case of the risk-adjusted profitability analysis. Our results indicate that, especially in the post-crisis period, banks that are more geographically diversified have been less penalised in terms of risk-adjusted profit. However, greater distance from the bank head-quarters could exacerbate the bank screening evaluations strategy creating negative effects on bank risk-adjusted profitability.

These results are shown to be robust for alternative measures of diversification and for different performance measures. In terms of alternative sub-samples used, the relative effects of revenue and geographic diversification on bank performance appear to be different between mutual and non-mutual banks, with the former benefiting more from geographic diversification and the latter benefiting more from functional diversification.

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Table 1: Variables and Definitions

Name	Definition
Dependent variables	
ROA	Net results from ordinary activity over total asset
SHROA	Annual ROA over its standard deviation calculated over the entire sample period
Z-SCORE	$\frac{\left(ROA_{i,t} + \frac{E_{i,t}}{TA_{i,t}}\right)}{\sigma(ROA_{i,t})}$ where E:Equity and TA: Total Assets.
Revenue and geographic diversification variables	
TRADT_TOP	Ratio of traditional income (Gross interest income + Traditional Banking Commission) on total operating revenues
NON_TRADT_TOP	Ratio of non-traditional income (Market and trading commission + Asset management commission + Fee based revenues from the distribution of third party products and services) on total operating revenues
MKT_TOP	Market and trading Commission on total operating revenue
AM_TOP	Share of asset management commission on total operating revenue
DIS_TOP	Ratio of fee based revenues from the distribution of third party products and services on total operating revenue
DIV_REV	$1-\left(\left(\frac{TRADT}{TOP}\right)^2+\left(\frac{MKT}{TOP}\right)^2+\left(\frac{AM}{TOP}\right)^2+\left(\frac{DIS}{TOP}\right)^2\right)$
DIV_NON	$1-\left(\left(\frac{TRADT}{TOP}\right)^2+\left(\frac{NON\_TRADT}{TOP}\right)^2\right)$
DIV_GEO	$1-[\mathrm{HHI\_}GEO_{it}]=1-\left[\frac{\sum_{z_p=1}^{P_i}\left(\frac{Branches_{t,i_{zp}}}{Branches_{t,i}}\right)^2}{P_{t,i}}\right]$ where i refers to the bank i and zp to the provinces where that branch is located
DISTANCE_GEO	$\frac{\sum_{z_b=1}^{B_i}[\mathrm{Branches}_{itz_b}\times\ln(1+D_{itz_b})]}{\sum_{z_b=1}^{B_i}\mathrm{Branches}_{tz_b}}$ where zb=1,…,Bi are the municipalities where the i-bank has branches and D_{itzb} the Euclidean distance between the municipality z_b where the branch is located and the municipality where the head quarter of the i-bank is located (HQ_i).
Bank specific determinants	
SIZE	Ln (Total Asset)
SIZE_SQ	Ln (Total Asset)^2
C_I	Personnel and other administrative expenses over intermediation margin
RC_RWA	Total capital over Risk Weighted Asset [Total capital ratio]
LLP	Loan loss provisions over Net loans
NPL	Net non-performing loans over Net loans
External determinants	
Ln GDP	GDP measures the Gross Domestic Product at the provincial level weighted for the presence of bank branches in the province
FIN_CRISIS	Dummy variable equals to one for the years 2008 and 2009 and equals to zero otherwise (2006, 2007, 2010, 2011 and 2012)
SOVER_CRISIS	Dummy variable equals to one for the years 2010 and 2011 and equals to zero otherwise (2006, 2007, 2008, 2009 and 2012)

Table 2: Revenue Diversification, Geographic diversification and performance. All banks in the sample. Dependent variables: ROA, SHROA, Z-SCORE

	ROA (1)	ROA (2)	ROA (3)	SHROA (4)	SHROA (5)	SHROA (6)	Z-SCORE (7)	Z-SCORE (8)	Z-SCORE (9)
Constant	-0.042**	-0.042**	-0.062***	-1.946	-1.487	-6.081**	64.947***	64.897***	57.733***
	(0.016)	(0.017)	(0.016)	(2.677)	(2.682)	(2.477)	(11.153)	(11.180)	(10.893)
DIV_REV	-0.017***		-0.015***	-0.224		0.153	3.259		7.904**
	(0.004)		(0.004)	(0.657)		(0.613)	(2.737)		(2.697)
MKT_TOP	0.025***		0.026***	-0.627		-0.335	-7.192**		-7.577**
	(0.005)		(0.004)	(0.739)		(0.681)	(3.074)		(2.992)
AM_TOP	0.031***		0.035***	1.992**		2.656***	3.592		5.212*
	(0.005)		(0.005)	(0.766)		(0.705)	(3.190)		(3.100)
DIS_TOP	0.067***		0.073***	-0.250		0.900*	-5.009		-1.411
	(0.005)		(0.005)	(0.883)		(0.814)	(3.676)		(3.577)
DIV_GEO		0.001	0.001		0.340**	0.375**		0.471	0.148
		(0.001)	(0.001)		(0.157)	(0.145)		(0.654)	(0.637)
DISTANCE_GEO		-0.001*	-0.000		-0.207***	-0.137**		-0.638**	-0.467*
		(0.000)	(0.000)		(0.061)	(0.056)		(0.256)	(0.248)
SIZE	0.015***	0.016***	0.017***	2.143***	2.029***	2.389***	2.727	2.815	3.238*
	(0.003)	(0.003)	(0.003)	(0.433)	(0.430)	(0.398)	(1.803)	(1.794)	(1.751)
SIZE_SQ	-0.001***	-0.001***	-0.001***	-0.141***	-0.134***	-0.136***	-0.421***	-0.418***	-0.403***
	(0.000)	(0.000)	(0.000)	(0.018)	(0.017)	(0.016)	(0.073)	(0.073)	(0.071)
C_I	-0.025***	-0.026***	-0.023***	-2.742***	-2.727***	-2.213***	-3.695***	-3.568***	-2.468***
	(0.001)	(0.001)	(0.001)	(0.081)	(0.081)	(0.078)	(0.337)	(0.337)	(0.343)
RC_RWA	-0.000	-0.000	-0.001	-0.347**	-0.402**	-0.410**	12.100***	11.780***	12.021***
	(0.001)	(0.001)	(0.001)	(0.164)	(0.164)	(0.151)	(0.684)	(0.683)	(0.665)
LLP	-0.525***	-0.516***	-0.539***	-39.769***	-41.171***	-46.960***	-62.644***	-62.900***	-77.258***
	(0.012)	(0.013)	(0.012)	(1.927)	(2.018)	(1.873)	(8.957)	(9.080)	(8.890)
NPL	-0.036***	-0.034***	-0.029***	-11.648***	-11.263***	-9.315***	-35.736***	-35.963***	-24.279***
	(0.007)	(0.008)	(0.007)	(1.225)	(1.237)	(1.160)	(5.176)	(5.186)	(5.133)
Ln GDP	0.000*	0.000	0.000	0.250***	0.268***	0.255***	0.106	0.056	-0.160
	(0.000)	(0.000)	(0.000)	(0.048)	(0.053)	(0.049)	(0.200)	(0.222)	(0.218)
FIN_CRISIS			-0.002***			-0.376***			-0.006
			(0.000)			(0.027)			(0.118)
SOVER_CRISIS			-0.003***			-0.643***			-1.560***
			(0.000)			(0.029)			(0.128)
Observations	3,388	3,377	3,377	3,391	3,380	3,380	3,380	3,370	3,370
R-squared	0.679	0.650	0.695	0.540	0.537	0.611	0.474	0.471	0.505
Adj. R-squared	0.621	0.587	0.639	0.457	0.454	0.540	0.379	0.376	0.415

***, **, * indicates statistical significance at the 1%, 5% and 10% respectively.

Table 3: Mutual and Non-Mutual Banks - Dependent variable: SHROA

	SHROA Mutual	SHROA Mutual	SHROA Non-Mutual	SHROA Non-Mutual
Constant	10.932**	-3.423	-11.997**	-10.847**
	(4.544)	(4.363)	(3.698)	(3.484)
DIV_REV	-10.632	-15.827	2.268**	2.200**
	(14.425)	(13.795)	(0.892)	(0.852)
MKT_TOP	18.145	28.402	-0.697	-0.462
	(26.516)	(25.307)	(0.836)	(0.787)
AM_TOP	31.682	30.948	2.356**	2.960***
	(27.666)	(26.329)	(0.842)	(0.796)
DIS_TOP	10.034	21.414	2.129**	2.753**
	(26.180)	(24.984)	(1.000)	(0.946)
DIV_GEO	0.560***	0.557***	0.066	0.450
	(0.153)	(0.145)	(0.413)	(0.392)
DISTANCE_GEO	-0.073	-0.094	-0.071	-0.087
	(0.096)	(0.091)	(0.100)	(0.095)
SIZE	0.769	2.656***	3.213***	2.726***
	(0.742)	(0.707)	(0.592)	(0.561)
SIZE_SQ	-0.119***	-0.178***	-0.151***	-0.126***
	(0.030)	(0.029)	(0.024)	(0.023)
C_I	-3.939***	-3.249***	-1.423***	-1.202***
	(0.103)	(0.105)	(0.126)	(0.122)
RC_RWA	-0.608**	-0.418**	-0.227	-0.372
	(0.209)	(0.198)	(0.259)	(0.244)
LLP	-41.109***	-45.074***	-43.272***	-51.075***
	(1.943)	(1.845)	(5.620)	(5.443)
NPL	-6.977***	-6.881***	-9.259**	-6.547*
	(1.200)	(1.143)	(3.549)	(3.477)
Ln GDP	0.334***	0.312***	0.117	0.155*
	(0.061)	(0.058)	(0.096)	(0.091)
FIN_CRISIS		-0.319***		-0.371***
		(0.028)		(0.069)
SOVER_CRISIS		-0.501***		-0.584***
		(0.031)		(0.072)
Observations	2,719	2,719	661	661
R-squared	0.648	0.688	0.465	0.528
Adj. R-squared	0.585	0.631	0.352	0.426

***, **, * indicates statistical significance at the 1%, 5% and 10% respectively.

Table 4: Revenue Diversification, Geographic diversification and performance - Robustness check

	SHROA (1)	SHROA (2)	Z-SCORE (3)	Z-SCORE (4)
Constant	-1.570	-6.262**	65.226***	56.109***
	(2.686)	(2.482)	(11.194)	(10.916)
DIV_NON	-0.466	-0.353	0.453	3.745
	(0.620)	(0.578)	(2.586)	(2.543)
NONTRADT_TOP	0.217	0.836	-2.427	-0.617
	(0.603)	(0.556)	(2.513)	(2.446)
DIV_GEO	0.341**	0.404**	0.424	0.300
	(0.157)	(0.145)	(0.656)	(0.638)
DISTANCE_GEO	-0.207***	-0.146**	-0.642**	-0.506**
	(0.061)	(0.057)	(0.256)	(0.249)
SIZE	2.057***	2.432***	2.842	3.605**
	(0.432)	(0.398)	(1.801)	(1.752)
SIZE_SQ	-0.136***	-0.137***	-0.420***	-0.418***
	(0.017)	(0.016)	(0.073)	(0.071)
C_I	-2.726***	-2.194***	-3.575***	-2.416***
	(0.081)	(0.078)	(0.337)	(0.343)
RC_RWA	-0.404**	-0.467**	11.806***	11.771***
	(0.164)	(0.151)	(0.683)	(0.664)
LLP	-41.248***	-46.987***	-63.018***	-77.666***
	(2.022)	(1.880)	(9.097)	(8.921)
NPL	-11.219***	-9.438***	-35.781***	-24.789***
	(1.240)	(1.164)	(5.199)	(5.149)
Ln GDP	0.265***	0.249***	0.035	-0.190
	(0.054)	(0.050)	(0.224)	(0.219)
FIN_CRISIS		-0.377***		-0.022
		(0.027)		(0.119)
SOVER_CRISIS		-0.641***		-1.539***
		(0.029)		(0.128)
Observations	3,380	3,380	3,370	3,370
R-squared	0.537	0.608	0.471	0.501
Adj. R-squared	0.454	0.537	0.376	0.411

***, **, * indicates statistical significance at the 1%, 5% and 10% respectively.