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Spillover and Competition Effects: Evidence from the Sub-Saharan African Banking Sector

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Abstract

This paper examines the efficiency effects of foreign bank entry on domestic banks in sub-Saharan Africa during the period 1999–2006. Using a recently compiled dataset on foreign bank presence, the competition and spillover effects of North–South, regional and non-regional South–South banks are distinguished. The results show that the competitive pressure on domestic banks' net interest margins emanates only from regional South–South banks. There is evidence of spillover effects from North-South and regional South-South banks on domestic banks. As domestic banks invest in foreign technologies, their overhead costs increase in the short-run. Non-regional South-South banks seem to have little effect on the efficiency of domestic banks.

Keywords: Sub-Saharan Africa, efficiency, South–South banks, spillover

JEL Code: F21, F23, F36

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Article Outline

1 Introduction[1]

In recognizing the benefits of foreign bank entry – such as increased quality and availability of financial services, more competitive and efficient domestic banking markets, and the stimulation of bank supervisory and regulatory frameworks (Levine 1996) – many developing countries have liberalized their financial systems and opened their banking markets to foreign competition. Alongside foreign banks from industrialized countries (North–South banks), foreign banks from developing countries (South–South banks) have become important investors in less developed economies.[2] Foreign direct investment (FDI) of banks from developing countries is regionally concentrated, i.e. many South–South banks are headquartered in a country of the same region (World Bank 2006).

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[2] In this paper, "North" refers to high-income countries and "South" comprises low- and middle-income countries, i.e. developing countries, as defined by the World Bank (2010). Also see Appendix A.

This paper analyzes the efficiency effects of foreign bank entry on domestic banks in developing countries. From a theoretical perspective, domestic banks may be forced to operate more efficiently due to the competitive pressure from foreign entrants. They may also improve their efficiency by adopting modern foreign technologies. However, if foreign banks cherry-pick the most profitable and low-risk customers and force domestic banks to specialize in serving more risky customers, their efficiency may be reduced (Jeon et al. 2010).

Empirical applications on the competition and spillover effects of foreign bank entry have produced conflicting findings. Using data from banks in a large sample of industrialized and developing countries, Claessens et al. (2001) find that foreign bank entry is negatively associated with domestic banks' net interest margins and overhead costs, and thus enhances the efficiency of the domestic banking market. In contrast, Hermes and Lensink (2002) find a positive relationship between foreign bank entry and domestic banks' margins in low-income countries. The authors argue that foreign banks crowd out domestic banks, which then enter other market segments where they subsequently increase their net interest margins through greater market power. Domestic banks' costs increase in the short term as they adopt the costly modern technologies of foreign entrants. In another article, Lensink and Hermes (2004) show that foreign bank entry is related to higher net interest margins and overhead costs of domestic banks only in countries with lower levels of economic development. At higher levels, banking markets are more competitive and spillover effects are less important.

These findings suggest that the efficiency effects of foreign bank entry depend on the host countries' level of economic development. Little is known, however, about the importance of the origin of the foreign investor. This paper adds to the findings of previous studies and distinguishes between the potential efficiency effects emanated by foreign banks hosted in industrialized countries and foreign banks from developing countries. To do this, changes in the efficiency of domestic banks in 17 low-income countries in Africa[3] during the period 1999–2006 are considered. By augmenting data on North–South and South–South bank presence, the effects of regional and non-regional South–South banks are further differentiated. The results indicate that North–South banks do not induce competitive pressure on domestic banks. However, domestic banks may benefit from spillover effects from North–South banks. The findings also reflect that South–South banks induce spillover effects, but there are ambiguous results with regard to the competition effects on domestic banks. In contrast, regional South–South banks seem to enhance domestic banks' efficiency both through spillover and competition effects.

The remainder of this paper is organized as follows. Section 2 summarizes the theoretical literature and expresses the expected effects of North–South and South–South bank entry. Section 3 describes the underlying dataset of the empirical analysis. Section 4 presents the

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[3]　　In this paper, "Africa" denotes countries in sub-Saharan Africa (that is, excluding countries in North Africa).

model specification, discusses the methodology and reports the main results as well as those of the sensitivity analysis. The final section 5 summarizes the findings of the paper.

2 Related Literature

Theories of multinational banks (MNBs) (see, for example, Cho 1985, Dunning 1989) posit that the foreign subsidiaries of MNBs have technological advantages (broadly defined as product, process and distribution technology, management and marketing skills) over domestic banks in developing countries. These advantages allow them to outweigh the costs associated with institutional and cultural differences as well as spatial distance and consumer preferences in foreign markets (Hymer 1976). Thus, generally, foreign banks operate at higher levels of efficiency compared to domestic banks and may force the latter to become more efficient to retain their market shares.

Distinguishing between foreign banks headquartered in industrialized countries and foreign banks from developing countries, Petrou (2007) argues that these types of banks differ from each other with regard to their levels of capability: According to the author, foreign banks from industrialized countries have the capital, reputation, modern practices and technologies to enter foreign markets according to risk-diversification and profit opportunities. In contrast, foreign banks from developing countries have fewer resources and skill-sets and therefore tend to follow clients from their home country.

Depending on their competitive advantages, foreign banks from industrialized and developing countries may serve different market segments. Industrialized country banks may mainly exploit their advantages in serving low-risk and profitable customers – such as large, export-oriented companies or multinational corporations. But they may lack the necessary soft information and relationship lending techniques for financing less transparent small- and medium-sized enterprises (SMEs), and their mechanical rules and procedures established in more advanced environments (Honohan/Beck 2007) may not be appropriate. Foreign banks from developing countries may be restricted to serving particular market niches in which they are best equipped with proprietary client information, expertise and reputation.

However, a report by UNCTAD (2006) suggests that developing country multinationals derive their competitive advantages from a wider range of sources than has traditionally been assumed. For the banking sector, the report implies that foreign banks from developing countries are characterized by the following sources of competitive advantages: First, they possess bank-specific advantages such as appropriate and specialized expertise and technology, distribution and service capabilities and specific business models. Second, they derive some advantages stemming from the home country environment which include access to funds and cultural affinity. Advantages stemming from the development process, or

the stage of development, comprise cheap and adapted products and services as well as institutional affinity.

The terms "affinity", "adaptation" and "appropriateness" indicate that foreign banks from developing countries may not be able to exploit their advantages on a global scale, but only in other developing countries. Additionally, the regional concentration of FDI in banking markets (World Bank 2006) implies that their advantages only apply on a regional scale. But within regional markets, South–South banks may be able to serve broader market segments instead of concentrating on particular market niches, as they have experience with the specific regional business practices, consumer characteristics and demands. This may put them into the position to expand their business focus on underserved market segments such as retail and SME banking. The operations of non-regional South–South banks may in contrast be restricted to particular market niches.

The following generalized banking market structure in developing countries may thus be expected: Even if domestic banks have generally more experience in local markets, the superiority of North–South banks in the wholesale segment may force them out of the market. As a consequence, domestic banks may focus on other target markets where they face less competitive pressure from North–South banks. This may also limit the scope for North–South spillover effects as the technologies and lending practices applied in the wholesale segment may not be suitable for other market segments. Hence, we expect that the market entry of North–South banks does not force domestic banks to improve efficiency.

In contrast, regional South–South banks and domestic banks may more often specialize in the same market segments. Regional South–South banks may not be superior and may not squeeze domestic banks out of the market, but they may force them to increase efficiency. Additionally, we expect that domestic banks benefit from spillover effects from regional South–South banks, which may also allow them to reach a higher efficiency. The concentration of non-regional South–South banks on market niches implies that non-regional South–South banks are not in direct competition with domestic banks. Hence, we expect that non-regional South–South banks do not have efficiency-enhancing effects on domestic banks.

3 Data

To test for North–South and South–South efficiency effects, accounting data from domestic banks in 17 low-income countries in Africa (see Appendix A, Table A) during the period from 1999 to 2006 is used. Next to data on North–South and South–South bank presence, industry- and country-specific variables are also included in the analysis. Table 1 includes a description and the sources of the data presented in the following sections.

Table 1:   **Definition and Sources of Variables**

variable name	definition	source
net margin	net interest income to total earning assets	Bankscope
costs	overhead costs to total assets	Bankscope
cost/income ratio	overhead costs to sum of net interest revenue and non-interest income	Bankscope
size	log of total assets	Bankscope
$size^2$	square of log of total assets	Bankscope
capital	equity to total assets	Bankscope
risk	loan loss provisions to loans	Bankscope
fee income	non-interest income to total assets	Bankscope
liquidity	liquid assets to total assets	Bankscope
share	individual banks' assets to total assets	Bankscope
foreign	share of foreign banks to total banks	Claessens et al. (2008)
south-south	share of south-south banks to total banks	Claessens et al. (2008)
north-south	share of north-south banks to total banks	Claessens et al. (2008)
reg. south-south	share of regional south-south banks to total banks	author's calculations based on Bankscope
non-reg. south-south	share of non-regional south-south banks to total banks	author's calculations based on Bankscope
growth	GDP per capita growth (annual)	World Development Indicators (World Bank)
inflation	annual inflation, GDP deflator	World Development Indicators (World Bank)
concentration	assets of the three largest banks as a share of all commercial banks	Database on the Structure and Development of the Financial Sector (Beck et al. 2000)
governance	governance (aggregated)	Governance Indicators (Kaufmann et al. 2009)

All variables are in per cent, except *size*, *$size^2$*, and *governance*.

Source: Author's compilation.

3.1 Efficiency Proxies

All bank-specific variables are from the Bureau van Dijks' Bankscope database – the most comprehensive and standardized database of bank-specific accounting data allowing for comparisons in a cross-country setting. To capture the extent of competitive pressure from foreign entrants changes of domestic banks' *net margin* are considered. This variable is defined as interest income minus interest expense (net interest income) divided by total earning assets.

To analyze whether there are spillover effects from foreign banks on domestic banks, two alternative proxies of bank efficiency – *costs* and the *cost/income ratio* – are used as the dependent variable. *Costs* are defined as overhead *costs* (personnel expenses, other non-interest expenses) to total assets and capture variations in wages and employment, managerial efficiency, product as well as service mix and quality (Demirgüç-Kunt/Huizinga 1999). The *cost/income ratio* is defined as overhead costs divided by the sum of net interest revenue and non-interest income.

Table 2 compares the efficiency of different groups of banks (domestic and foreign, domestic and South–South, domestic and North–South, South–South and North–South, regional South–South and non-regional South–South). A t-test is used to check whether the means of the two populations in each group are the same. Pairs of entries that are significantly different from each other are set in boldface. The comparison shows that domestic banks and foreign banks do not significantly differ with respect to the three efficiency proxies. In contrast, domestic banks' *net margin* is significantly higher than South–South banks' *net margin*. The *costs* and the *cost/income ratio* of domestic banks are significantly lower compared to South–South banks. North-South banks have significantly lower *costs*

than domestic banks. While there are no significant differences between the *net margin* of South–South and North–South banks, the *costs* and the *cost/income ratio* of South–South banks are significantly higher. These results may reflect that North–South banks more often concentrate on the wholesale segment, while South–South banks serve the SME segment, where risks and costs are higher. The *net margin* of regional South–South banks is significantly smaller than that of non-regional South–South banks, reflecting their higher efficiency. The *costs* of non-regional South–South banks are significantly higher compared to those of regional South–South banks, perhaps because non-regional South-South banks face greater informational disadvantages in African countries.

Table 2:   Comparison of Bank Efficiency

banks	net margin		costs		cost-income ratio	
	mean	N	mean	N	mean	N
domestic	7.65	514	6.21	516	64.62	495
foreign	7.23	525	6.15	517	68.34	510
domestic	**7.65**	514	6.21	516	**64.62**	495
south-south	**6.94**	248	6.69	237	**76.97**	239
domestic	7.65	514	6.21	516	64.62	495
north-south	7.50	277	**5.69**	280	60.73	271
south-south	6.94	248	6.69	237	**76.97**	239
north-south	7.50	277	5.69	280	**60.73**	271
reg. south-south	**6.15**	176	6.28	175	74.52	176
non-reg. south-south	**8.86**	72	7.86	62	83.80	63

Data Source: Bankscope.
Pairs of entries that are significantly different from each other are in boldface.

Source: Author's compilation.

3.2 Foreign Bank Entry

Claessens et al. (2008) have recently compiled data on North–South and South–South bank presence in 103 developing countries during the years 1995–2006 based on data from the Bankscope database. A bank is classified as foreign if its foreign holdings exceed 50 percent. A bank is classified as a South–South bank if these shares are majority held by an investor from another developing country, and as a North–South bank otherwise. Claessens et al. (2008) propose two measures of foreign bank presence: The first is given by the ratio of the number of foreign banks (North–South banks, South–South banks) to the total number of banks in the sector (number measure). The second measure relates the assets of foreign banks (North–South banks, South–South banks) to total banking sector assets (asset measure). Table 3 provides summary statistics for both measures of foreign bank presence. Using the number measure, the average share of foreign banks has been 53 percent, of South–South banks about 22 percent and of North–South banks approximately 31 percent between 1999 and 2006. Data for the asset measure is only available until 2005, because some banks had not yet reported to Bankscope for the year 2006 when the database was established. The summary

statistics of the asset measure are comparable to those of the number measure. However, the maximum share of foreign banks and south-south banks is 100 percent for the asset measure, while it is below 100 percent for the number measure. The discrepancy is caused by the irregular reporting behavior of some banks, which are active but do not report their balance sheet data.

Claessens et al. (2008) do not distinguish between regional and non-regional South–South banks in their data. To distinguish between their efficiency effects on domestic banks, a detailed shareholder analysis[4] is thus carried out. Based on Bankscope, the share of regional South–South, non-regional South–South and North–South banks' assets is calculated. Due to the limited availability of historical ownership data, the sample period is restricted to the years 1999 to 2006. As there are some differences regarding the classification of banks according to their country of origin, the calculated ratios do not always fit with the data on foreign bank presence in Africa provided by Claessens et al. (2008). Table 3 shows that the average presence of foreign banks as well as North–South banks is slightly overestimated. However, the sum of the shares of regional and non-regional South–South banks is comparable to the share of South–South banks calculated by Claessens et al. (2008). Table 3 points out that the presence of regional South–South banks is more important than of non-regional investors in the sample of African countries.

Table 3:   Summary Statistics of Foreign Bank Presence

number measure	mean	std. dev.	min.	max.	N
foreign	53.43	22.41	0.00	88.00	136
south-south	22.07	14.98	0.00	50.00	136
north-south	31.36	15.93	0.00	60.00	136
asset measure	**mean**	**std. dev.**	**min.**	**max.**	**N**
foreign	51.61	29.11	0.00	100.00	119
south-south	18.94	21.53	0.00	100.00	119
north-south	32.67	26.07	0.00	86.00	119
new asset measure	**mean**	**std. dev.**	**min.**	**max.**	**N**
foreign	53.24	30.51	0.00	100.00	119
reg. south-south	14.03	19.11	0.00	91.28	119
non-reg. south-south	5.07	8.85	0.00	55.12	119
north-south	34.14	25.98	0.00	94.59	119

Number Measure: Annual Data for 1999 to 2006. Data Source: Claessens et al. (2008).
Asset Measure: Annual Data for 1999 to 2005. Data Source: Claessens et al. (2008).
New Asset Measure: Annual Data for 1999 to 2005. Author's calculations based on Bankscope.
All variables are in percentages.
Includes only domestic banks' observations.
N denotes the total number of country-year observations.

Source: Author's compilation.

3.3   Bank-, Industry- and Country-Specific Control Variables

Next to data on foreign bank presence, bank-, industry- and country-specific control variables are included in the regressions. The first bank-specific control variable is bank *size*

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4   Details of this analysis are summarized in Appendix B.

and is measured by the log of total assets. Despite the small scale of African financial systems (Beck et al. 2009), banks may benefit from economies of scale (Flamini et al. 2009). In order to account for a possible non-linear relationship, i.e. diseconomies of scale, the square of the log of total assets (*size²*) also serves as a control variable. The ratio of equity to total assets (*capital*) is used to account for the capitalization of domestic banks. Banks in Africa are confronted with high credit risks, because of insufficient legal frameworks, creditor rights and borrower information (Flamini et al. 2009). Credit risk is captured by the ratio of loan-loss provisions to loans (*risk*). Fee-based activities are generally less risky than interest-earning activities (Flamini et al. 2009). The ratio of non-interest income to total assets (*fee income*) is used to control for different income sources. Differences in bank assets are reflected by the ratio of liquid assets to total assets (*liquidity*) (Demirgüç-Kunt et al. 2004). Market share is measured by individual banks' assets to total assets of the banking sector (*share*). Summary statistics of all bank-specific variables are provided in Table C.1 in Appendix C.

To control for the macro-economic environment in each host country, the annual growth rate of the gross domestic product (GDP) per capita (*growth*) and the annual growth rate of inflation (*inflation*) are used as control variables. The variable *concentration* is an industry-specific control variable and measures the degree of concentration within the banking industry. It is defined as the assets of the three largest banks as a share of the assets of all commercial banks in the market. To analyze whether domestic banks' efficiency is driven more by the governance environment than foreign bank presence, the variable *governance* is added in the regressions in the sensitivity analysis.[5] Summary statistics of the industry- and country-specific control variables are provided in Table C.2 in Appendix C.

4 Estimation

4.1 Model Specification and Methodology

The following general model proposed by Claessens et al. (2001) is used to examine the effects of foreign bank entry on domestic banks:

$$e_{ijt} = \alpha_0 + \beta f_{jt} + \delta b'_{it} + \gamma c'_{jt} + u_{ijt} \tag{1}$$

with $u_{ijt} = \alpha_i + \tau_t + \varepsilon_{ijt}$.

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[5] *Governance* is measured with respect to the following dimensions: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption. The indicators are compiled from Kaufmann et al. (2009) and are available for the years 1996, 1998, 2000, and for 2002 through 2008. The indicators are measured within scores from -2.5 to 2.5, while a higher score corresponds to a better governance environment. The simple average of the indicators per year is taken. As the year 1999 is not available, the average of the indicators 1998 and 2000 is calculated. The default 95% confidence level of the values is used.

where i identifies domestic banks, c countries and t the time period. Equation 1 explains the efficiency e_{ijt} (as a proxy, measured in terms of *net margin*, *costs* or the *cost/income ratio*) of domestic banks i by the share of foreign banks to total banks in a country f_{jt}, a vector of bank-specific variables b_{it} and country-specific variables c_{jt} The composite error term u_{ijt} consists of the idiosyncratic error e_{ijt}, the bank-specific effect α_i which is time-constant and may capture unobservable managerial skills, and time-specific effects τ_t.

To differentiate between the effects of South–South and North–South bank presence, Equation 1 is extended:

$$e_{ijt} = \alpha_0 + \varphi ss_{jt} + \eta ns_{jt} + \delta b'_{it} + \gamma c'_{jt} + u_{ijt} \tag{2}$$

where ss_{jt} reflects the share of South–South banks to total banks and ns_{jt} the share of North–South banks to total banks in a country. To control for possible differences between the effects of regional and non-regional South–South banks, the following model is estimated:

$$e_{ijt} = \alpha_0 + \xi rss_{jt} + \zeta nrss_{jt} + \eta ns_{jt} + \delta b'_{it} + \gamma c'_{jt} + u_{ijt} \tag{3}$$

where rss_{jt} is the share of regional South–South banks to total banks and $nrss_{jt}$ the share of non-regional South–South banks in a country.

At the outset, models 1 to 3 are estimated with pooled ordinary least squares (POLS).[6] However, the underlying assumption of the model of no correlation between the individual-specific effect α_i and the explanatory variables is unlikely to hold. Consequently, the pooled model is biased because of the omission of the time-constant bank-specific effect (heterogeneity bias). An additional problem in the pooled model is that the standard errors are biased and inconsistent as α_i is in the composite error in each time period and therefore the u_{ijt} are serially correlated over time (Wooldridge 2006).

The Random Effects (RE) estimator can be used under the assumption that the unobserved effect is purely random and uncorrelated with the explanatory variables. In contrast to POLS, a generalized least squares RE transformation eliminates the serial correlation in the composite error term.

Alternatively, to account for unobserved heterogeneity across banks, a First Differencing (FD) or a Fixed Effects (FE) transformation can be used. As the fixed effect is eliminated with both methods, the estimators of the coefficients are unbiased and consistent, even if the individual-specific effect is correlated with the explanatory variables. Both the FD and the FE estimator require the assumption of strict exogeneity to hold; in other words, the explanatory variables and the idiosyncratic error should not be correlated in any time period.

To test if the α_i are uncorrelated with the regressors, i.e. the appropriateness of the RE model, a test of overidentifying restrictions proposed by Schaffer and Stillman (2006) is

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[6]   The estimation results for the key variables of interest using POLS are summarized in Appendix D.

applied.[7] For each efficiency proxy, the RE estimator is rejected at the 1 percent level. Hence, the effects are fixed and the RE estimator is inconsistent.

While the FD and the FE model give the same results if $(t = 2)$, both estimators are not the same if $(t > 2)$. As both are generally unbiased and consistent, their relative efficiency should be used to choose between them. This efficiency is determined by the serial correlation in the idiosyncratic errors (Wooldridge 2006). While the FE estimator should be preferred if the latter are serially uncorrelated, the FD estimator is more efficient under the assumption of no serial correlation. A test proposed by Wooldridge (2002) suggests that the FD estimator is the more efficient.[8] To allow comparisons and to show the sensitivity of the regression results regarding both estimation methods, the estimation results of both the FD and the FE transformations are presented.

4.2 Results

4.2.1 *The Competitive Pressure of Foreign Banks*

Table 4 summarizes the estimation results using all three measures of foreign bank presence for the dependent variable *net margin*. Overall, foreign bank entry seems to have little effect on domestic banks' *net margin*. The positive coefficient of the share of North–South banks (measured in numbers) estimated in FD lends support to the assumption of a relatively strong market power of domestic banks after shifting their lending activities to other target markets due to the competitive pressure of North–South banks. In contrast, the negative and significant coefficient for regional South–South banks indicates that these banks force domestic banks to improve their efficiency.

The bank-specific control variables are of expected sign. *Net margin* and *size* have an inverted u-shaped relationship as suggested by the positive association between *size* and *net margin*, and *size²* and *net margin*. While larger banks have better opportunities for risk diversification and therefore lower cost of funding (McAllister/McManus 1993), they can realize a higher net interest income and benefit from financial scale economies (Ianotta et al. 2007). Banks that are too large may suffer from diseconomies of scale. In contrast to many other studies (e.g. Flamini et al. 2009, Demirgüç-Kunt/Huizinga 1999, Demirgüç-Kunt et al. 2004), *net margin* is negatively associated with *inflation*. An explanation for this finding is that the competitive pressure of foreign banks may force domestic banks to pass higher inflation rates on only to their depositors.

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[7] The test is similar to a Hausman test (Hausman 1987), but has the advantage of still being applicable in the event of heteroskedastic and clustered errors (Schaffer/Stillman 2006), which are used to correct for heteroskedasticity and within-bank serial correlation.

[8] The test uses the relation that under the null of no serial correlation, the residuals from the regression of the first-differenced variables should have an autocorrelation of -0.5.

Table 4: Impact of Foreign Bank Presence on Net Margin

	number measure				asset measure				new asset measure			
	1 FE	2 FE	3 FD	4 FD	5 FE	6 FE	7 FD	8 FD	9 FE	10 FE	11 FD	12 FD
foreign	0.0247 (0.0164)		0.0232 (0.0164)		0.0055 (0.0129)		−0.0018 (0.0134)		−0.0000 (0.0148)		−0.0114 (0.0159)	
south-south		0.0425 (0.0345)		0.0061 (0.0338)		0.0061 (0.0213)		−0.0100 (0.0236)				
reg. south-south										−0.0382 (0.0261)		−0.0604** (0.0264)
non-reg. south-south										0.0489 (0.0302)		0.0517 (0.0533)
north-south		0.0168 (0.0178)		0.0288* (0.0161)		0.0052 (0.0153)		0.0018 (0.0165)		0.0134 (0.0224)		0.0150 (0.0254)
size	0.1034*** (0.0293)	0.1049*** (0.0290)	0.1584*** (0.0432)	0.1591*** (0.0430)	0.1168*** (0.0345)	0.1168*** (0.0346)	0.1977*** (0.0477)	0.1980*** (0.0476)	0.1191*** (0.0337)	0.1195*** (0.0332)	0.1985*** (0.0477)	0.1945*** (0.0466)
size²	−0.0044*** (0.0015)	−0.0045*** (0.0015)	−0.0071*** (0.0020)	−0.0071*** (0.0020)	−0.0051*** (0.0017)	−0.0051*** (0.0017)	−0.0091*** (0.0022)	−0.0091*** (0.0022)	−0.0052*** (0.0017)	−0.0052*** (0.0016)	−0.0092*** (0.0022)	−0.0089*** (0.0022)
capital	0.0625 (0.0399)	0.0605 (0.0398)	0.0065 (0.0589)	0.0069 (0.0592)	0.0675 (0.0456)	0.0675 (0.0458)	0.0139 (0.0735)	0.0116 (0.0725)	0.0657 (0.0450)	0.0628 (0.0435)	0.0149 (0.0728)	−0.0022 (0.0722)
costs	0.3625* (0.1473)	0.3623* (0.1467)	0.6776*** (0.2103)	0.6856*** (0.2140)	0.3938** (0.1690)	0.3935** (0.1721)	0.7111*** (0.2207)	0.7143*** (0.2218)	0.4031** (0.1658)	0.4203** (0.1725)	0.7173*** (0.2175)	0.7264*** (0.2207)
risk	0.0361* (0.0205)	0.0358* (0.0206)	0.0166 (0.0166)	0.0166 (0.0165)	0.0355* (0.0204)	0.0354* (0.0208)	0.0144 (0.0173)	0.0147 (0.0175)	0.0344* (0.0202)	0.0325 (0.0197)	0.0142 (0.0174)	0.0113 (0.0161)
fee income	−0.4980*** (0.1723)	−0.4939*** (0.1735)	−0.6173*** (0.1576)	−0.6215*** (0.1589)	−0.5014*** (0.1828)	−0.5009*** (0.1888)	−0.6280*** (0.1563)	−0.6319*** (0.1600)	−0.5028*** (0.1821)	−0.5075*** (0.1868)	−0.6289*** (0.1560)	−0.6381*** (0.1594)
liquidity	−0.0572*** (0.0197)	−0.0571*** (0.0196)	−0.0484*** (0.0162)	−0.0476*** (0.0162)	−0.0576*** (0.0186)	−0.0577*** (0.0184)	−0.0430*** (0.0168)	−0.0426*** (0.0167)	−0.0567*** (0.0183)	−0.0537*** (0.0187)	−0.0434*** (0.0169)	−0.0419** (0.0170)
share	0.0198 (0.0448)	0.0245 (0.0454)	0.0821 (0.0527)	0.0821 (0.0531)	0.0313 (0.0504)	0.0315 (0.0495)	0.1120* (0.0622)	0.1140* (0.0628)	0.0312 (0.0506)	0.0372 (0.0506)	0.1091* (0.0610)	0.1190* (0.0621)
concentration	−0.0298 (0.0292)	−0.0328 (0.0297)	−0.0610** (0.0292)	−0.0608** (0.0293)	−0.0536 (0.0326)	−0.0539* (0.0313)	−0.0847** (0.0359)	−0.0834** (0.0342)	−0.0558* (0.0320)	−0.0544* (0.0296)	−0.0821** (0.0358)	−0.0733** (0.0325)
growth	−0.0000 (0.0004)	−0.0000 (0.0004)	−0.0001 (0.0003)	−0.0001 (0.0003)	0.0002 (0.0005)	0.0002 (0.0005)	0.0001 (0.0003)	0.0001 (0.0003)	0.0002 (0.0005)	0.0003 (0.0004)	0.0001 (0.0003)	0.0001 (0.0003)
inflation	−0.0001** (0.0000)	−0.0001** (0.0000)	−0.0001 (0.0000)	−0.0001 (0.0000)	−0.0001* (0.0000)	−0.0001** (0.0000)	−0.0001** (0.0000)	−0.0001* (0.0000)	−0.0001** (0.0000)	−0.0001* (0.0000)	−0.0001** (0.0000)	−0.0001 (0.0000)
N	344	344	250	250	302	302	208	208	302	302	208	208
R^2	0.275	0.276	0.356	0.357	0.286	0.286	0.379	0.380	0.285	0.295	0.381	0.392

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors's compilation.

Comparing the R^2 values of the FE and FD regressions (about 28 percent compared to 39 percent) shows that the variation in *net margin* is better explained by the FD estimations. As the data suffers from serial correlation, the FD regressions are more efficient. Overall, the findings indicate that competition effects on domestic banks in African countries are emanated mainly from regional South–South banks.

4.2.2   Spillover Effects of Foreign Bank Presence

Table 5 shows that *costs* are positively and significantly associated with foreign bank presence if the FD estimator is used. This lends support for the assumption of spillover effects from foreign on domestic banks. In contrast, there is no significant relationship if the FE estimator is used. The results also suggest that the market entry of South–South banks is linked to an increase in *costs* for domestic banks, while for North–South banks, the evidence is less clear. Comparing the coefficients of the regressions presented in column 4 by means of a t-test shows that the coefficients of South–South and North–South banks are significantly different from each other at the 5 percent level. The spillover effect from South–South banks seems to be stronger. As expected, the entry of regional South–South banks is positively associated with domestic banks' *costs*. Again, the problem of autocorrelation suggests a preference for the results of the FD regression. The variation in *costs* is also better explained by the FD regressions as indicated by the higher R^2. The other control variables are of expected sign.

Table 6 presents the results for the dependent variable *cost/income ratio*. Regional South–South bank presence is positively associated with domestic banks' *cost/income ratio* for the estimation in FD. Compared to the dependent variable *costs*, the magnitude of the coefficients is larger. For example, a 1 percent increase in the share of regional South–South banks implies an increase of the *cost/income ratio* by 0.25 percent compared to an increase in *costs* by 0.03 percent. The results presented in Table 6 suggest a u-shaped relationship between size and the *cost/income ratio* and thus diseconomies of scale of banks that are too large. The regression results of the FD estimation have a greater explanatory power as indicated by the higher R^2, and are more efficient as a test of autocorrelation reveals.

Overall, the findings with regard to the dependent variables *costs* and the *cost/income ratio* indicate that foreign banks induce spillover effects of modern technology on domestic banks. These spillover effects seem to emanate mainly from regional South–South banks and may be explained by the better applicability of their technologies to domestic banking markets. However, the results thus far may be driven by certain countries or groups of countries. Moreover, the efficiency of domestic banks may be determined more by the prevailing governance environment than foreign bank presence.

Table 5:   Impact of Foreign Bank Presence on Costs

	number measure				asset measure				new asset measure			
	1 FE	2 FE	3 FD	4 FD	5 FE	6 FE	7 FD	8 FD	9 FE	10 FE	11 FD	12 FD
foreign	0.0078 (0.0181)		0.0343*** (0.0113)		0.0183 (0.0123)		0.0226** (0.0105)		0.0146 (0.0143)		0.0230* (0.0119)	
south-south		0.0190 (0.0317)		0.0691*** (0.0217)		0.0391*** (0.0142)		0.0370** (0.0145)				
reg. south-south										0.0432*** (0.0134)		0.0344* (0.0185)
non-reg. south-south										0.0245 (0.0224)		0.0201 (0.0300)
north-south		0.0028 (0.0189)		0.0221* (0.0110)		0.0096 (0.0151)		0.0167 (0.0114)		-0.0012 (0.0206)		0.0160 (0.0169)
size	-0.0478* (0.0247)	-0.0465* (0.0245)	-0.0853*** (0.0280)	-0.0845*** (0.0289)	-0.0567** (0.0283)	-0.0560* (0.0284)	-0.0666** (0.0268)	-0.0666** (0.0269)	-0.0548* (0.0279)	-0.0531* (0.0284)	-0.0681** (0.0265)	-0.0669** (0.0268)
size²	0.0014 (0.0011)	0.0013 (0.0011)	0.0027** (0.0012)	0.0026* (0.0013)	0.0017 (0.0013)	0.0017 (0.0013)	0.0018 (0.0012)	0.0018 (0.0012)	0.0016 (0.0012)	0.0015 (0.0012)	0.0018 (0.0011)	0.0018 (0.0012)
capital	-0.0766** (0.0312)	-0.0777** (0.0307)	-0.1000** (0.0494)	-0.1008** (0.0494)	-0.0787** (0.0360)	-0.0771** (0.0338)	-0.1277** (0.0533)	-0.1223** (0.0522)	-0.0825** (0.0356)	-0.0790** (0.0330)	-0.1300** (0.0527)	-0.1259** (0.0528)
risk	-0.0004 (0.0163)	-0.0007 (0.0161)	0.0021 (0.0132)	0.0021 (0.0132)	-0.0017 (0.0164)	-0.0041 (0.0155)	-0.0110 (0.0109)	-0.0114 (0.0108)	-0.0040 (0.0161)	-0.0055 (0.0155)	-0.0126 (0.0109)	-0.0123 (0.0110)
fee income	0.1660** (0.0716)	0.1688** (0.0728)	0.0700 (0.0943)	0.0786 (0.0984)	0.2023** (0.0922)	0.2175** (0.0960)	0.1295 (0.1214)	0.1352 (0.1232)	0.2034** (0.0910)	0.2184** (0.0956)	0.1251 (0.1194)	0.1292 (0.1209)
liquidity	-0.0305* (0.0169)	-0.0304* (0.0171)	-0.0189 (0.0115)	-0.0201* (0.0114)	-0.0354** (0.0173)	-0.0367** (0.0169)	-0.0179 (0.0134)	-0.0189 (0.0132)	-0.0339** (0.0179)	-0.0359** (0.0174)	-0.0159 (0.0135)	-0.0166 (0.0135)
share	-0.1013*** (0.0363)	-0.0983*** (0.0350)	-0.1065*** (0.0368)	-0.1048*** (0.0365)	-0.1018** (0.0407)	-0.0943** (0.0397)	-0.1059*** (0.0393)	-0.1089*** (0.0384)	-0.0998** (0.0411)	-0.0954** (0.0404)	-0.1048*** (0.0389)	-0.1075*** (0.0382)
concentration	0.0197 (0.0201)	0.0178 (0.0200)	0.0310 (0.0198)	0.0300 (0.0199)	0.0439* (0.0240)	0.0364 (0.0223)	0.0467** (0.0226)	0.0441* (0.0227)	0.0378 (0.0254)	0.0312 (0.0231)	0.0401* (0.0228)	0.0384* (0.0225)
growth	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)
inflation	0.0001* (0.0000)	0.0001* (0.0000)	0.0001* (0.0000)	0.0001* (0.0000)	0.0001* (0.0000)	0.0001* (0.0000)	0.0001** (0.0000)	0.0001** (0.0000)	0.0001** (0.0000)	0.0001 (0.0000)	0.0001** (0.0000)	0.0001** (0.0000)
N	346	346	249	249	304	304	207	207	304	304	207	207
R²	0.366	0.367	0.399	0.408	0.426	0.435	0.423	0.427	0.419	0.429	0.419	0.421

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors's compilation.

Table 6:   **Impact of Foreign Bank Presence on the Cost/Income Ratio**

	number measure				asset measure				new asset measure			
	1 FE	2 FE	3 FD	4 FD	5 FE	6 FE	7 FD	8 FD	9 FE	10 FE	11 FD	12 FD
foreign	−0.0283 (0.1596)		0.1474 (0.1022)		0.0903 (0.0875)		0.1271* (0.0760)		0.0502 (0.1027)		0.1077 (0.0731)	
south-south		−0.0222 (0.3320)		0.4223* (0.2240)		0.0871 (0.1099)		0.1227 (0.1206)				
reg. south-south										0.1677 (0.1055)		0.2500*** (0.0848)
non-reg. south-south										−0.0827 (0.2404)		−0.2370 (0.2041)
north-south		−0.0311 (0.1722)		0.0510 (0.0931)		0.0919 (0.1066)		0.1291 (0.0902)		0.0054 (0.1653)		0.0438 (0.1199)
size	−0.7476** (0.2954)	−0.7469** (0.2962)	−0.9855*** (0.3190)	−0.9791*** (0.3203)	−0.7881** (0.3137)	−0.7885** (0.3140)	−0.8173*** (0.2825)	−0.8175*** (0.2829)	−0.7707** (0.3130)	−0.7702** (0.3158)	−0.8282*** (0.2794)	−0.8145*** (0.2772)
size^2	0.0297** (0.0134)	0.0297** (0.0134)	0.0391*** (0.0137)	0.0383*** (0.0137)	0.0311** (0.0145)	0.0311** (0.0145)	0.0316** (0.0129)	0.0316** (0.0129)	0.0301** (0.0144)	0.0299** (0.0145)	0.0322** (0.0127)	0.0315** (0.0125)
capital	−0.5850** (0.2452)	−0.5858** (0.2311)	0.0488 (0.2879)	0.0422 (0.2848)	−0.5919** (0.2352)	−0.5919** (0.2358)	−0.1137 (0.2733)	−0.1147 (0.2729)	−0.6198*** (0.2342)	−0.6080** (0.2306)	−0.1292 (0.2768)	−0.0743 (0.2750)
risk	−0.2117 (0.1318)	−0.2118 (0.1302)	0.0018 (0.0983)	0.0018 (0.0973)	−0.1889 (0.1216)	−0.1886 (0.1244)	−0.0115 (0.0923)	−0.0113 (0.0934)	−0.2029* (0.1192)	−0.1974 (0.1230)	−0.0222 (0.0919)	−0.0103 (0.0892)
fee income	−1.2857** (0.5831)	−1.2843** (0.5861)	−2.0904*** (0.5693)	−2.0320*** (0.5753)	−1.4427** (0.6395)	−1.4447** (0.6366)	−2.0769*** (0.5649)	−2.0787*** (0.5841)	−1.4278** (0.6284)	−1.4219** (0.6268)	−2.0828*** (0.5603)	−2.0647*** (0.5820)
liquidity	0.0413 (0.1018)	0.0414 (0.1016)	0.1520* (0.0837)	0.1433* (0.0850)	0.0084 (0.0924)	0.0085 (0.0931)	0.1510* (0.0849)	0.1512* (0.0854)	0.0159 (0.0931)	0.0084 (0.0947)	0.1589* (0.0841)	0.1570* (0.0857)
share	−1.0985*** (0.3331)	−1.0969*** (0.3223)	−1.0459*** (0.3469)	−1.0325*** (0.3477)	−1.2662*** (0.3022)	−1.2673*** (0.3064)	−1.3028*** (0.3022)	−1.3021*** (0.3040)	−1.2644*** (0.3003)	−1.2742*** (0.3059)	−1.3074*** (0.2943)	−1.3253*** (0.2924)
concentration	0.2144 (0.2069)	0.2133 (0.1999)	0.3879 (0.2386)	0.3795 (0.2388)	0.5618*** (0.1695)	0.5631*** (0.1753)	0.7782*** (0.1664)	0.7788*** (0.1677)	0.5322*** (0.1691)	0.5237*** (0.1685)	0.7488*** (0.1675)	0.7107*** (0.1639)
growth	−0.0013 (0.0028)	−0.0013 (0.0028)	−0.0021 (0.0019)	−0.0019 (0.0019)	−0.0010 (0.0029)	−0.0010 (0.0030)	−0.0010 (0.0019)	−0.0010 (0.0019)	−0.0008 (0.0030)	−0.0009 (0.0030)	−0.0008 (0.0019)	−0.0009 (0.0019)
inflation	0.0011*** (0.0004)	0.0011*** (0.0004)	0.0008*** (0.0003)	0.0008*** (0.0003)	0.0013*** (0.0004)	0.0013*** (0.0004)	0.0011*** (0.0003)	0.0011*** (0.0003)	0.0012*** (0.0004)	0.0012*** (0.0004)	0.0011*** (0.0003)	0.0010*** (0.0002)
N	346	346	251	251	303	303	208	208	303	303	208	208
R^2	0.235	0.235	0.255	0.261	0.323	0.323	0.374	0.374	0.320	0.322	0.370	0.376

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors's compilation.

4.2.3   Sensitivity Analysis

The purpose of this section is to determine whether the baseline results are robust when tested against alternative sub-samples and additional control variables. If FD is applied as estimation method, the number of bank observations reduces considerably because the panel data is highly unbalanced. In order to enhance the comparability with the FE results, the sample of observations used in the FD estimation is estimated with the FE estimator. For all efficiency proxies, the results of the FE estimation of the smaller sample show few differences with regard to the baseline results (see Table 7, Table 8 and Table 9).

Table 7:   Net Margin – Fixed Effects With First Differences Sample

net margin	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0375* (0.0224)		0.0234 (0.0147)		0.0145 (0.0133)	
south-south		0.0458 (0.0403)		0.0285 (0.0206)		−0.0047 (0.0267)
reg. south-south						0.0358 (0.0333)
non-reg. south-south						
north-south		0.0334* (0.0196)		0.0210 (0.0169)		0.0214 (0.0197)
N	250	250	208	208	208	208
R^2	0.379	0.379	0.413	0.413	0.405	0.407
Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1						

Source: Author's compilation.

Table 8:   Costs – Fixed Effects With First Differences Sample

costs	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0108 (0.0212)		0.0183 (0.0123)		0.0114 (0.0186)	
south-south		0.0265 (0.0348)		0.0374** (0.0154)		
reg. south-south						0.0387** (0.0187)
non-reg. south-south						0.0140 (0.0258)
north-south		0.0032 (0.0202)		0.0134 (0.0211)		−0.0032 (0.0274)
N	249	249	304	207	207	207
R^2	0.327	0.329	0.426	0.394	0.367	0.378
Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1						

Source: Author's compilation.

Table 9:   Cost/Income Ratio – Fixed Effects With First Differences Sample

cost/income ratio	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	−0.1028 (0.2240)		0.0760 (0.1301)		0.0542 (0.1461)	
south-south						
reg. south-south						0.1149 (0.1319)
non-reg. south-south		0.0034 (0.3423)		0.0927 (0.1180)		−0.0004 (0.2676)
north-south		−0.1545 (0.2117)		0.0687 (0.1719)		0.0295 (0.2385)
N	251	251	208	208	208	208
R²	0.227	0.228	0.231	0.231	0.229	0.229

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

In Benin, Burkina Faso, Niger and Togo, the presence of foreign banks measured in numbers is constant over the sample period. To check whether the baseline results are sensitive to an inclusion of these countries, countries with a constant share of foreign banks measured in numbers are excluded from the regressions. As the FD estimations are preferred over the FE estimations, only the results for the FD regressions are presented. For the dependent variable *net margin* the regression results are not very sensitive to an exclusion of countries with a constant share of foreign banks to total banks over the sample period. Regional South–South banks seem to put downward pressure on domestic banks' *net margin* (Table 10). In Table 11 the results for the dependent variable *costs* are presented. If countries with a constant presence of foreign banks are excluded from the estimations, there is no significant association between the share of regional South–South banks and *costs*. In contrast, there is a positive and significant relation between the presence of regional South–South banks and the *cost/income ratio* (Table 12).

Table 10:   Net Margin - Countries with Fluctuating Foreign Bank Presence

net margin	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0231 (0.0168)		−0.0010 (0.0137)		−0.0110 (0.0168)	
south-south		0.0049 (0.0362)		−0.0204 (0.0258)		
reg. south-south						−0.0634** (0.0275)
non-reg. south-south						0.0245 (0.0672)
north-south		0.0291* (0.0167)		0.0079 (0.0180)		0.0209 (0.0279)
N	222	222	186	186	186	186
R²	0.419	0.419	0.395	0.398	0.397	0.408

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table 11: Costs - Countries with Fluctuating Foreign Bank Presence

costs	(1) (2) number measure		(3) (4) asset measure		(5) (6) new asset measure	
foreign	0.0325*** (0.0118)		0.0230** (0.0108)		0.0235* (0.0128)	
south-south		0.0703*** (0.0216)		0.0398** (0.0160)		
reg. south-south						0.0343 (0.0208)
non-reg. south-south						0.0240 (0.0339)
north-south		0.0194 (0.0121)		0.0159 (0.0120)		0.0166 (0.0186)
N	221	221	185	185	185	185
R²	0.392	0.402	0.433	0.438	0.429	0.430

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table 12: Cost/Income Ratio - Countries with Fluctuating Foreign Bank Presence

cost/income ratio	(1) (2) number measure		(3) (4) asset measure		(5) (6) new asset measure	
foreign	0.1219 (0.0985)		0.1238 (0.0769)		0.1058 (0.0792)	
south-south		0.3579 (0.2230)		0.1828 (0.1221)		
reg. south-south						0.2406** (0.0913)
non-reg. south-south						−0.0644 (0.1972)
north-south		0.0400 (0.0915)		0.0960 (0.0922)		0.0302 (0.1252)
N	222	222	186	186	186	186
R²	0.321	0.326	0.398	0.399	0.394	0.398

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Moreover, the results presented in Section 4.2 may be driven by countries with a large number of domestic banks compared to other countries. As Kenya accounts for about one-third of the bank-year observations, the country is excluded in the following FD regressions. Overall, the results presented in Section 4.2 do not seem to be sensitive to an exclusion of Kenyan banks' observations for all dependent variables *net margin* (Table 13), *costs* (Table 14) and *cost/income ratio* (Table 15).

In order to analyze whether the variables *net margin*, *costs* and *cost/income ratio* are determined more by policy factors relating to the institutional conditions in a country than by foreign bank presence, the following FD regressions include governance as an explanatory variable. The results presented in Table 16 show that for both measures of foreign bank presence governance is insignificant. Attending to the estimation results for the dependent variable *costs* shows that a better governance environment allows domestic banks to cut overhead *costs* (Table 17). A better governance environment is also negatively – but

hardly significantly – associated with domestic banks' *cost/income ratio* of domestic banks (Table 18).

Table 13:   Net Margin – Exclusion of Kenyan Domestic Banks

net margin	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0186 (0.0171)		−0.0072 (0.0128)		−0.0145 (0.0147)	
south-south		0.0019 (0.0364)		−0.0125 (0.0239)		
reg. south-south						−0.0633** (0.0271)
non-reg. south-south						0.0724 (0.0465)
north-south		0.0241 (0.0169)		−0.0049 (0.0156)		0.0104 (0.0250)
N	217	217	180	180	180	180
R^2	0.402	0.402	0.454	0.455	0.456	0.468

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Author's compilation.

Table 14:   Costs – Exclusion of Kenyan Domestic Banks

costs	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0345*** (0.0120)		0.0229** (0.0105)		0.0213* (0.0121)	
south-south		0.0814*** (0.0212)		0.0415*** (0.0143)		
reg. south-south						0.0371** (0.0180)
non-reg. south-south						0.0236 (0.0299)
north-south		0.0180 (0.0122)		0.0154 (0.0115)		0.0112 (0.0175)
N	216	216	179	179	179	179
R^2	0.408	0.424	0.441	0.447	0.434	0.437

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Author's compilation.

Table 15:   Cost/Income Ratio – Exclusion of Kenyan Domestic Banks

cost/income ratio	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.1698 (0.1025)		0.1256 (0.0760)		0.1040 (0.0719)	
south-south		0.4328* (0.2312)		0.1243 (0.1245)		
reg. south-south						0.2445*** (0.0826)
non-reg. south-south						−0.1877 (0.1885)
north-south		0.0771 (0.0987)		0.1260 (0.0901)		0.0380 (0.1234)
N	213	213	177	177	177	177
R²	0.231	0.237	0.367	0.367	0.362	0.368

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table 16:   Net Margin – Importance of the Governance Environment

net margin	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0214 (0.0163)		−0.0043 (0.0131)		−0.0183 (0.0156)	
south-south		0.0066 (0.0336)		−0.0086 (0.0234)		
reg. south-south						−0.0588** (0.0273)
non-reg. south-south						0.0492 (0.0543)
north-south		0.0265 (0.0159)		−0.0022 (0.0163)		0.0073 (0.0289)
governance	0.0097 (0.0166)	0.0086 (0.0167)	0.0168 (0.0193)	0.0157 (0.0195)		0.0133 (0.0221)
N	250	250	208	208	208	208
R²	0.357	0.357	0.382	0.382	0.393	0.393

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table 17:   Costs – Importance of the Governance Environment

costs	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.0380*** (0.0113)		0.0258** (0.0105)		0.0309** (0.0120)	
south-south		0.0681*** (0.0209)		0.0350** (0.0136)		
reg. south-south						0.0312* (0.0179)
non-reg. south-south						0.0244 (0.0316)
north-south		0.0268** (0.0111)		0.0215* (0.0119)		0.0311 (0.0200)
governance	−0.0196* (0.0105)	−0.0172* (0.0099)	−0.0214* (0.0109)	−0.0192* (0.0109)	−0.0269** (0.0122)	−0.0269* (0.0138)
N	249	249	207	207	207	207
R²	0.408	0.415	0.433	0.435	0.433	0.433

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table 18:   Cost/Income Ratio – Importance of the Governance Environment

cost/income ratio	(1) number measure	(2)	(3) asset measure	(4)	(5) new asset measure	(6)
foreign	0.1710 (0.1032)		0.1479* (0.0759)		0.1594** (0.0689)	
south-south		0.4154* (0.2168)		0.1059 (0.1157)		
reg. south-south						0.2283** (0.0892)
non-reg. south-south						−0.2037 (0.2003)
north-south		0.0805 (0.0964)		0.1689* (0.0942)		0.1413 (0.1426)
governance	−0.1306 (0.0986)	−0.1110 (0.0968)	−0.1506 (0.0990)	−0.1614 (0.1067)	−0.1767* (0.1013)	−0.1694 (0.1193)
N	251	251	208	208	208	208
R^2	0.259	0.264	0.381	0.381	0.379	0.383

Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Author's compilation.

5   Conclusion

This paper presents evidence on the efficiency effects of North–South and South–South banks on domestic banks in Africa. The results suggest that North–South banks induce spillover effects on domestic banks, but do not force them to reduce their margins. While the results are ambiguous with regard to the competition effects of South–South banks, the findings regarding technological spillover effects are clearer: domestic banks seem to invest in the technologies of South–South banks. By further distinguishing between the effects of regional and non-regional South–South banks, the findings reflect that spillover and competition effects on domestic banks are emanated mainly by regional South–South banks. Non-regional South-South banks seem to have little effect on the efficiency of domestic banks.

Overall, the results suggest that cross-country investments of regional South–South banks should be facilitated through harmonized regulation and financial reporting. However, given the limited availability of ownership and bank-specific data and the short-term perspective of this study, the results have to be treated with caution. Qualitative data with regard to the characteristics and strategies of banks operating in Africa would have given further insights into the banking market structure in African countries. Moreover, more research is needed concerning the effects of North–South and South–South banks on local legal and supervisory frameworks.

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Appendix

A Income Classification of Sampled Countries

Table A presents the sampled low-income countries in Africa considered in this study, and their respective income levels.

Table A: Income Classification of Samples Countries

year	1999	2000	2001	2002	2003	2004	2005	2006
LIC	<= 755	<= 755	<= 745	<= 735	<= 765	<= 825	<= 875	<= 905
LMIC	756-2.995	756-2.995	746-2.975	736-2.935	766-3.035	826-3.255	876-3.465	906-3.595
UMIC	2.996-9.265	2.996-9.265	2.976-9.205	2.936-9.075	3.036-9.385	3.256-10.065	3.466-10.725	3.596-11.115
HIC	> 9.265	> 9.265	> 9.205	> 9.075	> 9.385	> 10.065	> 10.725	> 11.115
Angola	LIC	LIC	LIC	LIC	LIC	LMIC	LMIC	LMIC
Benin	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Burkina Faso	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Cameroon	LIC	LIC	LIC	LIC	LIC	LIC	LMIC	LMIC
Ghana	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Ivory Coast	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Kenya	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Malawi	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Mali	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Mauritania	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Niger	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Rwanda	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Senegal	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Tanzania	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Togo	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Uganda	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
Zambia	LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC

Source: World Bank (2010), World Bank Analytical Classifications, Classification as of July 1st, 2007, Gross National Income per Capita in US$ (Atlas Methodology).   LIC = low-income country, LMIC = lower-middle income country, UMIC = upper-middle income country, HIC = high income country

B Shareholder Analysis

This paper is the first that uses data on the presence of North-South and South–South banks in Africa provided by Claessens et al. (2008). Based on an analysis of the ownership structure of each bank in the sample, the dataset is extended to further distinguish between the presence of regional and non-regional South–South banks. Relating to the direct shareholder structure, a bank is classified as foreign if 50 percent or more of its shares are majority-held by a foreign investor and, otherwise, as domestic. A bank is classified as a South–South bank if these shares are held by an investor from another developing country and, otherwise, as a North–South bank. A South–South bank is designated as regional if the major shareholder is from an African country and as non-regional if the owner is from a developing country outside of sub-Saharan Africa. In line with Claessens et al. (2008), the percentages of shares held by foreigners are calculated according to the country of residence if a bank is generally classified as foreign. The source country of the foreign bank is determined by the country with the highest percentage of shares therein. Generally, direct ownership relations are applied.

   Several sources are used to determine the ownership structure of the sampled banks. First, Bankscope provides ownership information for a limited number of banks in the sample. However, ownership information is far from complete. In order to complement the shareholder inquiry, miscellaneous other sources aside from Bankscope had to be used. Second, whenever available, data from the homepages and the annual reports of individual banks were consulted. If no information was available from these sources, several other, country-specific studies were used. Third, the shareholder data is supplemented and controlled by different general studies about the banking markets of African countries. If shareholder information was only available for two years with gaps in between (such as 2002 and 2005), and no information was available for the other years of the sample period, the available ownership structure was also assumed for the years with missing information. Reports or information from web pages about the history of each respective bank was used to check whether these assumptions are reasonable. Furthermore, the data was checked against the available shareholder data in Bankscope and the data on foreign bank presence provided by Claessens et al. (2008). Overall, a vast number of consistency and plausibility checks were executed in order to obtain a reliable dataset. The initial aim was to collect information on the shareholder structures of all reporting banks in 24 low-income countries in Africa (with more than five active banks in 2006) covering the period 1995–2006. However, especially for some small and dissolved banks, the shareholder structure could not be determined for any year of the sample period. These banks were dropped from the sample, but only comprise ten observations. The scarcity of ownership data limits the sample period to the years from 1999–2006.

C Summary Statistics

Table C1:   Summary Statistics of Bank-Specific Variables

dependent variable	mean	std. dev.	min.	max.	N
net margin*	7.65	3.92	0.06	25.19	514
costs*	6.21	2.87	1.19	18.50	516
cost-income ratio*	64.62	21.11	21.08	205.50	495
control variable	**mean**	**std. dev.**	**min.**	**max.**	**N**
size	11.18	1.22	7.13	14.47	541
$size^2$	126.53	27.26	50.90	209.39	541
capital*	13.86	10.66	−39.48	62.91	541
risk*	4.24	9.83	−89.23	66.35	479
fee income*	3.81	2.69	−2.62	20.67	507
liquidity*	31.31	25.01	0.01	99.31	434
share*	11.57	14.53	0.11	100.00	541

Annual Data for 1999 to 2006. Variables with an asterisk are in percentages.
N denotes the total number of country-year observations.
Source: Bankscope. Includes only domestic banks' observations.
The top and bottom one % of observations of *net margin* , *costs* and the *cost/income ratio* are dropped.

Source: Author's compilation.

Table C2:   Summary Statistics of Industry- and Country-Specific Variables

control variable	mean	std. dev.	min.	max.	N
growth	1.754	3.41	−7.53	17.17	136
inflation	17.03	60.95	−3.85	556.94	136
concentration*	75.20	13.34	48.80	100.00	124
governance	−0.60	0.38	−1.71	0.08	136

Annual Data for 1999 to 2006. Variables with an asterisk are in percentages.
Growth and *inflation* are from the World Governance Indicators of the World Bank.
Concentration is from the Financial Structure Data Set (Beck et al. 2000). *Governance* is from the World Governance Indicators (Kaufmann et al. 2009).
N denotes the total number of country-year observations.

Source: Author's compilation.

D Estimation Results Using POLS

Table D1: Net Margin - POLS

net margin	(1)	(2)	(3)	(4)	(5)	(6)
	number measure		asset measure		new asset measure	
foreign	0.0093 (0.0082)		0.0082 (0.0093)		0.0015 (0.0088)	
south-south		0.0532*** (0.0144)		0.0293* (0.0161)		
reg. south-south						0.0513** (0.0205)
non-reg. south-south						−0.0763*** (0.0282)
north-south		−0.0280** (0.0129)		−0.0020 (0.0120)		−0.0037 (0.0115)
N	344	344	302	302	302	302
R^2	0.374	0.398	0.370	0.376	0.369	0.389

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table D2: Costs - POLS

costs	(1)	(2)	(3)	(4)	(5)	(6)
	number measure		asset measure		new asset measure	
foreign	0.0258*** (0.0054)		0.0280*** (0.0063)		0.0237*** (0.0060)	
south-south		0.0464*** (0.0111)		0.0558*** (0.0114)		
reg. south-south						0.0500*** (0.0158)
non-reg. south-south						0.0850*** (0.0316)
north-south		0.0079 (0.0093)		0.0137 (0.0084)		0.0031 (0.0082)
N	346	346	304	304	304	304
R^2	0.411	0.420	0.458	0.476	0.450	0.476

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

Table D3: Cost/Income Ratio - POLS

cost/income ratio	(1)	(2)	(3)	(4)	(5)	(6)
	number measure		asset measure		new asset measure	
foreign	0.0462 (0.0790)		0.0109 (0.0756)		0.0145 (0.0757)	
south-south		−0.0168 (0.1542)		0.0692 (0.1278)		
reg. south-south						−0.0626 (0.1422)
non-reg. south-south						0.5869* (0.3158)
north-south		0.1015 (0.1026)		−0.0198 (0.0917)		−0.0544 (0.0904)
N	346	346	303	303	303	303
R^2	0.291	0.293	0.295	0.297	0.295	0.309

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's compilation.

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