

Contribution of Rural Banks to Regional Economic Development: Evidence from the Philippines¹

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Abstract:

This paper examines the link between banking and economic development at the regional level in the Philippines and focuses on the role played by rural banks in regional economic activity. We apply cointegration panel data analysis on regional banking and economic data for the period 1993 to 2005. We ranked the sixteen regions in three different groups depending on their average economic development. Our results show that in the long run regional financial development causes regional economic development. But they do not confirm the existence of a consistently positive strong influence of regional financial development on economic development in the Philippines. However, our findings highlight a positive effect of the presence of rural banks, characterized by their expertise in financing micro-entrepreneurs and poor households, on economic development. We also show that this result is stronger for the intermediate developed regions than for the less developed regions, suggesting the existence of a threshold effect.

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Section 1. Introduction

During the last thirty years, the extent to which a better financial system fosters economic development has been the subject of extensive research. The emergence of the endogenous growth theory shed a new light on the link between financial and economic development. Levine (2005) identifies five broad functions provided by the financial sector that reduce information, enforcement and transaction costs: (i) production of information on investment projects and capital allocation; (ii) monitoring and effective corporate governance; (iii) trading, diversification and management of risk; (iv) saving mobilization and (v) easing the exchange of goods and services. The way these five functions are supplied by the financial system influences saving rates, investment decisions, technological innovation and hence economic activity. Since King and Levine (1993a, 1993b), a large number of empirical studies have analyzed the finance-growth nexus for developed as well as developing countries (see Wachtel, 2003, for a comprehensive survey), but they can disagree on the existence, the sign and the causality of the relationship. Whereas cross-country and panel data studies find a positive link, time series analyses support opposite results (Berger et al., 2004; Christopoulos and Tsionas, 2004; Apergis et al., 2007). The more contentious area of research investigates the causality of the relationship between growth and financial intermediation (King and Levine, 1994; Demetriades and Hussein, 1996; Wachtel and Rousseau, 1995). Some researchers assert that it is financial development that follows growth (See King and Levine, 1993a, 1993b; Demetriades and Hussein, 1996) while others find otherwise, that it is growth that fuels financial development (Christopoulos and Tsionas, 2004) since improvements in productivity and economic output would require increased investment and funding. Other studies claim that this causality is actually bi-directional (Demetriades and Hussein, 1996) while a few do not find any link between financial development and economic growth at all (Lucas, 1988).

Existing empirical studies mainly focus on the influence of financial development on economic growth across countries, and therefore there is a need to control for institutional, social and politics disparities. In this paper, we only study the case of the Philippine regions which enables us to assume that macroeconomic conditions and political governance (monetary and exchange rate policies, banking regulation, education and health policies, industrial policy ...) are relatively homogeneous across the country. The Philippine financial system is considered to be bank-based enabling us to concentrate on structural differences in the banking industry among regions in order to provide deeper insights in the

finance-growth nexus. Indeed, by focusing on the link between financial and economic development at the international level, cross-country empirical studies are not able to capture the influence of banking system specificities on local economic development.

Our aim is to contribute to the finance-growth nexus by taking into account institutional characteristics of the banking industry. More precisely, in developed as well as in developing countries, some types of banks are mainly dedicated to finance informationally opaque small and medium size enterprises financing and then to foster rural development. As pointed out by country level-case studies which consider the link between finance and growth at the regional level such as Rodriguez-Fuentes (1998), Collender and Shaffer (2003), Valverde and Fernandez (2004), Burgess and Pande (2005), small, regional and locally-owned banks may behave very differently from large, national and non locally-owned banks for a variety of reasons (superior access to local information, greater commitment to local prosperity, differences in costs and risk management, competition policy,...)². This type of bank may then have a specific influence on local economic development by improving financing opportunities to small and medium size enterprises. In developing countries where economic development is hampered by insufficient and inadequate access to financial services in rural areas, the potential influence of such type of banks is of crucial interest³.

In the Philippines, the formal banking system is composed of three categories of banks: universal and commercial banks, thrift and private development banks, and regional rural and cooperatives banks. Although the formal banking system is dominated by commercial banks, rural banks in the Philippines were primarily established to promote and expand the rural economy. They generally cater to small borrowers including farmers, entrepreneurs, market vendors, business owners, wage earners, teachers and cooperatives. From the 1960s to the 1980s, rural banks served as conduits of subsidized loan funds from the government and international donors and were plagued by high default rates, insolvent lending programs, and high operating costs to name a few (Agabin and Daly, 1996). In response, regulations were implemented in the 1990s covering minimum capitalization requirements, limitations and restrictions to single borrowers and shareholders, and increase in capital adequacy ratio for all banks at 10% of risk-weighted assets. Interest rate restrictions were also removed and the liberalization of new bank openings and branching was pursued. Recent government policies

² See Hasan *et al.* 2007 for a survey.

³ Burgess and Pande (2005) show that state-led rural branch expansion is associated with poverty reduction in India, where rural banks here are defined as being located in areas with fewer than 10,000 persons.

have led to strengthen the place of rural banks by enhancing their role in financing micro-entrepreneurs and poor households because of their potentially deeper market penetration.

Therefore, we test whether the presence of rural banks positively affects regional economic activity using regional banking and economic annual data for the period 1993 to 2005. Our econometric specification is designed, on the one hand, to address the heterogeneity of economic development and banking coverage of the regions and, on the other hand, to enable us to efficiently utilize the limited regional data available presently as annual financial regional data do not exist prior 1993. We apply the model on sub-samples of regions in the Philippines (all regions, intermediate developed regions, less developed regions,...). Moreover, we aim to study the specific contribution of rural banks to economic development rather than growth. Therefore regions are classified as less economically developed, intermediate developed, and developed using macroeconomic data from the Philippine National Statistics Office, National Statistical Coordination Board and the Bangko Sentral ng Pilipinas. We build on the works of Apergis et al. (2007) and Christopoulos and Tsionas (2004) for our cointegration panel data analysis which aims to assess the special role of rural banks on regional economic activity in the Philippines. If our estimations do not show the existence of a strong relationship between regional financial and economic development in the Philippines, our findings highlight a positive effect of the presence of rural banks on economic development.

The paper is organized as follows. Section 2 briefly describes regional characteristics of the Philippines. Section 3 presents our research design and the results. Section 4 concludes the paper.

Section 2. Discrepancy in the regional economic and financial developments in the Philippines

2.1 Data description

Focusing on one country allows us to consider that social and legal systems, education, monetary and fiscal policies, etc. are quite homogeneous. However, stages of economic development of the regions in the Philippines are distinct. In this paper, we aim to analyze specifically how differences in regional economic development might be explained by disparities in the regional financial system, actually the banking system, underlying the role of rural banks.

The macroeconomic regional data are from the Philippine National Statistics Office and National Statistical Coordination Board. Bank regional data comes from the Central Bank of the

Philippines (Bangko Sentral ng Pilipinas). Annual regional data are available since 1993 until 2005. Our dataset could not start prior to 1993 as the organization of the regions in the Philippines were different. Therefore, our sample includes the Asian crisis that we did not exclude as we aim to study a long term relationship between banking and economic development. We are aware of that this could affect our results.

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To calculate bank data, the Central Bank aggregate data per bank branch office into regions and then into national. Thrift and rural banks operate mainly at a regional level, and this information is publicly available. However regional data for commercial banks were directly provided by the Central Bank of the Philippines.

2.2 Regional economic development

The Philippines is divided into seventeen geographic regions. For this study however, we refer to only sixteen regions, having integrated Region 4-A, Calabarzon and Region 4-B, Mimaropa (Region 4 was divided into two separate jurisdictions only in 2002). The per capita real gross regional domestic product (PC_RGRDP) is used as a measure of the regional economic structure and ranking of the regions depending on its variable has remained relatively constant over the period covered by this study. In view of the heterogeneity of the stages of economic development, we classify the regions into three groups: less-economically developed, intermediate developed and developed regions. Table 1 presents the real per capita gross regional product of the regions. The National Capital Region (NCR) is the most economically developed region and the Autonomous Region in Muslim Mindanao (ARMM) has the lowest per capita regional GDP among the regions in the country.

Table 1 Per Capita Real Gross Regional Domestic Product: Summary statistics and ranking indicators (1993-2005)

	1993	<i>1993 Rank</i>	2005	<i>2005 Rank</i>
<i>Developed regions</i>				
NCR	0,88	<i>1</i>	1,45	<i>1</i>
Northern Mindanao	0,52	<i>2</i>	0,62	<i>2</i>
CAR	0,37	<i>3</i>	0,58	<i>3</i>
<i>Intermediate developed regions</i>				
Socksargen	0,29	<i>8</i>	0,48	<i>4</i>
Central Visayas	0,32	<i>6</i>	0,43	<i>5</i>
South Luzon	0,37	<i>4</i>	0,42	<i>6</i>
Western Visayas	0,29	<i>9</i>	0,42	<i>7</i>
Central Luzon	0,31	<i>7</i>	0,36	<i>8</i>
Davao	0,35	<i>5</i>	0,31	<i>9</i>
<i>Less developed regions</i>				
Zamboanga Peninsula	0,26	<i>10</i>	0,28	<i>10</i>
Eastern Visayas	0,19	<i>12</i>	0,258	<i>11</i>
Ilocos	0,18	<i>14</i>	0,257	<i>12</i>
Cagayan Valley	0,19	<i>13</i>	0,24	<i>13</i>
Caraga	0,21*	<i>11</i>	0,22	<i>14</i>
Bicol	0,18	<i>15</i>	0,21	<i>15</i>
ARMM	0,11	<i>16</i>	0,13	<i>16</i>
Mean	0,32		0,42	
Mean excluding NCR	0,28		0,35	
Median	0,29		0,33	
Median excluding NCR	0,28		0,30	

Source: National Statistical Coordination Board ; *Caraga figure corresponds to 1997. Real gross regional domestic product is expressed in millions of pesos at 1990 prices.

Based on simple statistical analyses of the above data, we identify the less-economically developed regions to be the following: Ilocos, Cagayan Valley, Bicol, Eastern Visayas region, Zamboanga Peninsula, the Autonomous Region in Muslim Mindanao (ARMM) and Caraga. These regions are basically agriculture intensive with lower levels of industrialization. Their regional contribution to the Philippine GDP as of 2005 is below 2.9% whereas their inhabitants account for 26.4% of the Philippine population.

The developed regions, NCR, Cordillera Administrative Region (CAR), and Northern Mindanao are those with a strong service sector coupled with a vibrant industrial sector characterized by a large number of business establishments. CAR is classified as developed in view of the presence of the province of Benguet in the region, which is highly developed and which greatly improves the ranking of the region despite the significantly poorer economic performance of the other provinces in the region. Central Visayas (with Cebu province) and Davao (with Davao del Sur province) regions,

despite being more highly urbanized than Northern Mindanao and the CAR, were not classified in this group in view of the lower ranking of their per capita GDRP levels as of 2005.

The intermediate economically-developed regions are comprised of those regions that were not classified as developed or as less developed and include Central Luzon, South Luzon, Western Visayas, Central Visayas, Davao and Socksargen.

2.3 Regional banking structure

As with regional economic development, the banking structure is also heterogeneous through the regions. The current financial system in the Philippines is considered to be bank-based because of the dominance of banks in the country as evidenced by the limited presence of equity markets as source of finance (Gochoco-Bautista 1999), and the fact that only the largest corporations are listed in the country's stock exchanges. Hence funding for the majority of businesses in the country is expected to be sourced primarily from banks and not through financial markets (Gochoco-Bautista, 1999; Asian Development Bank, 2007).

Table 2 presents descriptive statistics for some banking indicators at the regional level. Two measures of the regional banking activity are provided: total deposits and total net loans. To measure financial development (FD), four different measures are used: three measures of financial depth (the share of total net loans over nominal regional gross domestic product (Loans), the share of total deposits over regional gross domestic product (Deposits), the number of banking offices per capita (Banking office density)) and one measure of local intermediation (total net loans over total deposits (Intermediation)). Recent studies (Berger et al., 2004; Hasan et al., 2007) suggest to use quality-based indicator instead of quantity-based to measure financial development. Unfortunately, the individual bank data required to construct such measures are available only for few commercial banks but not for rural banks in the Philippines. Finally, two measures of rural banks presence are computed: the share of net loans granted by rural banks per region over total net loans granted per region (RB Loans share), and the share of total resources of rural banks per region over total resources for all banks per region (RB Resources share). To measure the impact of rural banks on the economic development we will focus on loans variables as the purpose of the rural financial market as defined by policy reforms in the late 1980s is to provide credit access to small borrowers (Llanto, 2005). We will consider the four following groups of regions: "All regions", "Developed regions", "Intermediate regions" and "Less

developed regions”. But, given the macroeconomic specificities of the NCR region, we will also study the group “All regions except NCR” to appreciate its possible impact.

Three main results can be highlighted.

First, considering either the group “All regions” or the group “All regions except NCR” allows us to show the predominance of the NCR region in terms of financial development and banking coverage.

Second, the three different groups of regions are characterized by a great heterogeneity of financial development. As an example, the mean value of the share of total net loans over nominal regional gross domestic product (Loans) ranges from 0.69 to 0.10 when considering respectively the group “Developed regions” and the group “Less developed regions”. Whatever the measure used (intermediation, deposits and banking office density), we still find heterogeneity through Philippine regions and they show that the wealthiest regions have greater financial development.

The third result is related to the presence of rural banks. Whatever the measure used (RB Loans share or RB Resources share), the presence of rural banks is higher on average in the less developed regions than in the intermediate developed regions, itself higher than in the developed regions. 18% of the total average amount of loans are granted by rural banks in the less developed regions against 13% in the intermediate regions and 9 % in the developed regions.

Table 2: Descriptive statistics (Average value of the variables over the 1993-2005 period)

	Total deposits*	Total net loans*	Intermediation	PC_RGRDP	Deposits	Loans	Banking office density	RB Resources share	RB Loans share
DEVELOPED REGIONS									
NCR	1 299 034	1 274 290	0,99	1,13	1,19	1,19	0,24	0,11%	0,18%
Northern Mindanao	22 226	15 989	0,82	0,52	0,16	0,13	0,08	7,21%	9,55%
CAR	16 754	4 470	0,26	0,51	0,24	0,06	0,07	5,36%	17,28%
Mean	446 005	431 583	0,69	0,72	0,53	0,46	0,13	4,23%	9,00%
Standard deviation	738 750	729 828	0,38	0,36	0,57	0,63	0,10	0,04	0,09
INTERMEDIATE DEVELOPED REGIONS									
Socksargen	10 579	4 778	0,54	0,35	0,10	0,05	0,04	9,56%	14,68%
Central Visayas	90 404	43 462	0,56	0,38	0,41	0,23	0,08	3,58%	4,68%
South Luzon	120 274	38 084	0,37	0,39	0,26	0,09	0,10	13,05%	24,92%
Western Visayas	50 817	19 782	0,47	0,34	0,24	0,11	0,06	5,39%	10,30%
Central Luzon	84 780	33 918	0,46	0,33	0,33	0,14	0,09	10,95%	17,27%
Davao	38 855	23 996	0,67	0,35	0,23	0,15	0,06	5,88%	7,33%
Mean	65 952	27 337	0,51	0,36	0,26	0,13	0,07	8,07%	13,19%
Standard deviation	39 831	14 113	0,10	0,02	0,10	0,06	0,02	0,04	0,07
LESS DEVELOPED REGIONS									
Zamboanga Peninsula	17 158	5 508	0,36	0,26	0,22	0,08	0,03	4,13%	11,15%
Eastern Visayas	13 694	4 449	0,36	0,22	0,17	0,06	0,03	6,44%	12,95%
Ilocos	37 820	11 922	0,38	0,23	0,38	0,14	0,08	12,84%	26,96%
Cagayan Valley	15 529	8 779	0,64	0,23	0,24	0,15	0,07	16,40%	20,73%
Caraga	8 954	4 395	0,51	0,22	0,19	0,09	0,04	18,98%	26,47%
Bicol	19 403	9 183	0,51	0,19	0,22	0,11	0,04	12,72%	20,79%
ARMM	4 568	1 315	0,31	0,13	0,21	0,06	0,02	2,75%	8,50%
Mean	16 732	6 507	0,44	0,21	0,23	0,10	0,05	10,61%	18,22%
Standard deviation	10 576	3 612	0,12	0,04	0,07	0,04	0,02	0,06	0,07
ALL REGIONS									
Mean	115 678	94 020	0,51	0,36	0,30	0,18	0,07	8,45%	14,60%
Standard deviation	317 366	315 014	0,194	0,23	0,25	0,27	0,05	0,05	0,08
ALL REGIONS EXCEPT NCR									
Mean	36 788	15 335	0,48	0,31	0,24	0,11	0,06	9,01%	15,56%
Standard deviation	34 985	13 634	0,15	0,11	0,08	0,047	0,02	0,05	0,07

Loans: total net loans/nominal regional gross domestic product, Deposits: total deposits/regional gross domestic product, Banking office density: number of banking offices per capita, Intermediation: total net loans/total deposits, RB Loans share: net loans of rural banks per region/total net loans per region, RB Resources share: total resources of rural banks per region/total resources per region.* In millions of pesos. Source: Bangko Sentral ng Pilipinas; National Statistical Coordination Board.

To analyze more precisely rural bank presence, Table 3 and Table 4 provide information respectively on the market share of the different types of banks (commercial banks, thrift banks and rural banks) at the national level and of the rural bank market share at the regional level.

The formal banking sector⁴ is dominated by commercial banks, which over the 1993-2005 period, represent 52,8% of the total number of bank offices in the Philippines. The thrift banks represent 11,9% of the total number of bank offices and the remaining 35,3% of the total banking offices operating in the country are regional rural and cooperative banks.

Table 3: Market share per type of banks in the Philippines 1993-2005

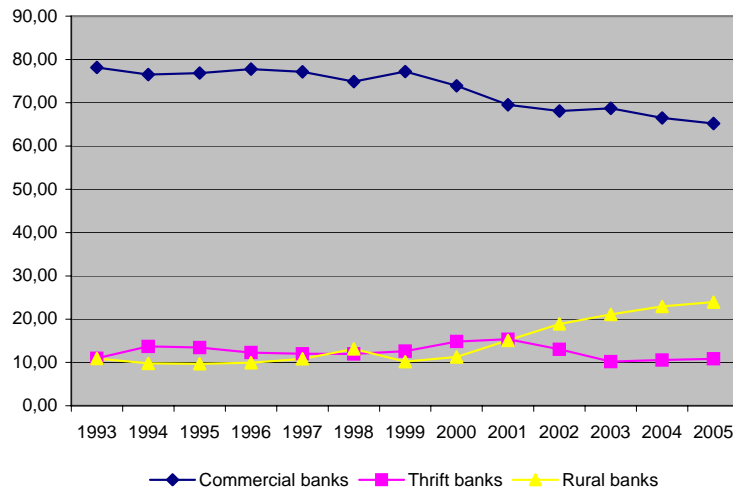
	Commercial banks	Thrift banks	Rural Banks
Banking office density	56,81 %	17,81 %	25,37 %
	<i>45,45 %</i>	<i>16,96 %</i>	<i>37,60 %</i>
Total resources	90,67 %	7,77 %	1,55 %
	<i>79,07 %</i>	<i>12,05 %</i>	<i>8,88 %</i>
Total net loans	89,13 %	8,52 %	2,34 %
	<i>73,12 %</i>	<i>12,44 %</i>	<i>14,44 %</i>

Numbers in italics are the market share computed for the group “All regions except NCR”, Source: Bangko Sentral ng Pilipinas

Commercial banks remain the major source of funding with an average credit market share of 89% and 73% when considering respectively the group “All regions” and the group “All regions except NCR”. However, at the national level, rural bank, on average, account for 37,60% of the total number of banking office and granted 14,44% of the total amount of loans, when excluding the NCR over the 1993-2005 period. Moreover, since 1998, Figure 1 shows a decline of the loan market share of commercial banks (from 77% to 65%) and thrift banks (12,60% to 11%) and, at the same time, an increase of the loan market share of the rural banks (from 11% to 24%).

⁴ In this paper, we do not aim to study the semi-formal and informal financial sectors. For a presentation of the financial system in the Philippines, see Dauner et al. (2005). For a detailed study of rural finance, see Llanto (2005).

Figure 1: Loan market shares of commercial, thrift and rural banks in the Philippines* (1993-2005)



* Loan market shares are computed for the group “All regions except NCR”.
 Source: Bangko Sentral ng Pilipinas

Evolution of regional market shares of rural banks presented in Table 4 reinforce one of the results highlighted above. The influence of rural banks seems to be higher whatever the measure used in the less developed regions than in the intermediate developed regions and in the developed regions. And their presence has been strengthened through the period while developing their microfinance activities which enable them to increase the number of their branches (see Dauner Garniol et al., 2005)

Table 4: Rural banks market share per region in %

	1993						2005					
	Total resources ¹	Rank	Loans ²	Rank	Bank offices ³	Rank	Total resources	Rank	Loans	Rank	Bank offices	Rank
<i>Developed regions</i>												
NCR	0,05	16	0,007	16	1,21	16	0,21	16	0,5	16	2,61	16
Northern Mindanao	4,92	11	6	14	31,38	13	10,37	7	18	11	43,31	4
CAR	4,01	12	14	4	40	7	7,94	10	34,9	5	38,18	10
<i>Intermediate developed regions</i>												
Socksargen	9,18	5	12,7	6	41,54	6	10,01	8	20	10	39,18	8
Central Visayas	3,92	13	4,9	15	31,46	12	5,20	15	9	15	26,59	14
South Luzon	11,25	2	18	2	38,55	8	13,50	5	37,7	3	39,82	7
Western Visayas	5,23	9	8	10	37,06	9	6,43	13	16,8	12	33,18	12
Central Luzon	8,44	6	12,5	7	32,77	11	14,30	4	27	7	41,32	5
Davao	5,22	10	6,4	13	29,86	14	8,97	9	15	14	33,60	11
<i>Less developed regions</i>												
Zamboanga Peninsula	2,87	14	6,9	11	24,39	15	7,08	12	23	9	29,91	13
Eastern Visayas	5,67	8	12	8	42,71	5	7,40	11	16,6	13	39,10	9
Ilocos	12,90	1	27	1	51,36	2	13,21	6	38,1	2	50,92	3
Cagayan Valley	10,58	3	13,1	5	53,03	1	19,25	2	31	6	63,39	1
Caraga ⁴	10,22	4	17	3	47,94	3	23,20	1	45	1	61,40	2
Bicol	6,61	7	11	9	45,51	4	17,26	3	35,4	4	39,91	6
ARMM	2,62	15	6,7	12	36,96	10	6,11	14	26	8	19,23	15

¹ Share of net loans granted by rural banks over total net loans granted; ² Share of net loans granted by rural banks over total net loans granted; ³ Number bank offices for of rural banks over total number of bank offices; ⁴ CARAGA figure corresponds to 1997. Source: Bangko Sentral ng Pilipinas

Section 3. Empirical framework and estimation results

3.1 Rank-order correlation tests

To begin our investigations on the relationship between regional economic development, financial intermediation and the role of rural banks in the Philippines, we initially test for correlation between selected banking and economic development indicators. These tests are performed using five samples of regions: all regions, all regions except NCR, developed regions, intermediate developed regions, and less developed regions. Table 5 presents the results of our correlation analysis for our five sub-samples of regions using Spearman rank-order tests. The null hypothesis is the absence of rank-order correlation between the two variables.

Table 5. Correlation Analysis: Spearman rank-order with PC_RGRDP as referent variable

	All regions	All regions except NCR	Developed regions	Intermediate developed regions	Less developed regions
<i>Financial Development (FD)</i>					
<i>Financial depth</i>					
- Loans	0.233***	0.066	0.841***	-0.824	0.043
- Deposits	0.244***	0.072	0.884***	0.247**	0.246**
- Banking office density	0.652***	0.576***	0.948***	0.314***	0.358***
<i>Local intermediation</i>					
- Intermediation	0.181***	0.011	0.485***	-0.397***	0.110
<i>Rural banks market share (RBMS)</i>					
- RB Loans share	-0.261***	-0.103	-0.489***	0.297***	0.284***
- RB Resources share	-0.380***	-0.134*	-0.653***	0.080	0.313***

Boldface values denote a significant presence of a rank-order correlation. (***) (** and *) signify rejection of the null hypothesis of absence of rank-order correlation at the 1%, 5% and 10% levels respectively.

Three main results are obtained from the rank order tests. First, a positive and significant correlation between economic development and financial depth at the regional level is obtained when financial depth is measured by banking office density and deposits for four of the five samples. This result is consistent with the existing empirical literature on the finance growth nexus. The correlation obtained is stronger for the sub-sample “Developed regions” than for the sub-samples “Intermediate developed regions” and “Less developed regions”. When the variable Loans is used as an indicator of financial depth, the correlation is also significant for the economically developed regions but not for the

intermediate and less economically developed regions. When financial development is measured as the ratio of total net loans to total deposits (Intermediation), we find a positive and significant correlation for two sub-samples, “All regions” and “Developed regions”.

Second, rank order tests show different results for the sub-sample “All regions except NCR”. A positive and significant correlation is obtained between economic and financial development only when the bank office density is used as a measure of financial development.

Third, the most interesting result with regard to our issue is related to the role of rural banks on regional economic activity. A negative and significant correlation is obtained between economic development and rural banks presence for the samples “All regions”, “All regions except NCR” and “Developed regions”. On the contrary, a positive and significant correlation is obtained between the variables PC_RGDRP and the market share of rural banks which means that the higher is the market share of rural banks, the higher is the regional economic development.

3.2 Panel data estimations

The lack of agreement on the impact of financial development on economic growth (its existence, level or direction) is argued to arise primarily from the estimation techniques used to assess this relationship (times series, panel data, ...see Apergis et al., 2007). According to Apergis et al. (2007), the cross-sectional estimation methodology misses (i) to address the issue of integration and cointegration properties of the data, and (ii) to examine the direction of causality between economic and financial development. In estimating panel data, Apergis et al. (2007) point out that using instrumental variables and GMM dynamic panel estimators alone to account for potential biases induced by simultaneity of regressors, omitted variables and/or unobserved country-specific effects on the finance-growth nexus may be insufficient. The integration properties of the data should be considered.

Following this methodology and in order to explore the relationship between finance, development and the effect of rural banks, we first conduct panel unit root tests on our dataset. We used the Im, Pesaran and Shin t-test⁵. Results are presented in Table 6.

⁵ The IPS test is based on individual ADF regressions and assumes a separate unit roots between the cross-sections units.

Table 6. Im, Pesaran and Shin (IPS) panel unit root tests

	Variable in level	Variable in first difference
PC_RGDRP	2.77	-3.86***
<i>Financial development (FD)</i>		
<i>Financial depth</i>		
- Loans	0.25	-2.75***
- Deposits	-1.48	-3.11***
- Banking office density	-2.83***	
<i>Local intermediation</i>		
- Intermediation	0.91	-2.67***
<i>Rural banks market share (RBMS)</i>		
- RB Loans share	6.37	-2.04***
- RB Resources share	1.93	-2.69***

(***), (**) and (*) signify rejection of the null hypothesis of absence of unit root at the 1%, 5% and 10% levels respectively.

Panel unit root tests support the hypothesis of a unit root for most variables in level. However we reject the null hypothesis with the IPS test for bank office density at the 1% level. In first difference, unit root tests show that all variables are stationary.

As a second step, we conduct panel cointegration tests. To test for the presence of a long run relationship between financial and economic development, we use the methodology suggested by Pedroni (1999, 2004). This procedure is based on Engle-Granger (1987) two-step cointegration tests. Pedroni proposed eleven statistics that allow for heterogeneous intercepts and trend coefficients across cross sections. Two alternatives classes of statistics are tested: the first one is based on the within dimension of the panel while the second one is based on the between dimension of the panel. According to Pedroni (2004), for very small value of T (time dimension) and a limited number of individuals, the Phillips-Peron (PP) statistic performs relatively better than the others. Therefore we rely on this statistic to test the null hypothesis of no cointegration.

Since the direction of the relationship between economic and financial regional development is not clear, we follow here the methodology suggested by Christopoulos and Tsionas (2004) and we perform cointegration tests on the two following models:

$$PC_RGDRP_t = \alpha + \beta FD_t + \gamma RBMS_t + \varepsilon_t \quad (1)$$

$$FD_t = \alpha + \beta PC_RGDRP_t + \gamma RBMS_t + \varepsilon_t \quad (2)$$

where PC_RGRDP_t is per capita real gross regional domestic product, FD_t is a measure of financial development and $RBMS$ a measure of rural bank market share.

In equation (1), cointegration tests are performed using as explanatory variables (i) alternatively one of the three I(1) measure for financial development⁶ and (ii) alternatively one of the two I(1) measures for rural banks market share (RB Loans share or RB Resources share).

In equation (2), cointegration tests are performed using as the explained variable alternatively one of the three I(1) measures for financial development (FD) and as explanatory variables (i) the per capita real gross regional domestic product (PC_RGRDP) and (ii) alternatively one of the two I(1) measures for rural banks market share (RB Loans share or RB Resources share). Test results for equation (1) and equation (2) are respectively shown in tables A1 and A2, Annex I.

When per capita real gross regional domestic product is used as the dependent variable (equation (1)), the null hypothesis of no cointegration is rejected for the whole sample and for the sub-samples “Intermediate developed regions” and “Less developed regions”. Therefore our results show that in the long run regional financial development causes regional economic development. However, when financial development is used as the dependent variable (equation (2)), the null hypothesis is only rejected once for all samples⁷ when deposits are used to build the financial depth measure, and in this case the equation might reflect a money demand based on transactions motive. Overall the causality highlighted by our results shows that the long run relationship between economic and financial regional development is from financial development to economic development, and is even unidirectional if we do not consider deposits as the most appropriate proxy of financial depth in order to assess the impact

⁶ Loans, Deposits or the Local intermediation variable. The bank office density variable is I(0). The statistic presented is the Phillips-Perron group statistic.

⁷ We reject also the null hypothesis for the economically developed regions when financial depth is proxied using loans.

of the banking system on economic activity. Therefore our analysis of the relationship between economic development, financial development and the role of rural banks will be focused on equation (1) for the three sub-samples “All regions”, “Intermediate developed regions” and “Less developed regions”.

The estimation of the long run relationship between economic and financial development is performed using alternatively three different estimators: ordinary least squares (OLS), fully-modified least squares (FMOLS) initially proposed by Phillips and Hansen (1990) and the dynamic least squares (DOLS) of Saikkonen (1991) and Stock and Watson (1993). We first use on our panel data set the OLS estimator. But, as underlined by Kao and Chiang (2000) this estimator suffers from a non-negligible bias in finite samples. We then use the FMOLS estimator as suggested by Pedroni (1996) which performs better than the OLS estimator for small samples as in our case. However, Kao and Chiang (2000) find from Monte-Carlo simulations that the DOLS estimator over-performs the FMOLS and OLS estimators in estimating cointegrated panel regressions.

Table 7 displays the long run relationship between economic and financial development for the four groups of regions for which the Pedroni test is conclusive.

Table 7. Long run relationship between economic development, financial development and the role of rural banks¹ using OLS, DOLS and FMOLS estimators

FD:	Financial depth: Loans			Financial depth: Deposits			Local intermediation		
	OLS	FMOLS	DOLS	OLS	FMOLS	DOLS	OLS	FMOLS	DOLS
<i>All regions</i>									
FD	-0.20***	-0.02	0.01	-0.06	0.12	-0.18*	-0.06*	-0.04**	-0.01
RB	0.18***	8.18***	0.30***	0.28***	8.55***	0.53***	0.14*	7.30***	0.25**
<i>All regions except NCR</i>									
FD	-0.05	-0.21*	0.01	0.17*	0.12	0.03	-0.04*	-0.02**	-0.08
RB	0.23***	0.31***	0.33***	0.22***	0.32***	0.44***	0.18***	0.23***	0.20*
<i>Intermediate developed regions</i>									
FD	-0.02	-0.56*	-0.01	0.25*	0.30***	0.34**	-0.05	-0.62***	-0.25**
RB	0.40***	0.40***	0.41***	0.32***	0.43***	0.52***	0.27**	1.35***	-0.016
<i>Less developed regions</i>									
FD	-0.15**	-0.15	-0.09	0.10*	-0.04***	0.10	-0.05***	-0.03	-0.03
RB	0.08***	0.11***	0.12***	0.09***	0.11***	0.10**	0.05*	0.09***	0.11***

(***), (**) and (*) indicate significance at the 1%, 5% and 10% levels respectively. ¹ The role of rural banks is measured by the variable RB Loans share.

While analyzing the impact of financial development on economic development, OLS estimations show opposite results depending on the proxy retained. Financial depth when measured as the ratio of total net loans on the nominal regional gross domestic product (Loans) for all group of regions (all regions, intermediate developed regions and less developed regions) has a negative impact on economic development. The literature has often pointed out that variables such as loans have an ambiguous status. They are good measure of the size of the financial sector and could also well predict banking crisis. Indeed we might explained our result by a strong decrease in the level of loans granted by commercial banks following the Asian crisis, whereas the economic activity recovered more rapidly (Podpiera and Singh 2007). This negative link between financial depth and economic development when data set includes 1997-1998 Asian crisis is in line with the finding of Rousseau and Wachtel (2005). Unfortunately, given the availability of the data, we were not able to work on a period excluding the Asian crisis. The role of commercial banks is of main importance for the country because of their strong presence especially in the wealthy regions. This result holds if we use the local intermediation variable instead of the variable Loans. However, as soon as we used the ratio of total deposits on the nominal regional gross domestic product (Deposits), we find a positive and often significant impact of financial depth on economic development. Using the FMOLS estimation procedure leads mainly to the same overall explanation of the results even if the results don't exactly tally for each sample and if the significance of the coefficients is stronger for the "local intermediation" variable and less robust for the "loans" variable. However if we consider the DOLS as the most appropriate estimators given the properties of our data set, the link between financial development and economic development collapses. This finding of the sensitivity of our results to the econometric methodology used has been highlighted by a number of studies such as Favara (2003) and Dufrénot et al. (2007) and is often explained by the difficulty to specify correctly the origin of non-stationary variables. An answer could be the use of common factor models such as the PANIC methodology (Panel Analysis of Non-stationarity in Idiosyncrasic and Common Components) proposed by Bai and Ng (2004). Unfortunately, our sample does not able us to use this technique as it requires a large time and individual dimension panels.

The most interesting result of our analysis is the positive and always significant but once impact of the presence of rural banks on economic development. We show for all samples studied⁸ that rural bank presence affects positively the economic activity even for the sample “All regions” for which we obtained a negative relationship from Spearman rank-order tests. Our results are robust to the econometric estimators used: OLS, FMOLS and DOLS estimation procedures give mostly the same results. However in the case of the sample “All regions”, using the FMOLS estimators we find an abnormal high value for the coefficient of the rural bank variable whatever the proxy used for financial development. This result could be explained by specificities of the National Capital Region (where the presence of rural banks is negligible) as we do no longer find such coefficient for the sample “All regions except NCR”. Our results also show that the impact of rural banks on economic development for the intermediate developed regions is usually stronger than for the less developed regions and than the average effect of rural banks on economic development. It might suggest that a threshold exists. Threshold effects are also found in the literature of cross-countries growth finance nexus, built on country ranking using ex-ante economic or financial development criteria (see Dermirgüç-Kunt and Levine, 2008). In particular, Rioja and Valev (2004) show, in their study where the Philippines are classified as a low-income country, the existence of a threshold effect of financial development on economic development. Under the threshold, finance affects economic development mainly through capital accumulation. Above, economic development is enhanced not only by capital accumulation but also through productivity growth. Thus this positive impact of financial development is all the more important that the country has a high level of per capita GDP. Our work show that in a low-income country where overall the link finance-growth is weaker, a minimum of economic development is required for an effective impact of financial institutions dedicated to low-income households and microentrepreneurs. Therefore we underline the existence of a poverty trap. In other words, a minimum level of economic development should be required for the influence of rural banks on economic activity to be more effective.

To check for the robustness of our results, we also estimate the long run equilibrium using the total resources market share of rural banks as a proxy of rural bank presence. The results we found are mainly the same while a little less significant.

⁸ The study doesn't include the sample “economically developed regions” for which we didn't find a cointegration relationship between the variables.

Section 4. Conclusion

This paper aimed to identify the role played by rural banks, as part of the Philippines financial nexus, on economic development. More precisely we analyzed whether the specificity of rural banks better foster development than the other types of banks (commercial and thrift ones).

The period studied on the one hand is relatively short because of data availability, and on the other hand includes the Asian crisis. Thus we were not able to clearly identify a positive long term relationship between financial depth and economic development. However, we succeed in identifying that rural bank presence affects positively the economic development of the intermediate and less developed regions, with a stronger impact for intermediate regions. This result might suggest that a minimum level of economic development should be required for the rural bank influence on economic development to be more effective.

Our findings suggest that the presence of rural banks which have an expertise in financing micro-entrepreneurs and poor households should be supported in order to stimulate economic development. Our research may also encourage continuing government efforts aimed at developing the Philippine rural banking sector and in increasing the volume of investments in the regions. Policy implications may include the need to enhance confidence in the Philippine rural banking system, to encourage savings in regional rural banks, and to ensure efficient transfer of resources from savers to investors.

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Annex I

Table A1. Pedroni panel cointegration test

Dependent variable: PC_RGDRP	<i>Rural bank market share</i>	
	RB Loans share	RB Resources share
<i>All regions</i> (N ₁ = 204 ; N ₂ = 16)		
Financial depth (Loans)	-3.80***	-2.10**
Financial depth (Deposits)	-5.98***	-3.22***
Local intermediation	-3.53***	-2.96***
<i>All regions except NCR</i> (N ₁ = 195 ; N ₂ = 15)		
Financial depth (Loans)	-4.24***	-2.23**
Financial depth (Deposits)	-6.41***	-3.45***
Local intermediation	-3.86***	-3.19***
<i>Economically developed regions</i> (N ₁ = 39 ; N ₂ = 3)		
Financial depth (Loans)	0.61	1.24
Financial depth (Deposits)	0.83	1.08
Local intermediation	1.33	1.30
<i>Intermediate developed regions</i> (N ₁ = 78 ; N ₂ = 6)		
Financial depth (Loans)	-4.25***	-0.41
Financial depth (Deposits)	-7.48***	-1.76
Local intermediation	-3.45***	-0.34
<i>Less developed regions</i> (N ₁ = 91 ; N ₂ = 7)		
Financial depth (Loans)	-2.61***	-3.77***
Financial depth (Deposits)	-2.66***	-3.95***
Local intermediation	-3.43***	-5.12***

Table A2. Pedroni panel cointegration test

Dependent variable: Loans		
	<i>Rural bank market share</i>	
	RB Loans share	RB Resources share
All regions ($N_1 = 204$; $N_2 = 16$)		
Output per capita (PC_RGDRP)	-0.34	-0.48
All regions except NCR ($N_1 = 195$; $N_2 = 15$)		
Output per capita (PC_RGDRP)	-0.47	-0.57
Economically developed regions ($N_1 = 39$; $N_2 = 3$)		
Output per capita (PC_RGDRP)	-1.47*	-1.95**
Intermediate developed regions ($N_1 = 78$; $N_2 = 6$)		
Output per capita (PC_RGDRP)	0.37	0.66
Less developed regions ($N_1 = 91$; $N_2 = 7$)		
Output per capita (PC_RGDRP)	0.28	0.19
Dependent variable: Deposits		
	<i>Rural bank market share</i>	
	RB Loans share	RB Resources share
All regions ($N_1 = 204$; $N_2 = 16$)		
Output per capita (PC_RGDRP)	-7.67***	-5.81***
All regions except NCR ($N_1 = 195$; $N_2 = 15$)		
Output per capita (PC_RGDRP)	-8.00***	-6.17***
Economically developed regions ($N_1 = 39$; $N_2 = 3$)		
Output per capita (PC_RGDRP)	-3.80***	-4.19***
Intermediate developed regions ($N_1 = 78$; $N_2 = 6$)		
Output per capita (PC_RGDRP)	-3.13***	-3.76***
Less developed regions ($N_1 = 91$; $N_2 = 7$)		
Output per capita (PC_RGDRP)	-4.07***	-1.63*
Dependent variable: Intermediation		
	<i>Rural bank market share</i>	
	RB Loans share	RB Resources share
All regions ($N_1 = 204$; $N_2 = 16$)		
Output per capita (PC_RGDRP)	0.84	0.62
All regions except NCR ($N_1 = 195$; $N_2 = 15$)		
Output per capita (PC_RGDRP)	-0.88	-0.70
Economically developed regions ($N_1 = 39$; $N_2 = 3$)		
Output per capita (PC_RGDRP)	-0.58	-0.84
Intermediate developed regions ($N_1 = 78$; $N_2 = 6$)		
Output per capita (PC_RGDRP)	1.68	1.28
Less developed regions ($N_1 = 91$; $N_2 = 7$)		
Output per capita (PC_RGDRP)	0.30	0.50

(***), (**) and (*) signify rejection of the null hypothesis of absence of long run relationship at the 1%, 5% and 10% levels respectively. N_1 and N_2 are respectively the number of observations and the number of cross-section units.

Annex II

Table A3. Long run relationship between economic development, financial development and the role of rural banks¹ using OLS, DOLS and FMOLS estimators

FD:	Financial depth: Loans			Financial depth: Deposits			Local intermediation		
	OLS	FMOLS	DOLS	OLS	FMOLS	DOLS	OLS	FMOLS	DOLS
<i>All regions</i>									
FD	-0.24***	-0.14***	-0.28***	0.02	0.24***	0.06	-0.09***	-0.07***	-0.13**
RB	0.187	25.34***	0.35***	0.26	25.36***	0.45***	0.06	26.16***	0.08
<i>All regions except NCR</i>									
FD	-0.21***	-0.16***	-0.29***	0.33***	0.27***	0.18*	-0.07***	-0.06***	-0.18***
RB	0.19*	1.31***	0.31***	0.16	1.28***	0.37***	0.09	0.79***	0.02
<i>Intermediate developed regions</i>									
FD	-0.19	-0.11***	-0.54***	0.40***	0.49***	0.51***	-0.11***	-0.17***	-0.35***
RB	0.45	0.08***	0.40**	0.26	1.38***	0.44**	-0.28	-0.23	-0.52**
<i>Less developed regions</i>									
FD	-0.23***	-0.23***	-0.22***	0.18***	-0.01	0.24***	-0.06***	-0.03***	-0.05***
RB	0.11***	0.50***	0.10	0.09**	0.83***	0.09	0.07*	0.56***	0.06

(***), (**) and (*) indicate significance at the 1%, 5% and 10% levels respectively. ¹ The role of rural banks is measured by the variable RB resources share.