Is Cooperative Finance a Solution to Banking Market Failure?

The Complex Relationship between Financial Cooperatives and the Traditional Banking Sector

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Abstract

The recent financial crisis has shown the importance of developing a sustainable financial system. In this regard, cooperatives, which the United Nations celebrated in 2012, deserve special attention. Understanding their relationship with the banking sector is key to develop adequate policies. In line with the market failure theory, our empirical analysis shows that FCs reach more members in countries where the banking sector is less developed. However, important synergies exist between banks and FCs concerning savings activity. In particular, the presence of banks increases FCs' capacity to collect savings by offering them a safe place to secure their savings surplus.

Keywords – Cooperative, microfinance, bank, financial development, public policy

1. Introduction

The United Nations General Assembly has declared 2012 as “the International Year of Cooperatives”. In many countries, such organizations play an important role in the economy. Based on the values of self-help, democracy, equity and solidarity, cooperatives work for the mutual interest of their members and support the development of their local area. As stressed by Ban Ki-moon, the United Nations Secretary-General: "Cooperatives are a reminder to the international community that it is possible to pursue both economic viability and social responsibility" (IYC, 2012). Despite this, these organizations remain poorly addressed by policymakers and academics (Groeneveld and de Vries, 2009). In particular, Kalmi (2007) shows that cooperatives have progressively disappeared from the economics textbooks after World War II.

The recent financial crisis has increased the importance of savers’ protection and prudential regulation of banking activities (Hellwig, 2009) and triggered new research on alternative ownership and governance structures for banks. In that line, financial cooperatives (FCs) deserve special attention. Indeed, FCs tend to focus on retail banking, take lower risks, and have a positive impact on the sector stability (Hesse, and Cihák, 2007; Ayadi *et al.*, 2010). Michie *et al.* (2009) and Groeneveld and de Vries (2009) mention that cooperative finance can be instrumental in setting up the new global financial system.

In developing countries, FCs plays a crucial role in financial inclusion. In particular, they serve rural areas that other types of microfinance institutions (MFIs) are unwilling or unable to serve and reach people who do not have access to other formal financial services. By 2012, FCs served more than 81 million members in developing countries (WOCCU, 2012). They

are among the earliest and most widespread forms of MFIs across the world (Hollis and Sweetman, 1998). However, their development can differ largely from one country to other. In this context, it is relevant to analyze which macro-factors help their development, and especially how the traditional banking sector affects their expansion. Indeed, one can wonder: Why are FCs more developed in some countries and not in others? How is cooperative finance affected by the traditional banking sector? Are FCs more developed in countries where the banking sector is rather low? Or, do they benefit from synergies with banks growing in parallel to this sector? This paper investigates the preceding questions.

First developed in northern countries during the 19th century, FCs were created with the purpose to serve people excluded from the formal financial sector and have succeeded in overcoming asymmetric information and enforcement problems characterizing the credit market (Guinnane, 2001). Nowadays, they are widely present in developing country. The Overseas Cooperative Development Council stresses: "This honor [the UN International Year of Cooperatives] recognizes the contributions of cooperatives to global economic development, and the impact of that work in reducing poverty and creating new opportunities. The General Assembly voiced special appreciation for the role of cooperatives in improving the quality of life in rural communities and among indigenous peoples." (Rob Nooter, OCDC, 2012)

Although created to fill a gap left by the financial sector, FCs have built synergies with banks and have used them to develop their services beginning in the 19th century and potentially even more today. Spillover effects also exist between different types of financial institutions (Hermes et al., 2009).

Consequently, the impact of the domestic banking sector on cooperative finance can be both positive and negative.

Recent studies, such as Gonzalez (2007), Ahlin *et al.* (2011) or Vanroose and D'Espallier (2013)[1], have shown the influence of macro-environmental factors on the development of microfinance. Cull et al. (2009) are the first ones to point out the importance of understanding the relation between microfinance and the broader banking sector. As many central banks are willing to promote financial inclusion, an understanding of this relationship seems essential in order to define adequate policies. Ahlin et al. (2011) and Vanroose and D'Espallier, (2013) stress that MFIs serve more clients and are more profitable in countries where the financial sector is not well developed. However, no real evidence has yet been revealed regarding cooperative finance. Cooperatives differ from other MFIs since they are governed by their members who are both clients and owners of the organization (Hansmann, 1996). Furthermore, FCs finance themselves mainly through savings from their members acting as intermediaries, whereas most of the MFIs generally only lend (Mersland, 2009; Hartarska *et al.*, 2012).

Thanks to an original database from WOCCU (World Council of Credit Unions), this paper investigates, at country level, the impact of domestic banking sector development and bank competition on the expansion of cooperative finance. We conduct a panel data analysis using aggregate information for 66 developing countries from 1990 to 2011.

Our empirical results show that FCs reach more members in countries where the banking sector is weak. This demonstrates the role of cooperatives in overcoming banking market

[1] Those studies used the Mix Market database. They include some cooperatives active in microfinance, but coops are always underrepresented. Coops rarely self-report their data to the Mix, which explains that they are underrepresented whereas they actually are very present in developing countries (Mersland, 2009).

failure, serving people excluded from the banking sector. However, our empirical analysis also reveals the existence of some positive synergies with the banking sector. In particular, FCs benefits from a minimal presence of banks, which provide them safe infrastructures to secure their savings surplus. FCs are also better able to mobilize savings from their members in countries with higher banks' network coverage. This could be due to the use of bank branches' network by FCs to manager savings mobility inside their own network. Some spillover effects could also explain this positive impact. For instance, the development of the whole banking sector goes with greater financial literacy (Cole *et al.*, 2011) and can in turn stimulate savings behavior of the population. Because savings mobilization proves crucial to FCs sustainability, this positive synergy is key (Guinnane, 1994; Branch and Baker, 2000; Armendáriz et Morduch, 2010).

The rest of the paper is organized as follows: section 2 provides background by exploring the recent studies on the interactions between financial organizations working for poverty alleviation and the traditional banking sector. Section 3 analyses the specific relationship between FCs and banks - FCs' role as a solution to market failure and the synergies they have developed with banks - and it defines the two main hypotheses that will be tested. In section 4, the methodology and the database are successively presented. Section 5 presents and discusses the empirical results. Section 6 conducts robustness checks and section 7 concludes and proposes policy-oriented recommendations.

2. Financial Institutions Working for Poverty Alleviation and the Traditional Banking Sector

Recently, different authors have focused on the link between the traditional banking sector and the development of financial institutions working for poverty alleviation such as MFIs, savings banks or state financial institutions. Evidence is not clear-cut.

Vanroose and D'Espallier (2013) demonstrate that MFIs have a higher outreach in terms of *total number of active borrowers* and *total loan portfolio*, in areas where the financial sector is less developed, in line with their role of market failure solution. However, they also show that MFIs depend on the domestic banking sector for additional funds and that inflation has a bad effect on the MFIs' profitability, stressing that these institutions are sensitive to the stability of the formal financial system. Ahlin *et al.* (2011) find only marginal evidence of an impact of financial depth on MFIs' growth, but when this impact is significant, it is negatively associated with MFI portfolio growth.

Financial institutions working for poverty alleviation have also developed positive synergies with the traditional banking system. For instance, Guinnane (2002) shows that, in 19th century Germany, savings banks, whose objective was to offer a safe place for the poor to deposit their savings extended banking behavior to a larger part of the population and later large banks relied on savings banks to develop their retail deposit networks.

Regarding performances, Burges and Pande (2005) show that Indian state-led bank branches that were developed in rural areas not served by commercial banks significantly reduced rural poverty. Ahlin *et al.* (2011) observe a positive influence of financial sector development on

MFIs efficiency reducing their costs, their default, and their interest rates. Cull *et al.* (2009) find that a higher development of the banking sector positively influences the MFIs' social performances (in terms of type of clients), especially for commercially-oriented MFIs, and, to a lower extent, increases their profitability. Hermes *et al.* (2009) observe a positive impact from financial market development on MFIs' efficiency. They explain this influence as the positive effect of spillover of financial innovations and banking technologies, competition and better regulation and supervision.

Looking at competition, empirical studies find different results. Regarding competition within the banking sector, Beck *et al.* (2004) find that bank concentration has a negative impact on financial access in developing countries. Conversely, Assefa *et al.* (2013) and McIntosh and Wydick (2005) stress that the competition within the microfinance sector has a negative effect in reducing financial access, especially due to the impossibility for non-profit MFIs to do cross-subsidization anymore. However Cull *et al.* (2009) show that competition with banks pushes "microbanks" to serve poorer clients, which leads to a reduction of financial exclusion. However, they find no influence on the MFIs' profitability, while, Hermes *et al.* (2009) observe that bank competition positively influences MFIs' efficiency. In another vein, Mersland (2011) stresses that in their early years, savings banks did not face any competition, but later traditional banks competition had a positive impact on their efficiency, playing as a disciplinary mechanism.

Nevertheless, none of these papers have analyzed the interaction between the traditional banking sector and cooperative finance.[2] FCs differ from other MFIs by their ownership

[2] Some of those studies include a few cooperatives active in microfinance, but coops are always underrepresented since they rarely report their data on the MixMarket. Although some of these studies used the status as control variable (capturing the status influence on MFIs' performances or growth), they do not study the influence of financial market development and the bank competition on the outreach of each type of MFIs.

feature (Mersland, 2009). Cooperatives are characterized by the double status of their members who are simultaneously owners and clients of the organization (Hansmann, 1996). They generally observe the “one-member, one-vote" rule. This generates specific governance issues differing from those faced by other MFIs. Moreover, FCs mobilize local savings. They mainly finance their lending activity through savings from their members, doing real financial intermediation. This represent a major distinction compared to NPOs in microfinance which generally are not allowed to collect savings (Westley and Shaffer, 1997; Robinson, 2001, Mersland 2009). Therefore, having a different balance sheet and ownership structure than other MFIs, FCs could be differently affected by the domestic financial sector. The next section develops the theoretical considerations on the interaction between FCs and banks and defines the hypotheses to be tested.

3. Hypotheses Construction: Cooperative Finance and the Traditional Banking Sector Relationship

In 19th century, financial cooperatives were created to provide financial services to financially excluded people (Fonteyne, 2007). Those organizations overcame the imperfect information in financial market, which lead to adverse selection and moral hazard, subsequently causing credit rationing and market failures (Stiglitz and Weiss, 1981). In the 19th century, northern countries suffered greatly from the imperfection of the financial system, with a large part of the population not having access to financial services, especially in rural areas (Hollis and Sweetman, 1998; IRU, 2005).

FCs served rural areas deserted by commercial banks, as well as urban artisans, small shopkeepers, and “handworkers” (Hollis and Sweetman, 1998; Guinnane, 2001). These

organizations had comparative advantages in terms of information gathering as well as the ability to mobilize cheap and efficient reimbursement incentive mechanisms based on economic and social sanctions exerted by peers (Banerjee *et al.*, 1994; Armendáriz and Morduch, 2010). As an example, German FCs, which were among the earliest and most successful financial cooperative experiences in Europe, preserved their social capital and informational advantages by limiting their membership to small communities (Kotz and Nagel, 2002; Prinz, 2002, Guinnane, 2001). Guinnane (2003) registers an average of 100 members per rural FC. These FCs did not provide credits to outsiders from the village, except for very profitable loans.

Slowly, a high majority of northern FCs has progressed toward big structures functioning on a similar basis as classical commercial banks and serving similar clients. This trend has opened the debate on cooperative identity preservation (Côté, 2001). However, in developing countries, FCs continue to fill a gap left by the banking sector and serve mostly financially excluded people (Rogaly, 1998; Cuevas and Fischer, 2006; Branch and Grace, 2008; Hirschland *et al.,* 2008 ; Hartarska *et al.*, 2012). In some areas, such as West Africa, the microfinance sector is even dominated by the cooperative status (Ouédraogo and Gentil, 2008). Therefore, in developing countries, FCs continue to play a role in the solution to the banking market failure. We can thus make the following hypothesis:

Hypothesis 1 - Market Failure Solution (H1): *FCs are more developed where the domestic financial system is weak. Traditional banks' development represents a threat for FCs expansion.*

But, FCs are not totally disconnected from the banking sector. Thus, what are their links with

banks? Historically, if we look at the German experience, Raiffeisen and Haas rural FCs were relatively disconnected from the banking system. Leaders had set up cooperative regional centrals which provided financial services to FCs while preventing these organizations from dealing with other financial institutions due to an exclusive clause. By including both financial and non-financial coops, the regional centrals system were able to keep the resources within the cooperative sector, i.e., FCs' surpluses were made available to other cooperatives (Guinnane, 2002). Nevertheless, Guinnane (2011) stresses that German FCs took advantage of the development of the banking sector. The Schulze-Delitzsch urban FCs had already started to develop some synergies with banks. As an example, they used the Dresdner Bank as their central. This bank was a large, professional institution able to provide a huge variety of services, but with no special commitment to coops, unlike Haas or Raiffeisen rural centrals. Also, FCs could benefit from the infrastructure related to the banking system such as the Post Office that facilitated money transfer between FCs and their regional Central (central cooperative organization providing financial services to local FCs).

Today, FCs have also built multiple synergies with the banking sector. Based on the literature and field research, we have identified three main types of synergies. The first one is the savings security. The protection of members' savings is crucial, but many small FCs, as well as big networks, cannot afford, unlike banks, to invest in safe infrastructures in order to keep their financial resources protected. Thus, FCs' networks, as well as very small cooperatives, have bank accounts to secure their surplus of members' savings. Andersen and Malchow-Moller (2006) stress the comparative advantages (savings cost versus information cost) existing between more formal and informal sectors. This is typically the case for FCs: they have lower information costs on their members than banks, thanks to their ownership structure. But they have higher deposit costs than banks, the latter having large and secure

infrastructure. Each of them could use the other's advantage through an adequate cooperation.

A second important synergy for FCs' networks is the liquidity transfer facilities. They can use the banking system to transfer liquidities from one affiliated FC to another. Obviously, banks could not have an agency in every working area of the network (especially for remote rural areas) but still, banks' network coverage can greatly facilitate the circulation of liquidities inside the cooperative network (as pinpointed by the director of the Pamecas, one of the largest Senegalese FCs network, June 2010). [3]

Finally, links with the banking system enable FCs to broaden the scope of services they offer with products such as salaries domiciliation or remittances transfers. [4] These products require FCs to have bank accounts or to work as bank subcontractors. The development of remittances services in microfinance is starting to attract more attention (Sukadi Mata, 2012; Aggarwal *et al.*, 2011) and some FCs, such as the Pamecas (a Senegalese FCs network), are starting to provide these services (Evans and Klaehn, 2004).

All of these positive synergies with the banking sector could help FCs to develop. This argument leads to the second hypothesis:

Hypothesis 2 – Complements thanks to synergies (H2): *The existence of strong synergies makes FCs more developed where a well-established domestic financial sector is present. Thanks to their respective comparative advantages, they are not in competition with banks*

[3] Field research conducted in Pamecas, a Senegalese FCs network (January 2010 and June 2010), in the FONGS, a Senegalese network of farmer organizations with associated FCs (February 2007 and June 2009), and in the MUFEDE, a Burkinabe FC (November 2008).

[4] Sodokin and Donou-Adonsou (2010) also insist on the complementarities of West African MFIs (especially composed of FCs) and banks to meet the challenge of economic growth and to improve the quality of the whole financial sector.

serving a different type of population.

These considerations show that interactions between FCs and banks can be both positive and negative. Consequently, the relationship between banks and cooperative finance is complex: Are FCs more developed where the banking sector is weaker, being more widespread where the gap left by the financial sector is bigger? Or are synergies so important that domestic banking sector development favors the expansion of FCs? Are FCs affected by the competition in the banking sector? Or, do FCs work with a totally different population?

The theory of the market failure solution could suggest that FCs will be more developed in areas where financial market failure is important and the banking sector is weak. However, due to the potential synergies with banks, a minimal presence of banks could help FCs to develop. Also, their comparative advantage on information asymmetry should push FCs located in different areas or serving another type of population to work in different spheres than banks; therefore, their expansion should not be sensitive to the banking sector competition. But, in practice, this is not so obvious. Overlaps could appear if FCs serve a part of banks' clientele (up scaling), or inversely if banks enlarge their coverage and start to serve unbanked poor people (downscaling).

The empirical analysis will try to reveal some dominant effects in testing the two opposite theoretical hypotheses.

4. Methodology and Data

We specify a panel data model in order to test the hypotheses sub-defined. We define two dependent variables representing two dimensions of FCs' development. First, we use a measure of FCs' expansion through the degree of penetration at the country level: the *Outreach* variable. This variable is obtained by dividing the sum of national FCs' members by the country population older than fifteen years. Second, we use a measure of FCs' capacity to mobilize savings through the average savings per member: *Savings per Member*. In practice, this variable is obtained by dividing the total savings collected by FCs by their number of members. The empirical analysis investigates the impact of the domestic banking sector development on those two dependent variables, while controlling for different parameters to isolate this impact.

To estimate the parameters of the model, we opt for a progressive approach using first pooled-OLS and then random-effects regression models. The pooled-OLS model is a relevant first step since it gives more weight to the cross-countries variations and also allows us to control for variables for which we do not have time series. Using a robust clustering method, we correct for potential cross-sectional heteroskedasticity and serial correlation (in this case, across multiple observations from the same country).

As a second step, we use a random-effects model. This model has some main advantages. It considers unobservable time-invariant characteristics of individuals (country-specific variables in this case). This reduces the risk of omitted variables bias (Hausman and Taylor, 1981). Contrarily to the fixed-effect model, the random-effect method moderates the number of parameters that has to be estimated and it enables to identify time invariant variables

(Baltagi, 1995; Hartarska, 2005). By adding a set of year dummies to our model, we conduct a two-way random-effects method, which enables analysis of regressors' variation over time within each country as well as regressors' variation over country within each period. Since the random-effects method supposes the additional hypothesis of orthogonality between the individual effects and the regressors, at the end of the analysis, we also conduct fixed-effect method as a robustness check. The general specification of the model is presented as follows:

$$Outreach_{it} = \alpha + \beta_1 finsyst_{it} + \beta_2 \ln Inflation_{it} + \beta_3 \ln GNI_{it} + \beta_4 Growth_{itt} + \beta_5 FDI_{it}$$
$$+\beta_6 \ln AID_{it} + \beta_7 Industry_{it} + \beta_8 PopDensity_{it} + \beta_9 year_t + \mu_i + u_{it} \quad (1)$$

The explained variables of the model are composed of the variables of interest named *finsyst*, measuring financial system development, and a set of control variables. We respectively control for economic macro-factors: inflation, GNI per capita and GDP growth rate; external funds: aid per capita (*AID*) and foreign direct investment in GDP percentage (*FDI*); sectorial activity: Industry (value added from industrial sector in GDP percentage) and population features: the population density (*Pop Density* is the population per square km). In a second instance, we also add institutional control. Finally, $year_t$ is the set of year dummies, μ_i is a dummy variable for each country – it captures unobserved country characteristics – and u_{it} is the error term.

Referring to the literature, we use the standard measures to estimate the domestic financial development (Levine, 2005; Cull *et al.*, 2009). First, we use a proxy for the expansion of financial services: the total domestic credit provided by the banking sector expressed in percentage of GDP (*BankCred/GDP*). This variable gives measures of the depth of the banking sector: a positive/negative sign of their associated coefficients means that the banking

sector expansion favors/discourages the development of financial cooperatives. Secondly, we analyze the impact of the banks' network coverage using two variables: the number of branches of commercial banks per 100,000 adults (*Branch*) and the number of automated teller machines per 100,000 adults (*ATM*). Finally, we use the interest rate spread of banks to capture the impact of competition in the banking sector: the spread between the interest rate on credits and savings (*IR Spread*) can be considered as a proxy for banking sector competition (Hermes *et al.*, 2009). A lower spread means a stronger competition between banks, which is a sign of a more developed financial system. A negative impact of this variable on FCs' outreach could mean that a stronger competition in the banking sector will reduce the expansion of FCs. This could be explained by an overlap in their activities, as banks tend to reach new markets.

The FC panel database is made of information provided by WOCCU's annual statistical reports. WOCCU collects information all around the world thanks to its partnerships with different representative national professional organizations. The aim of WOCCU's survey is "to measure credit union growth and member service trends worldwide" (WOCCU, statistical rapport 2009, p1).[5] Thus, they try to have an overview of the world situation even if, obviously, these data are not totally exhaustive and therefore only estimations. Information comes from WOCCU member and non-member countries. WOCCU works in partnership with relevant national institutions to get better information: for instance, West African data come from the microfinance department of the West African Central Bank, which has the best available information on West African FCs. However, this kind of optimal partnership is not

[5] WOCCU has a large definition of Credit Unions: "Credit Unions, called by various names around the world, are user-owned financial cooperatives that offer savings, credit and other financial services to their members. Credit union membership is based on a common bond, a linkage shared by savers and borrowers that can be based on a community, organizational, religious or employee affiliations." (WOCCU, Branch and Grace, 2008). Thus, it includes financial cooperatives, SACCOs (Savings and Credit Cooperatives), *caisses d'épargne et de crédit*, and other microfinance organizations working on a cooperative base.

in place everywhere.

The WOCCU data only concern financial cooperatives and do not include cooperative banks (except for India).[6] This prevents any double counting between FCs and Banks. Our sample is an unbalanced panel composed of 66 developing countries for the period from 1990 to 2011 with an average of 15.4 years per country. Regarding geography repartition, the database includes 29 African Countries (out of 54), 18 Central and Latin American Countries (out of 19) and 19 Asian Countries (out of 51) including some of the most important such as India and Bangladesh, but not China.

Information on macro-environment factors comes from the World Development Indicators (WDI) provided by the World Bank. This database contains the standard measures of financial sector development (Levine, 2005; Cull *et al.*, 2009; Hermes *et al.*, 2009).

5. Empirical Results and Discussion

(a) *Descriptive Statistics*

Table 1 provides descriptive statistics of our sample. This table is divided into five categories: FCs variables, banking sector development, macro-environment indicators, institutional variables and area distribution. On average, FCs serve 4.1% of the national population older than fifteen years and include 5,171 members per organization. Geographically, the sample is dominated by Africa, which includes 43% of the observations, then Latin America with 33%

[6] The only exception is for India's urban cooperative banks and credit societies and for European countries such as France and Germany (this information comes directly from WOCCU). European countries are not included in our sample. Regarding the Indian case, we have conducted the same regressions after removing India from the database in order to avoid any possible double counting between FCs and Banks variables, and we found similar results.

of the observations and finally Asia, which is slightly underrepresented, with 24% of the observations.

< Insert Table 1 >

Table 2 shows the correlation between the main variables: variables related to FCs' sector and to the traditional banking sector. First, regarding the correlation within FCs' variables, we can see that outreach of FCs is positively correlated with their size. This means that a sector composed of some large FCs tends to reach more people than a sector composed of a lot of small FCs. Indeed, the size of FCs can be seen as a proxy for sector maturity. Cooperatives grow through networking and a more structured sector will push small local FCs to join larger networks (Desrochers and Fischer, 2005). There is no significant correlation between FCs' outreach and size and the amount of savings they collect per member.

Second, concerning the correlations within banking sector variables, as expected, domestic credit provided by banks is positively correlated with the number of branches and the number of ATMs: banks with larger network coverage provide more credit to the population. Conversely, domestic credit provided by banks is, quite logically, negatively correlated with the interest rate (IR) spread, which is an indicator of competition in banking sector. Indeed, when banks provide more credit, it increases the competition, which reduces the IR spread.

Finally, regarding the correlation between FCs' and the banking sector's variables, Table 2 shows a negative correlation between the number of members served by FCs and the domestic credit provided by traditional banks. This is in line with the substitution assumption. As a solution to banking market failure, FCs tend to reach more members in countries where the banking sector is weak. However, FCs' ability to collect savings from their members are

positively correlated with the two variables related to banks' network coverage: ATMs and Branches. This could support some positive spillover effects. To investigate these relationships more deeply, we will conduct a multivariate analysis and control for a large range of macro-environmental factors.

< Insert Table 2 >

(a) Multivariate analysis and discussion

In this empirical analysis, we look at the impact of the traditional banking sector on FCs' outreach and on FCs' capacity to mobilize savings respectively. We successively investigate the impact of the three dimensions of banking sector development: the financial system depth estimated by the domestic credit provided by banks divided by the GDP, the banking network coverage estimated by the number of branches and the number of ATMs, and the level of competition within the banking sector approximated by banks' interest rate spread.

We first focus on the relationship between FCs' outreach and the traditional banking sector. We conduct pooled-OLS regressions with and without controlling for external funds (AID and FDI). Regressions (1) to (2) in Table 3 show that FCs reach significantly more members in countries where the banking sector is less developed. This result is consistent when controlling for macro-economic variables as well as sectorial activity and population density.

We then use a random-effects method. Outcomes confirm the first result. Regression (3) shows a negative and significant coefficient. Controlling for the square of the *BankCred/GDP* variable, regression (4) reveals a quadratic function with a concave relationship. The coefficient associated to the variable in level is positive, but non-significant, whereas, the

coefficient associated with the square of the variable is negative. The turning point is estimated at the point when *BankCred/GDP* reaches 52%. However, it is likely that there is a multicolinearity problem due to a too high correlation between *BankCred/GDP* variables in level and squared. Thus, we also test for a concave relationship by interacting *BankCred/GDP* with two dummies capturing the size of the variable. Regression (5) supports the previous results revealing strong negative coefficients for the dummies associated to the last two quintiles of the BankCred/GDP distribution.

These findings mean that a minimal presence of banks can have a positive impact on FCs creation and expansion due to synergies and spillover effects. Indeed, banks offer the required infrastructure for FCs to secure their members' savings and induce basic banking legislation favoring financial organizations' development. But, an expansion of the banking sector reduces FCs outreach supporting a substitution effect. As the market failure is reduced, the need for cooperatives is less pronounced.

In short, the main result is that *banking sector depth has a negative impact on the outreach of FCs*. This outcome supports H1: FCs' solution to market failure dominates the positive synergies existing with banks, making cooperatives better able to reach members when the banking sector is weak. However, a minimal presence of banks can be beneficial for FCs to develop. These results are relatively in line with those obtained by Vanroose and D'Espallier (2013) for the microfinance sector, MFIs having a higher outreach when the financial market is weak.

< Insert Table 3 >

In contrast, Table 4 shows that the outreach of FCs is not sensitive to the banks' network

coverage estimated by both the number of branches as well as the number ATMs. This result is a bit counterintuitive and differs from what other authors have found for mainstream microfinance. Indeed, Vanroose and D'Espallier (2013) show that banks' network coverage negatively affects MFIs' outreach, revealing a certain competition. In the case of coops, this could mean that they work with another population than banks. Finally, FCs' outreach is not affected by the level of competition within the banking sector. When banks compete with each other, they tend to moderate their costs and provide cheaper services to their clients, thus reducing the IR spread. However, this spread has no significant impact on the percentage of the population served by FCs. This seems to reveal that FCs do not work in the same sector as traditional banks, since they are not directly affected by the competition within the banking sector, even if, as shown by the first regressions, the expansion of the whole banking sector negatively affects FCs' outreach.

< Insert Table 4 >

To complete this first analysis, we now investigate the impact of the traditional banking sector on the ability of FCs to mobilize savings from their members. Savings is a key element for FCs sustainability (Guinnane, 1994; Branch and Baker, 2000; Armendáriz et Morduch, 2010). Therefore, it is worth considering this issue in parallel with the outreach dimension. In Table 5, the Pooled-OLS regression (1) show a negative, but not significant, impact from the traditional banking sector on FCs' abilities to collect savings from their members. However, random-effects and fixed-effects regressions, (2) and (3), show a positive relationship: FCs are better able to mobilize savings from their members in countries where the banking sector is more developed. This impact is relatively important since the coefficient associate to *Bank Cred/GDP* is large. This could be explained by an increase in "savings habit" with the presence of banks (Sahoo and Das, 2013), since people are more aware of the importance of

monetary savings (Masson et al., 1998). Savings mobilization being key to FCs' sustainability, this spillover effect is a major positive synergy between FCs and banks.

Banks' network coverage also positively influences FCs' ability to collect savings. Regressions (4) and (5) shows that FCs collect more savings in countries with larger banks' branches coverage. This positive synergy could be explained by the use of banking networks by FCs to manage money transfers and savings mobility within their own networks. Finally, the coefficient associated with the competition within the banking sector is positive but not significant as revealed by regressions (6) and (7).

< Insert Table 5 >

In summary, these empirical findings support that, as institutions capable of overcoming financial market failure, FCs reach more clients in countries where the banking sector is weak. Although some bank presence has a positive impact on FCs development (banks offer some basic infrastructures to secure their savings) an expansion of the banking sector negatively influences FCs' outreach by reducing the need for cooperative finance. However, positive synergies exist regarding FCs' ability to collect savings, since they mobilize more savings per member in countries where the banking network coverage is larger. The next section will conduct some additional tests in order to assess the robustness of the results.

6. Robustness Check

This section tests the robustness of previous results by including additional institutional variables and by discussing causality issue.

As stressed by Cull *et al.* (2009) and Ahlin *et al.* (2011), the institutional and regulatory

environment can affect the development of financial institutions. Following those authors, we add to our analysis the commonly used institutional indices. Since we have very low time-variability for those indices, we only use Pooled-OLS methodology. First, we add two variables that indicate the suitability of regulatory environment for doing business. Regressions (1) to (4) in Table 6 respectively control for the cost of business start-up procedures in percentage of GNI per capita (*Cost to start Business*) and the number of start-up procedures to register a business (# *Procedures to Start*). Results obtained are consistent with the previous ones: banking sector depth has a negative impact on FCs' outreach and banks' network coverage has a positive one on FCs' ability to mobilize savings. Interestingly, we found no significant impact of business regulatory environment on those two dimensions of FCs development.

Second, we take into account the trust in the legal system and the property protection by controlling for time in days required to enforce a contract (*Time Enforce Contract*) and the number of procedures to register property (*Register Property*). Here also, regressions (5) to (8) in Table 6 show that the results are consistent with previous findings.

< Insert Table 6 >

Last but not least, regarding the risk of reverse causality: Since FCs' outreach reaches on average only 4.1% of the population older than fifteen years, it seems reasonable to consider that the banking sector influences the development of FCs rather than the opposite. Reverse causality is especially unlikely with small institutions, as supported by Ahlin *et al.* (2011). Following the latter, we retest the main results dropping out data in order to have only low FCs' outreach: we drop out the observations when FCs' total members equals or exceeds 2% of the total population older than fifteen years. Globally, Table 7 shows that results are

relatively similar to the baseline ones obtained with the complete sample. We can thus conclude that reverse causality is very unlikely. We also use the fixed-effect method to check the robustness of the concave relationship existing between FCs' outreach and the banking sector development. Regression (4) confirms this relationship. Finally, we cannot totally exclude omitted variable bias, however, we control for classical macro-economic factors (Vanroose and D'Espallier, 2013; Hermes *et al.*, 2009; Cull et al., 2009; Caudill *et al.*, 2009), as well as, time invariant characteristics.

< Insert Table 7 >

7. Conclusion

This paper analyzes the interaction between cooperative finance and domestic banking sector development. FCs are one of the oldest and most widespread types of MFIs in the world. These organizations were set up to fill a gap left by the financial sector. Thanks to their additional information on members, they represent a solution to credit market failure. Although nowadays, in developed countries, cooperative banks serve a similar population to traditional banks, in developing countries, cooperative finance continues to serve people excluded from the formal financial market. However, FCs have also built synergies with the domestic banking system, especially for savings security.

Thus, the interaction between FCs and the banking sector can be both negative, assuming that FCs are more developed where banks are less present and market failure is huge, or positive, possibly due to synergies existing between banks and FCs or to spillover effects. This paper empirically investigates both options and shows that the market failure hypothesis can be validated: FCs reach more members in countries where the banking sector is weak. However,

this main result hides a more complex relationship. Indeed, FCs seem to benefit from some bank presence, likely because banks provide access to basic infrastructures to secure savings and create a trustworthy environment. But with the banking sector expansion, market failure is reduced and the need for FCs is less crucial. Consequently, FCs reach less members or progress toward big structures functioning on a similar basis as classical commercial banks, as indicated through the history of developed countries.

However, the empirical analysis also reveals some important positive synergies with the banking sector, especially regarding savings mobilization: FCs are better able to collect savings from their members when the banking sector is more developed, especially in countries where banks' network coverage is large. FCs use banks' branch network to manage savings mobility within their own network. Also, positive spillover effects can be generated by the positive influence of financial system development on private savings habit.

The empirical analysis also shows that FCs' outreach is not sensitive to the competition in the banking sector, which supports that FCs do not compete directly with banks, as they reach another type of population.

This result has possible public policy implications. It supports arguments for policies favoring synergies between banks and FCs, in order to encourage FCs' sustainability and promote financial inclusion, while on a certain level, FCs are still protected from banks' competition.

Savings security is likely to represent a key synergy. Savings services are a main comparative advantage of FCs vis-à-vis the MFIs with an NPO status. However, small FCs, as well as some big networks cannot guarantee themselves as effective protectors of their members'

savings. Holding bank accounts to secure their surpluses is thus extremely valuable for these organizations. Facilities for liquidity transfers inside FCs networks and possibilities to broaden the scope of their services with products such as salaries domiciliation or remittances are additional relevant synergies. Public policies should help these synergies to be further developed, due to an adequate regulation and implementation of incentives for banks to deal with FCs or through direct FCs support in the construction of these synergies.

Finally, our study evidently faces some limitations, such as the relative data precision. We have country-aggregated information on FCs that makes it impossible to control for individual FC characteristics. Further studies could investigate the relationship between FCs and the banking sector more deeply using a larger database including disaggregated information at FC level. However, this paper gives the first relevant and original evidence on the complex relationship existing between cooperative finance and the traditional banking sector.

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List of Tables

Table 1: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
FCs					
Outreach	1,018	0.04	0.06	0.00002	0.43
Savings per Members	987	590	1,369	0	18,274
FCs Size	1,009	5,171	21,958	31	562,575
Banking Sector					
BankCred / GDP	967	0.44	0.38	-0.19	2.49
Branch	336	11.04	11.52	0.31	66.36
ATM	290	19.70	22.89	0.00	119.63
IR Spread	791	0.10	0.09	0.001	0.79
Macro-Environmental Factors					
Economic Indicators					
GNI	985	3,701	3,299	210	16,720
Growth	1,007	2.28	4.37	-18.69	37.12
Inflation	916	10.06	10.50	-1.99	68.46
Population Features					
Pop Density	1,018	116	171	1.62	1,156
External Funds					
FDI	1,003	3.04	5.15	-4.85	84.94
AID	1,017	37.34	37.05	0.00	355.34
Economic Sectors					
Industry (Value Added, % GDP)	955	28.70	9.90	4.84	70.22
Institutional variables					
Cost to start Business	455	90.33	309.11	0.3	6,376
# Procedures to Start	455	9.68	3.48	2	28
Time Enforce Contract	454	707.36	346.97	195	1,715
Register Property	415	6.64	2.32	2	14
Area					
Africa	1,018	0.433	0.496	0	1
Latin-America	1,018	0.328	0.470	0	1
Asia	1,018	0.239	0.427	0	1

Table 2: Correlation between FCs' Variables and Banking Sector's Variables

	Outreach	Savings per Member	FCs Size	BankCred/ GDP	ATM	Branch	IR Spread
Outreach	1						
Savings per Member	-0.02	1					
FCs Size	0.20***	0.03	1				
BankCred/GDP	-0.14***	0.14***	-0.02	1			
ATM	0.13**	0.57***	0.25***	0.52***	1		
Branch	0.09	0.30***	0.12**	0.18***	0.47***	1	
IR Spread	0.02	-0.02	-0.03	-0.14***	0.30***	0.10*	1

Table 3: FCs' Outreach and Banking Sector Depth

	(1) Outreach	(2) Outreach	(3) Outreach	(4) Outreach	(5) Outreach
BankCred/GDP	-0.0311**	-0.0277**	-0.0162*	0.0225	0.0336*
	(0.0120)	(0.0123)	(0.00892)	(0.0202)	(0.0200)
BankCred/GDP*2				-0.0216**	
				(0.0102)	
BankCred/GDP* D1[a]					-0.0251**
					(0.0125)
BankCred/GDP* D2					-0.0453***
					(0.0164)
FDI		-0.00178***	-0.000654*	-0.000690*	-0.000666*
		(0.000592)	(0.000366)	(0.000366)	(0.000365)
lnAID		0.00918**	0.00277	0.00285	0.00314
		(0.00362)	(0.00252)	(0.00252)	(0.00253)
lnInflation	-0.00415	-0.00389	0.000716	0.000859	0.000907
	(0.00362)	(0.00346)	(0.00187)	(0.00186)	(0.00187)
lnGNI	0.0138**	0.0184***	-0.00403	-0.00799	-0.00517
	(0.00674)	(0.00639)	(0.00627)	(0.00652)	(0.00634)
GDP Growth	-0.00166**	-0.00118	-0.000686	-0.000685	-0.000619
	(0.000743)	(0.000707)	(0.000429)	(0.000427)	(0.000428)
Industry	-0.0015***	-0.00156***	-0.00107**	-0.000980**	-0.00108**
	(0.000501)	(0.000460)	(0.000419)	(0.000422)	(0.000421)
Pop Density	-1.88e-05	-1.96e-05	-4.83e-05	-6.23e-05**	-5.19e-05*
	(1.92e-05)	(1.56e-05)	(3.00e-05)	(3.10e-05)	(3.07e-05)
Year	Yes	Yes	Yes	Yes	Yes
Constant	-0.0124	-0.0745	0.0768*	0.0947**	0.0721
	(0.0488)	(0.0540)	(0.0461)	(0.0470)	(0.0468)
Observations	812	787	787	787	787
R2 / R_Within	0.228	0.270	0.296	0.303	0.304
F / chi2	3.16***	4.20***	289.8***	296.5***	301.0***
N_clust	57	57	57	57	57
model	ols	ols	re	re	re

[a]: D1 and D2 are dummy variables that are equal to one respectively for the last two quintiles of the *BankCred/GDP* variable distribution.

Table 4: FCs' Outreach and Banking Sector Network and Competition

	(1) Outreach	(2) Outreach	(3) Outreach	(4) Outreach
Branch	0.000396			
	(0.000660)			
ATM		-0.000305		
		(0.000193)		
IR Spread			-0.0313	-0.0269
			(0.0354)	(0.0288)
FDI	-0.00125**	-0.000812	-0.00115**	-0.000119
	(0.000609)	(0.000510)	(0.000504)	(0.000218)
lnAID	0.00597	0.00597	0.00995***	0.00199
	(0.00416)	(0.00401)	(0.00353)	(0.00184)
lnInflation	0.00274	0.0108*	0.00536*	-0.000167
	(0.00852)	(0.00587)	(0.00271)	(0.00169)
lnGNI	0.0177	0.0263**	0.0203***	0.00251
	(0.0127)	(0.0105)	(0.00580)	(0.00696)
GDP Growth	-0.00139	-0.00111	0.000259	7.87e-05
	(0.00144)	(0.00125)	(0.000531)	(0.000367)
Industry	-0.00171***	-0.00160***	-0.00147***	-0.000510
	(0.000584)	(0.000593)	(0.000410)	(0.000413)
Pop Density	-2.13e-05	-1.64e-05	-1.22e-05	-4.01e-05
	(1.84e-05)	(1.92e-05)	(1.32e-05)	(2.76e-05)
Year	Yes	Yes	Yes	Yes
Constant	-0.0540	-0.148*	-0.125**	0.00992
	(0.124)	(0.0830)	(0.0507)	(0.0512)
Observations	291	249	655	655
R2 / R_Within	0.177	0.220	0.251	0.307
F / chi2	2.803***	2.662***	7.008***	153.4***
N_clust	49	45	51	51
model	ols	ols	ols	re

Table 5: FCs' Ability to Collect Savings and Banking Sector Depth and Banking Sector Network

	(1) Savings per Member	(2) Savings per Member	(3) Savings per Member	(4) Savings per Member	(5) Savings per Member	(6) Savings per Member	(7) Savings per Member
BankCred/GDP	-68.93	423.7*	603.0**				
	(313.7)	(253.4)	(282.4)				
Branch				25.08**			
				(10.74)			
ATM					14.85***		
					(5.120)		
IR Spread						49.60	506.7
						(932.5)	(677.4)
lnInflation	-229.5	-142.2	-128.0***	-2.772	9.695	-319.2*	-179.0***
	(160.6)	(123.5)	(46.41)	(50.61)	(64.74)	(182.7)	(49.61)
lnGNI	253.1	263.9	735.6*	46.95	34.71	306.8***	552.2***
	(166.8)	(314.4)	(389.4)	(171.1)	(181.7)	(96.65)	(148.7)
GDP Growth	-4.796	-7.830	-6.551	2.011	-6.156	-5.447	-14.34
	(10.56)	(8.268)	(10.52)	(17.56)	(18.51)	(12.55)	(11.20)
FDI	9.615	5.825	8.416	-1.683	5.563	10.71	5.863
	(10.00)	(6.429)	(9.401)	(6.760)	(8.000)	(7.855)	(8.592)
lnAID	-136.8	-50.09	-22.86	-164.7**	-96.40	-94.76	-44.44
	(87.77)	(59.19)	(66.60)	(75.88)	(84.52)	(100.6)	(62.49)
Industry	-5.489	-9.439	-8.094	3.675	1.038	-3.325	-13.29
	(9.045)	(11.26)	(13.33)	(12.25)	(13.61)	(7.821)	(10.52)
Pop Density	-0.559	-1.335*	-2.781	-0.319*	-0.136	-0.475	-0.844
	(0.370)	(0.802)	(1.805)	(0.182)	(0.221)	(0.384)	(0.676)
Year & Area	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-301.3	-575.5	-4,433	552.4	333.3	-741.3	-2,706**
	(1,175)	(2,338)	(2,760)	(1,276)	(1,220)	(955.9)	(1,141)
Observations	769	769	769	283	245	639	639
R2 / R_Within	0.108	0.0746	0.079	0.361	0.369	0.195	0.0949
F / chi2	3.569***	167.1***	2.013***	3.123***	5.278***	4.907***	77.87***
N_clust	57	57	57	49	45	51	51
model	ols	re	fe	ols	ols	ols	re

Table 6: Baseline Results Controlling for Institutional Variables

	(1) Outreach	(2) Outreach	(3) Savings per Member	(4) Savings per Member	(5) Outreach	(6) Outreach	(7) Savings per Member	(8) Savings per Member
BankCred/ GDP	-0.050***	-0.049***			-0.050***	-0.053***		
	(0.0146)	(0.0141)			(0.0147)	(0.0155)		
Branch			22.35**	22.16**			22.10*	22.79**
			(11.05)	(10.41)			(11.00)	(9.787)
Cost to start Business	4.70e-05		-0.700					
	(0.000138)		(0.743)					
# Procedures to Start		0.00197		17.34				
		(0.00205)		(20.90)				
Time Enforce Contract					9.21e-06		0.139	
					(2.21e-05)		(0.197)	
Register Property						-0.00383		29.50
						(0.00327)		(39.86)
lnInflation	-0.0139	-0.0155	-10.22	-1.983	-0.0145	-0.0143	0.311	-12.02
	(0.00918)	(0.00929)	(63.02)	(56.34)	(0.00955)	(0.0106)	(57.55)	(61.75)
lnGNI	0.0210*	0.0200*	142.8	180.4	0.0190*	0.0197*	170.6	167.7
	(0.0118)	(0.0106)	(139.8)	(136.7)	(0.0108)	(0.0109)	(140.2)	(138.8)
GDP Growth	-0.00228	-0.00226	-6.408	-4.281	-0.00229	-0.00219	-4.271	-7.599
	(0.00188)	(0.00184)	(18.76)	(18.39)	(0.00188)	(0.00196)	(18.70)	(18.65)
FDI	-0.002***	-0.002**	-0.729	0.129	-0.002***	-0.002**	-0.571	-0.783
	(0.000780)	(0.000783)	(6.978)	(6.404)	(0.000749)	(0.000803)	(6.865)	(6.496)
lnAID	0.00705	0.00848*	-122.4	-110.7	0.00716	0.00633	-121.7	-119.7
	(0.00484)	(0.00464)	(78.53)	(76.21)	(0.00483)	(0.00484)	(76.19)	(77.34)
Industry	-0.002***	-0.003***	-6.359	-5.423	-0.002***	-0.003***	-4.719	-4.022
	(0.000645)	(0.000671)	(10.43)	(10.25)	(0.000706)	(0.000754)	(10.20)	(9.973)
Pop Density	-3.14e-05	-2.77e-05	-0.533**	-0.456*	-3.95e-05	-3.98e-05*	-0.598***	-0.478**
	(2.13e-05)	(2.11e-05)	(0.225)	(0.227)	(2.61e-05)	(2.01e-05)	(0.217)	(0.192)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0287	-0.0382	-76.14	-712.9	-0.0130	0.0414	-496.6	-600.8
	(0.103)	(0.100)	(1,135)	(1,112)	(0.0947)	(0.105)	(1,150)	(1,149)
Obs	380	380	281	281	380	347	281	281
R-squared	0.286	0.291	0.335	0.338	0.286	0.293	0.336	0.339
F	2.941***	3.637***	2.524***	2.468***	3.033***	2.768***	2.615***	3.732***
N_clust	55	55	49	49	55	55	49	49
model	ols	ols	ols	ols	ols	ols	ols	ols

Table 7: Causality Test - Baseline Results Dropping the Observations in which Outreach exceeds 2% of the total population older than 15 year old.

	(1) Outreach	(2) Outreach	(3) Outreach	(4) Outreach	(5) Savings per Member	(6) Savings per Member
BankCred/ GDP	-0.00525***	-0.00210**	0.00331	0.00741***		
	(0.00144)	(0.000889)	(0.00217)	(0.00241)		
BankCred/ GDP*2			-0.00266***	-0.00396***		
			(0.000983)	(0.00103)		
Branch					17.97***	
					(2.662)	
ATM						13.29**
						(5.209)
lnInflation	6.28e-05	-0.000122	-8.61e-05	6.12e-05	13.01	73.55
	(0.000514)	(0.000189)	(0.000186)	(0.000183)	(32.46)	(58.07)
lnGNI	0.00204**	0.00187**	0.00125	-0.000398	-79.60	-161.9
	(0.000838)	(0.000783)	(0.000827)	(0.00214)	(172.8)	(233.5)
GDP Growth	-0.000140	-1.57e-05	-9.32e-06	1.83e-05	-10.77	-17.03
	(9.73e-05)	(4.22e-05)	(4.14e-05)	(3.93e-05)	(11.26)	(11.99)
FDI	6.85e-05	3.72e-05	3.10e-05	5.16e-05	-2.146	4.947
	(5.72e-05)	(3.58e-05)	(3.54e-05)	(3.52e-05)	(2.996)	(7.967)
lnAID	0.000685*	-0.000238	-0.000269	-0.000425	-9.035	-14.25
	(0.000387)	(0.000285)	(0.000282)	(0.000291)	(35.36)	(61.48)
Industry	-6.96e-05	-0.000119**	-0.000115**	-0.000110*	10.85	12.37
	(8.06e-05)	(4.96e-05)	(4.97e-05)	(5.94e-05)	(11.07)	(11.84)
Pop Density	-2.64e-06	-4.86e-06	-8.32e-06**	-2.65e-05***	-0.233	-0.139
	(1.83e-06)	(3.36e-06)	(3.60e-06)	(6.66e-06)	(0.155)	(0.204)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.00684	-0.00350	-0.000166	0.0120	525.6	953.1
	(0.00585)	(0.00559)	(0.00580)	(0.0151)	(1,139)	(1,555)
Obs	376	376	376	376	105	100
R2 / R_Within	0.259	0.429	0.447	0.467	0.297	0.310
F / chi2	7.261***	191.4***	208.3***	8.815***	80.20***	5.766***
N_clust	44	44	44	44	23	23
model	ols	re	re	fe	ols	ols

Annexes

Country	# Year	Country	# Year	Country	# Year
Afghanistan	8	Guatemala	22	Nigeria	6
Argentina	8	Guinea-Bissau	6	Panama	22
Azerbaijan	6	Honduras	22	Papua New Guinea	12
Bangladesh	22	India	14	Paraguay	18
Benin	14	Indonesia	22	Peru	22
Bolivia	19	Iran	6	Philippines	22
Botswana	10	Kenya	22	Rwanda	16
Brazil	20	Kyrgyzstan	4	Senegal	20
Burkina Faso	14	Laos	6	Sierra Leone	9
Cambodia	8	Lesotho	15	South Africa	20
Cameroon	22	Liberia	10	Sri Lanka	22
Chile	16	Malawi	22	Swaziland	18
Colombia	18	Malaysia	22	Tanzania	21
Congo, Dem. Rep.	6	Mali	6	Thailand	22
Costa Rica	19	Mauritius	21	Togo	20
Cote d'Ivoire	17	Mexico	22	Uganda	21
Dominican Republic	16	Mongolia	6	Uruguay	20
Ecuador	22	Myanmar	6	Uzbekistan	10
El Salvador	22	Namibia	6	Venezuela	6
Ethiopia	14	Nepal	15	Vietnam	10
Gambia	22	Nicaragua	20	Zambia	9
Ghana	22	Niger	10	Zimbabwe	22
Mean					15.4
Total					1,018