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Working Paper

Does diversification increase or decrease bank risk and performance? Evidence on diversification and the risk-return tradeoff in banking

BOFIT Discussion Papers, No. 9/2010

Provided in Cooperation with:
Bank of Finland, Helsinki

Suggested Citation: Berger, Allen N.; Hasan, Iftekhar; Korhonen, Iikka; Zhou, Mingming (2010) : Does diversification increase or decrease bank risk and performance? Evidence on diversification and the risk-return tradeoff in banking, BOFIT Discussion Papers, No. 9/2010, ISBN 978-952-462-684-2, Bank of Finland, Institute for Economies in Transition (BOFIT), Helsinki, https://nbn-resolving.de/urn:nbn:fi:bof-201408071987

This Version is available at:
https://hdl.handle.net/10419/212677

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BOFIT Discussion Papers
9 • 2010

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Bank of Finland, BOFIT
Institute for Economies in Transition

BOFIT Discussion Papers
Editor-in-Chief Aaron Mehrotra

BOFIT Discussion Papers 9/2010
21.6.2010

Allen N. Berger, Iftekhar Hasan, Iikka Korhonen, Mingming Zhou: Does diversification increase or decrease bank risk and performance? Evidence on diversification and the risk-return tradeoff in banking

ISBN 978-952- 462- 684-2
ISSN 1456-5889
(online)

This paper can be downloaded without charge from
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http://ssrn.com/abstract_id=.

Suomen Pankki
Helsinki 2010

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All opinions expressed are those of the authors and do not necessarily reflect the views of the Bank of Finland.

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Does Diversification increase or decrease bank risk and performance? Evidence on diversification and the risk-return tradeoff in banking[1]

Abstract

Conventional wisdom in banking argues that diversification tends to reduce bank risk and improve performance, but the recent financial crisis suggests that aggressive diversification strategies may have resulted in increased risk taking and poor performance. This paper addresses this important question by evaluating the empirical relationship between diversification strategies and the risk-return tradeoff in banking. Our data set covers Russian banks during the 1999-2006 period and finds somewhat mixed results. Specifically, we find that banks' performance tends to be non-monotonically related to their diversification strategy. The marginal effects of focus indices (inverse measures of diversification) on performance are nonlinearly associated with the level of risk and foreign ownership. A focused strategy is found to be associated with increased profit and decreased risk only up to a certain threshold. Additionally, when foreign ownership is either very high or very low, banks tend to benefit more from being diversified. This analysis provides important strategic and policy implications for bank managers and regulators in Russia as well as in other emerging economies.

JEL classification: G21; G28; G34
Keywords: banks; diversification; focus; Russia; foreign ownership, scope economies

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Allen N. Berger, Iftekhar Hasan, Iikka Korhonen and Mingming Zhou

Does Diversification increase or decrease bank risk and performance? Evidence on diversification and the risk-return tradeoff in banking

Tiivistelmä

Pankkien diversifikaation on yleisesti oletettu laskevan pankkien riskiä ja parantavan tuloksia. Kokemukset viimeaikaisesta finanssikriisistä viittaavat kuitenkin siihen, että aggressiivinen diversifikaatio on saattanut lisätä riskinottoa ja heikentää tuloksia. Tässä tutkimuksessa käsitellään tätä tärkeää kysymystä ja arvioidaan pankkien diversifikaation sekä riskin ja tuoton välistä yhteyttä. Aineisto kattaa venäläiset pankit vuosina 1999–2006. Tutkimustulosten mukaan diversifikaation sekä pankkien tulosten välinen yhteys ei ole monotoninen. Keskittymisindeksien marginaalinen vaikutus pankkien tuloksiin vaihtelee epälineaarisesti riskitason ja ulkomaisen omistuksen suhteen. Toiminnan keskittäminen nostaa voittoja ja laskee riskiä ainoastaan tiettyyn tasoon asti. Kun ulkomainen omistus on joko tarpeeksi pientä tai suurta, pankit hyötyvät toimintansa diversifikaatiosta. Tulokset ovat tärkeitä pankeille ja pankkivalvojille, jotka toimivat Venäjällä ja muilla kehittyvillä markkinoilla.

Asiasanat: pankit, diversifikaatio, keskittyminen, Venäjä, ulkomainen omistus, yhteistuotannon edut

1 Introduction

Conventional wisdom in banking argues that diversification tends to reduce bank risk and improve performance. In contrast, the recent worldwide financial crisis raises serious concerns among legislators, regulators, practitioners, and academics as to whether banking institutions have outgrown their optimal scope and whether aggressive diversification strategies may have led some banks to be exposed to much higher risk instead of lower risk. This question is important because it not only demands ex post evaluations of the economic impacts of changes in legislation and regulatory environment on the banking industry, which might provide an exogenous motive for banks to diversify, but it also mandates careful investigation of the effects of diversification strategies on the risk-return tradeoff of banking institutions.

Existing studies of the performance effects of bank diversification, although many in number, have not yet come to a consensus. Moreover, most of these studies are based on a simple model which assumes a linear relationship between the bank's risk-return tradeoff and its diversification strategy (Acharya et al. 2006 is an exception). Ignoring the possibility that a bank's risk-return tradeoff might depend nonmonotonically on its diversification strategy may be misleading and could jeopardize the validity of the policy implications of these studies. Moreover, this line of research is heavily saturated in studies that focus on banks in developed markets, while leaving the banking industry in emerging and transitional economies largely unexamined (an exception is Berger et al. (2010)).[2]

We analyze banks in one emerging economy, Russia. This nation has been characterized by a dramatically improving macroeconomic environment, rapid development of its banking sector, and changes in banking regulations that have led to lower barriers to foreign investment and acquisitions. The ongoing structural change of the Russian economy – e.g., the growth of small business and entrepreneurial activities – has increased the demand for financial services and led to intensified competition in the market. This competition compelled Russian banks to change or to contemplate restructuring their asset-liability strategies. With more than 1,000 banking institutions of different size, ownership, and business strategy, Russia provides a rich test case for analyzing the impact of banks' diversification strategies on risk-return scenarios. We have been able to obtain highly detailed information on financial variables and ownership particulars of almost all the Russian banks,

[2] Berger et al. (2010), which focuses primarily on methodological innovation in estimating the effects of diversification, also examines the effects of diversification on the performance of Chinese banks and finds reduced profits and higher costs associated with more diversification.

which enables us to compute focus indices and construct measures of diversification economies based on sub-items within loans, assets, liabilities, etc.

This paper specifically investigates the relationship between diversification strategies and the risk-return tradeoff in the Russian banking industry over the period from 1999 to 2006. Diversification is measured in four dimensions: loans, deposits, assets, and liabilities. We evaluate the effects of diversification strategy on firm performance based on the concept of economies of diversification developed by Berger et al. (2010) and compare the results to those of the more conventional *focus index*, which is based on the sum of squares of shares in different bank products. For all four dimensions, we find that banks' performance tends to be nonmonotonically related to diversification strategy, and the marginal effects of focus indices on bank performance are also nonlinearly associated with level of risk and foreign ownership. Specifically, we find that a bank's initial move towards focus (from a complete diversification strategy) tends to increase the bank's profits and reduce its risk, but that this favorable effect of becoming more focused tends to be reversed when it exceeds a certain threshold. Further, we find that the diversification strategy tends to have a stronger impact on banks' performance when they operate at higher risk levels. As for the role of foreign ownership, our results suggest that there is a range of foreign ownership within which banks can benefit most from being focused. When foreign ownership is either relatively high or relatively low, banks tend to benefit more from being diversified.

As noted above, from both policy and research perspectives, it is important to gain a better understanding of the sustainability of current practices and the successes of financial intermediaries regarding their diversification strategies. Given the global integration of the financial market and some of the characteristics shared between the Russian banking industry and those in other emerging countries, we believe our analysis generates important implications for bank managers and regulators in Russia as well as in other emerging economies.

The structure of the paper is as follows. Section 2 reviews the most relevant literature on bank diversification and on Russian banks. Section 3 provides some background on Russian banking. Section 4 describes our sample and outlines our empirical methodology. Section 5 presents the empirical results, and Section 6 concludes and discusses the results.

2 Literature review

We separate the literature review into two sections: (a) literature on focus versus diversification, and (b) literature on Russian banks.

2.1 Focus versus diversification literature

Conventional wisdom in the banking literature argues that banks should be as diversified as possible. First, it is argued that banks could reduce their chances and/or expected costs of financial distress/bankruptcy by spreading operations across different products and economic environments (Boot and Schmeits (2000)). This argument is supported by several empirical studies. Boyd and Graham (1988) find lowered risk of bankruptcy of banks that merge with insurance companies, Rose (1989) suggests reduced cash flow risk for banks when they move into non-bank product lines, Templeton and Severiens (1992) find that diversifying into other financial services reduces banks' unsystematic risk, and Berger et al. (1999) find that consolidation in the financial services industry has been consistent with greater diversification of risk on average. Second, theoretical studies suggest that diversification makes it cheaper for institutions to achieve credibility in their role as screeners or monitors of borrowers (e.g., Diamond (1984), Ramakrishnan and Thakor (1984), Boyd and Prescott (1986)). In addition, some studies propose that diversifying firms can benefit from the leveraging of managerial skills and abilities across products, or from activity diversification that generates economies of scope for the organization (e.g., Iskandar-Datta and McLaughlin (2005), Drucker and Puri (2009)).

On the other hand, some studies join the general consensus in corporate literature (e.g., Jensen (1986), Berger and Ofek (1996), Servaes (1996), Denis et al. (1997)) and argue that the cost of diversification might outweigh the benefits. Therefore, a financial institution should focus on a single line of business so as to take the maximum advantage of management's expertise and reduce agency problems, leaving investors to diversify on their own. Consistent with this view, DeYoung and Roland (2001) find that US banks replacing traditional lending activities with fee-based activities are associated with higher revenue volatility, implying higher risk.[3] Similarly, Stiroh (2004) documents that non-interest diversification is negatively related with performance. Complementing

[3] Demsetz and Strahan (1997) also find that large bank holding companies are better diversified than small bank holding companies, but that the diversification does not translate into lower risk levels because of lower capital ratios, larger commercial and industrial loan portfolios, and greater use of derivatives by large banks.

the agency-theoretic analysis of the boundaries of a bank's activities, as proposed in Cerasi and Daltung (2000), Acharya et al. (2006) suggest that there are diseconomies of scope that arise through weakened monitoring incentives and a poorer quality loan portfolio when a risky bank expands into additional industries and sectors. Laeven and Levine (2007) find that financial conglomerates engaging in multiple lending activities have lower market value than they would if they were split into separate financial institutions. Similarly, most of the studies on cost scope economies within the financial service sector find no substantial evidence of such economies (e.g., Berger et al. (1987), Mester (1987, 1993), Hunter et al. (1990), Noulas et al. (1990), Berger and Humphrey (1991), Goldberg et al. (1991), Pulley and Humphrey (1993)).

The existing banking literature on diversification is heavily concentrated in US and European banking markets, leaving the emerging economies largely unexamined. One exception is Berger et al. (2010), which empirically examines the diversification-performance linkage for Chinese banks, and finds that both product and geography diversifications are associated with reduced profits and higher costs. However, their study does not account for the nonlinearity of the relationship between performance and diversification, nor do they examine whether diversification-performance linkage relates nonmonotonically to banks' risk and/or ownership.

2.2 Literature on Russian banks

While Russia is an important and rapidly growing economy, the literature on the Russian banking system has been fairly sparse. We are able to contribute to this still nascent literature, as until now the papers on Russian banking have concentrated on issues other than the effects of diversification strategies.

In recent years, there have been a number of papers on Russian bank supervision and introduction of the deposit insurance scheme (e.g., Montes-Negret and Camara (2006), Vernikov (2007), Clayes and Schoors (2007)), market discipline and deposit interest rates (e.g., Peresetsky et al. (2007)), bank failures (e.g., Lanine and Vennet (2006), Fungacova and Weill (2009)), and bank efficiency (e.g., Styrin (2005), Karas et al. (2008)). In this section, we briefly review some of the results from these papers.

Turning first to the efficiency studies, Karas et al. (2008) report that while foreign banks are more efficient than other banks in Russia, the public or state-owned banks are found to be more efficient than the domestic private banks and that the efficiency gap increased in the post-deposit insurance era. Their findings are partly consistent with Fries and Taci (2005) and Styrin (2005),

both of which report superior efficiency of foreign banks. These results are generally confirmed for other transition countries by Bonin et al. (2005a,b).

Clayes and Schoors (2007) delve into the potential conflict between micro- and macro-prudential objectives of bank supervisors by investigating the licensing policy of the Russian central bank, and report evidence supportive of both dimensions. The analysis strongly indicates that macro-prudential concerns related to systemic stability are present in the central bank's objective function. Vernikov (2007) criticizes the lack of privatization of the core Russian state banks and draws a similarity between Russian state banks and the big Chinese state banks, as opposed to the liberalized and privatized Eastern and Central European banking industries. Fungacova and Solanko (2008) focus on the riskiness of Russian banks during 1999-2007 and report a higher likelihood of insolvency for the large Russian banks. Ungan et al. (2008) investigate the consolidation and re-structuring actions of the Russian central bank in the post-2000 environment and find evidence consistent with market discipline, where higher capitalized and more liquid banking institutions are more successful in attracting and increasing their deposit base. Peresetsky et al. (2007) and Peresetsky (2008) analyze market discipline and market behavior in the post-deposit insurance regime, and show that market discipline weakened after deposit insurance was introduced. Finally, Lanine and Vennet (2006) and Fungacova and Weill (2009) investigate failure predictions for Russian banks, pointing to shortfalls in liquidity, asset quality, and capital adequacy, as well as market competitiveness, as the major factors.

3 Background information on Russian banks

In this section, we provide background information on the Russian banking industry, along with a discussion of Russian banks' focus strategies, and the entry of foreign banks.

3.1 Historical perspective

During the Soviet period, banking – like other economic activities – was tightly controlled by the state. When cautious economic reforms were launched in the mid-1980s, the banking sector was also affected. In 1987, the USSR began a two-tiered banking sector, with the central bank, Gosbank, in charge of the overall money supply and engaging in certain commercial banking activities, and several specialized spetsbanki banks handling savings (Sberbank), agriculture (Agroprombank), in-

dustry (Promstroibank), housing (Zhilsotsbank), investment credit (Stoybank), and foreign trade (Vneshtorgbank). When the Soviet Union broke up and economic reforms commenced in Russia in 1991-1992, several hundred new banks – owned by individuals, governments, corporations, and other organizations – began to enter the market (Claeys and Schoors, 2007). At the end of 1991, Russia had about 1,700 banking institutions (Rautava, 1996), and by the end of 1995, there were over 3,300 banks (Ungan et al., (2008)). At the same time, a number of foreign banks and their subsidiaries joined the market. However, during the aftermath of the 1995 interbank money market crisis, a large number of banks either failed or had their banking licenses revoked. During the severe financial crisis of 1998, the ruble was devalued, the Russian government suspended its debt servicing, and several banks suspended operations. In the post-crisis environment, however, banks began to reorganize their businesses. New prudential regulatory rules in 2002 spurred further restructuring, as did the adoption of international accounting standards and guidelines based on Basel Accord principles. In 2004, a new deposit insurance system was introduced and initially implemented in the largest banks. However, by 2006, most deposits in the banking market were covered by the deposit insurance scheme.

After the 1998 crisis, the role of Russian banks as financial intermediaries was strengthened and the economy underwent a process of financial deepening. The Russian economy has been much more stable, and rapid growth has increased the demand for bank lending and deposits. For example, the ratio of domestic credit in the private sector to GDP was only 13.3% in 1998, but by 2007 it had risen to 38.5%. During this period, the number of foreign banking institutions in Russia also increased, with about 50 foreign credit institutions active in the market and holding over 11% of the total market assets (Central Bank of Russia (2008)). Nevertheless, the banking sector continues to be dominated by the large state-controlled banks.

Table 1 provides further details on entries and exits of banks during the sample years. At the end of 2006, there were 1,344 credit institutions of which 1,292 were banks. Some 88% of these banks had a license granted by the central bank to operate and 71% could take deposits from savers. Over 60% of licensed banks were allowed to conduct operations in foreign exchange-related transactions. Although there was substantial foreign involvement in the local banking industry, only 52 banks were wholly foreign-owned and 31 were state-run. There were also substantial exits of banks (license revoked) during the sample years. Given that our sample covers the vast majority of Russian banks, we can further illustrate the structure of Russian banks based on Table 2. Panel A of Table 2 shows the distributions of Russian banks across different locations, size, and foreign owner-

ship. Of the 1,010 Russian banks in our sample for year 2006, 393 are Moscow-based (headquarters in Moscow), 28 are St. Petersburg-based, and the rest are located in other cities/regions. The national banks – generally the largest – have headquarters in Moscow. In terms of size, Panel A of Table 2 shows that of the 1,010 sample banks in 2006, 27 have total assets exceeding 100 billion rubles (3.8 billion US dollars), 113 banks have total assets between 10 billion and 100 billion rubles, etc. In Panel B of Table 2, we find that the largest banks with assets exceeding 100 billion rubles account for 63.67% of total banking assets in our sample.

3.2 Entry of foreign banks

After 2004, Russian banks began to face more competition from foreign banks, as higher economic growth and a more stable macroeconomic environment attracted a large number of foreign banks into the market, although most of them concentrated in the corporate lending sector rather than competing in consumer loans with the domestic Russian banks. Table 1 shows the numbers of banks with at least minimal foreign stakes (more than 1%), the wholly foreign-owned banks, and the majority foreign-owned banks (foreign ownership exceeding 50%), along with other categories of banks in Russia. Between 1999 and 2006, the number of banks with at least minimal foreign stakes increased from 130 to 153, while the number of wholly foreign-owned banks more than doubled. In Table 2, both Panel A and Panel B provide the distributions of banks associated with different levels of foreign ownership. While Panel A clearly shows that the majority of Russian banks (92.28% in numbers) are not associated with foreign ownership, Panel B suggests that the percentage of total assets in banks with no foreign ownership accounts for only about 59.31% of total assets in all banks in our sample. Of the banks associated with foreign ownership, those with foreign ownership between 0% and 25% account for the largest share of assets (28.52%), followed by banks with foreign ownership between 75% and 100% (8.24%). The heterogeneity of foreign ownership of Russian banks enables us to conduct a more in-depth investigation of the role of foreign ownership in the diversification-performance linkage.

3.3 Diversification in the operations of Russian banks

Some studies report that in recent years Russian banks have increased their lending to small and medium-sized enterprises and have extended their operations to consumer loans (including housing loans). As a result, some less diversified local banks could become more vulnerable to a decline in

housing prices (e.g., Fungacova and Solanko (2008)). On the other hand, most foreign banks, having fewer local connections, are expected to have a somewhat different focus of operations than the domestic banks.

Panel B of Table 3 presents descriptive statistics of disaggregated components in asset, loan, liability, and deposit portfolios for the banks in our sample. In terms of asset structure, the average bank has 2.59% of total assets is in government securities, 73.93% in loans, 6.28% in promissory notes, 2.88% in foreign assets, and 14.31% in other assets. In the loan portfolios, the average bank has 36.41% of its loans to other banks, 53.17% in loans to firms and entrepreneurs, with less than 11% of in loans to government, individuals, or foreigners. In the liability portfolio, 85.29% of total liabilities are in deposits, 10.26% in non-bond debt securities, and 4.44% in bonds, foreign or other liabilities. Finally, the deposit portfolio of the average bank is dominated by deposits of firms (62.13%) and individuals (23.33%).

4 Sample and methodology

In this section, we describe the data source and sample. We also present a brief outline of the methodology for measuring Russian banks' economies of diversification, focus indices, and other variables.

4.1 Sample

Our sample is a large unbalanced annual panel dataset which includes almost all Russian commercial banks of the post-1998 crisis period, from 1999 to 2006. The annual observations in our sample are based on quarterly bank-level data from the Financial Information Agency Interfax. To ensure that a bank in the sample engages in lending activities, we discard banks with loans below 5% of total assets. We also exclude from the sample banks with negative capital ratios. The cleaned sample includes 1449 banks from 1999 - 2006, i.e. 9997 bank-year observations.

As mentioned above, the majority of the market share of the Russian banking sector is accounted for by the large Moscow-based and state-controlled banks. However, the Russian banking sector is also extremely fragmented by a large number of very small banks. In addition, compared with banking sectors in Central European transitional economies, the Russian state has maintained a

relatively high degree of control over the banking sector, and the presence of foreign banks has been more limited.

For each bank in our sample, data are available to calculate the following portfolio decompositions:

1. A disaggregated loan decomposition based on each bank's correspondent accounts with other banks (L_1), loans to federal, regional, and local governments (L_2), loans to firms and individual entrepreneurs (L_3), loans to households (L_4), and loans to foreign nonbanks (L_5).
2. A disaggregated deposit decomposition based on each bank's deposits in correspondent accounts (D_1), deposits in interbank accounts (D_2), deposits by federal, regional, and local government (D_3), deposits by firms (D_4), and deposits by households and individuals (D_5).
3. A disaggregated asset decomposition based on each bank's assets in government securities investments (A_1), assets in total loans (A_2), assets in promissory notes investments (A_3), assets in foreign assets (A_4), and assets in other assets (A_5).
4. A disaggregated geographical decomposition based on each bank's liabilities in deposits (B_1), liabilities in non-bond debt securities issued (B_2), liabilities in bonds issued (B_3), foreign liabilities (B_4), and other liabilities (B_5).

4.2 Economies of diversification approach

We apply the economies of diversification approach of Berger et al. (2010) to the Russian banks. In the following, we briefly describe the estimation issues, including functional form and variable selection. For a more detailed description of the economies of diversification framework, see Berger et al. (2010).

The concept of economies of diversification is based on prior banking studies that use the concept of economies of scope (e.g., Berger et al. (1993, 1996), Clark and Siems (1997)). Profit scope economies are the proportional increases in profit from producing a given output jointly versus via specialist firms. Usually, a single continuous profit function is used for joint producers but assumed to apply to specialists as well because of an absence of data on specialists. For the selection of the profit function, we follow Berger et al. (2010) and adopt a modified version of the composite form. We specify the profit function for loan portfolios as:

$$\frac{\pi}{z \times w_m} = \left[\sum_{i=1}^{n} \beta_i \frac{L_i}{z} + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \delta_{i,j} \frac{L_i}{z} \frac{L_j}{z} + \sum_{i=1}^{n} \sum_{k=1}^{m-1} \gamma_{i,k} \frac{L_i}{z} \ln\left(\frac{w_k}{w_m} \right) + \sum_{t=1}^{T-1} \lambda_t D_t \right]$$

$$\times \exp\left[\sum_{k=1}^{m}\phi_k \ln\left(\frac{w_k}{w_m}\right)+\frac{1}{2}\sum_{k=1}^{m-1}\sum_{l=1}^{m-1}\varphi_{k,l}\ln\left(\frac{w_k}{w_m}\right)\ln\left(\frac{w_l}{w_m}\right)\right]+\varepsilon \qquad \ldots (1)$$

where π is profit, L_i is the i^{th} loan output, $i = 1, 2, \ldots, n$ (n = 5 in our case). z is the fixed netput (total assets), w_k is the k^{th} input price, $k = 1, 2, .., m$ (m = 3 in our case). For input prices, we have: w_1 (price of labor, proxied by the ratio of personnel expenses to total assets), w_2 (price of other funds, proxied by the ratio of interest expenses on other funds to total other funds), w_3 (price of deposits, proxied by the ratio of interest expenses on deposits to total deposits).[4] D_t is the t^{th} year dummy, where $t = 1, 2, \ldots, T-1$ (T = 8 in our case).[5]

In equation (1), we normalize the dependent variable by the quantity of the fixed netput (z) and the price of last input (w_3). We also normalize all the output terms by z, and we normalize the first two input prices by w_3. As mentioned earlier, z is total assets, and w_3 is the price of deposits.[6] In the following, let $\pi(L_1, L_2, L_3, L_4, L_5, w, z, year)$ be the predicted profit function with all variables at their means. Nonlinear least squares regressions are used to estimate the coefficients in the composite profit function based on the observed sample of joint producers, and by assuming that the focused banks have the same profit function as the diversified banks, we are able to obtain predicted profits for both observed diversified banks and hypothetical focused banks.

In our context of product diversification for Russian banks, the profit economies of the diversification approach yields five measures, each being the proportional difference in predicted profits between the observed diversified bank and a hypothetical focused bank that uses all its resources to produce just one product. If the focused bank produces only the second product, for example, the measure is

$$D_{\Pi}^{T}(1,2,3,4,5) = [\pi(L_1, L_2, L_3, L_4, L_5, w, z, year) - \pi(0, L_1 + L_2 + L_3 + L_4 + L_5, 0, 0, 0, w, z, year)] / \pi(L_1, L_2, L_3, L_4, L_5, w, z, year). \qquad \ldots (2)$$

We calculate the quasi-diversification economies to avoid the inaccurate measurement issue when considerable extrapolation beyond the sample data is required given that no firms are observed at zero outputs, as discussed by Berger et al. (2000b). Assuming that firms produce at least

[4] Because data on total numbers of employees are not available at bank level, we use the ratio of personnel expenses to total assets as the price of labor.
[5] Note that we estimate the alternative profit function, which specifies output quantities, instead of the standard profit function, which specifies output prices.
[6] The normalization by total assets, z, is designed to control for heteroskedasticity, reduce scale biases in estimation, and make the model more suitable for economic interpretation. The normalization by w_3 imposes linear homogeneity in the input prices (see Berger et al. (2000b) for more discussion).

the minimum observed value of each of the outputs, we measure the quasi-diversification economies of profit. For the second product, for example, the measure is

$$QD_{\Pi}^{T}(1,2,3,4,5) = \{\pi(L_1, L_2, L_3, L_4, L_5, w, z, year) - \pi[L_{1min}, (L_1 + L_2 + L_3 + L_4 + L_5) - (L_{1min} + L_{3min} + L_{4min} + L_{5min}), L_{3min}, L_{4min}, L_{5min}, w, z, year]\} / \pi(L_1, L_2, L_3, L_4, L_5, w, z, year). \quad \ldots (3)$$

We also estimate a cost function using the same specification and give the quasi-diversification economies for cost measures as below, by comparing costs as between a hypothetical focused bank (which specializes in the second product) and the diversified bank:

$$QD_{\Pi}^{T}(1,2,3,4,5) \text{ for cost} = \{ C[L_{1min}, (L_1 + L_2 + L_3 + L_4 + L_5) - (L_{1min} + L_{3min} + L_{4min} + L_{5min}), L_{3min}, L_{4min}, L_{5min}, w, z, year] - C(L_1, L_2, L_3, L_4, L_5, w, z, year) \} / C(L_1, L_2, L_3, L_4, L_5, w, z, year). \quad \ldots (4)$$

The profit (cost) economies of diversification for alternative focus strategies (i.e., focusing on alternative products) are calculated in a similar manner. Positive profit (cost) economies of diversification suggest a diversification premium or economies of diversification (i.e., the diversified bank enjoys higher profits (lower costs) than the hypothetical focused bank, and a negative number suggests a diversification discount, or diseconomies of diversification (i.e., the diversified bank performs worse than the hypothetical focused bank). Then we calculate the weighted average of economies of diversification measures for asset, loan, liability, and deposit portfolios based on the profit premiums or cost discounts on individual components of the portfolios, with weights being the proportions of the components of the portfolio.

4.3 Focus index

We also construct a more conventional measure of focus versus diversification, the Focus Index. Following Acharya et al. (2006), the Focus Index is the sum of squares of the proportions of portfolios in each classification. In our case, we construct four different Focus Indices: loan, deposit, asset, and geographic.

For the loan Focus Index, we denote the loans in each of the five loan categories as L_i, where i =1, 2, …, 5, so that

$$\text{Loan Focus Index} = \sum_{i=1}^{5} (L_i / Q)^2 \text{ , where } Q = \sum_{j=1}^{5} L_j \quad \ldots(5)$$

Note that the Focus Index, by definition, ranges from 1/n, or 1/5 in this case, to 1, with a higher value of the index indicating more focus (less diversification).

4.4 Other variables

For risk proxies, we follow some recent studies that investigate bank risk-taking behavior in emerging markets (e.g., Haselmann and Wachtel (2007), Maechler et al. (2007)) and use three alternative proxies for bank risk: volatility, defined as the standard deviation of quarterly earnings (earnings here refer to the ratio of pre-tax profit to total assets); nonperforming loan ratio (NPL); and loan loss provision ratio (LLP). The market measure of risks is not available due to the limited number of banks listed on the stock exchange. All of the tables shown in the paper use volatility of quarterly earnings as the proxy for risk, while we also run robustness checks by using NPL and LLP alternatively as risk proxies (these robustness results are available from the authors upon request). In all the regressions, we include a continuous variable, foreign ownership (*foreign*), to capture the effect of foreign involvement on bank performance and the interaction effects between foreign ownership and the focus index for bank performance. We obtained the foreign ownership data from the Central Bank of Russia. We further control for bank location to see if Moscow-based and St. Petersburg banks, having wider networks of branches across the nation and sometimes overseas and thus better access to domestic and international interbank markets, are able to gain larger economies of diversification when they diversify their product ranges. We also control for the capital ratio, amount of bank assets, and changes in the environment that are common to all banks (including global or country-level economic developments, important changes in the institutional set-up of Russian banks, such as the introduction of deposit insurance scheme) by adding year dummies to the regressions.

Table 3 (Panel A) presents summary statistics for the variables used in the analysis, where all financial items (except ratios) are in thousands of rubles, inflation-adjusted to the price level of year 1996. Note that there is a wide range of pre-tax ROAs for the banks in our sample, and we do not exclude those with very poor performance because our intention is to examine the diversification-performance connection for all the banks, not just for the better performers. The range of volatility of quarterly earnings, from 0 to 11.41, seems to suggest that some Russian banks have very volatile earnings from one quarter to another, even after the 1998 crisis (given that our sample runs from 1999 to 2006). Such volatility of quarterly earnings might reflect changes in nonperforming loan ratios or net provisions ratios during the sample period, which also exhibit wide ranges based on descriptive statistics reported in Table 3.

Table 4 presents the descriptive statistics on profit premiums (Panel A) and cost discounts (Panel B) measured by economies of diversification for the asset, loan, liability, and deposit portfo-

lios of Russian banks. While the range of profit premiums and cost discounts is sometimes wide (e.g., the profit premium for asset diversification ranges from -0.62 to 0.59), the means of all the profit premiums are negative, and the means of all the cost discounts are positive, regardless of the reference of alternative portfolios. In other words, on average, a diversified in our sample is associated with lower profits and lower costs compared to a (quasi) focused bank. In the next section, we present more results and discussion based on regression analysis.

5 Empirical results

5.1 Tests of the effects of risk and foreign ownership on economies of diversification

In order to investigate the effects of foreign ownership and risk on the economies of diversification, we specify the following regression equations:

$$PP(CD)_{i,t} = \alpha + \beta_1 \times risk_{i,t} + \beta_2 \times risk_{i,t}^2 + \beta_3 \times foreign_{i,t-1} + \beta_4 \times foreign_{i,t-1}^2 + \beta_5 \times risk_{i,t} \times foreign_{i,t-1} + \delta \times z_{i,t} \quad \ldots(6)$$

For Equation (6), we run regressions for profit premium (*PP*, the profit economies of diversification measure) or cost discount (*CD*, the cost economies of diversification measure) against a group of variables of interest, including *risk*, *risk* squared, *foreign* (with one-year lag), *foreign* squared, and the interaction term between *risk* and *foreign*, while *z* is a vector of control variables including location (*Moscow and St. Petersburg*, a dummy variable that equals 1 if the bank is located in Moscow or St. Petersburg, 0 otherwise), *capital ratio* (total equity/total assets), and log of bank size (*ln(assets)*). We include the squared terms for both foreign ownership and risk, because it is possible that the effect of ownership and risk on economies of scope is nonlinear, as indicated by Anderson and Reeb (2003) and Delios and Wu (2005). Throughout this paper, regressions are run by pooling all bank-year observations with year dummies.

The regression results are shown in Tables 5 and 6. Table 5 presents the OLS regressions for profit premium on firm characteristics of Russian banks. The profit premium is calculated on four different definitions of decompositions of portfolios, and for each definition of a portfolio, we display three regressions. The first regression only includes linear terms of firm characteristic variables, while the second includes the interaction terms between *risk* and *foreign* in addition to the linear terms. The third regression further includes the squared terms for *risk* and *foreign* ownership,

as described by equation (9). All independent variables are based on concurrent terms except *foreign* which is based on the one-year lagged terms.[7]

There are several interesting results shown in Table 5. First, note that when only linear terms of risk (volatility) and foreign ownership are included in the first regression in each group, the results indicate that risk is significantly and positively correlated with profit premium and that foreign ownership is significantly and positively correlated with profit premium. In other words, banks tend to gain more profit economies of diversification with increased risk, and/or with increased foreign ownership. For the second regression in each group, which includes the interaction term of risk and foreign ownership, we find that the coefficient of the interaction term is negative significant, suggesting that foreign ownership tends to weaken the marginal effects of risk on profit economies of diversification. In the third regression in each group, the squared terms of risk are associated with negative significant coefficients, while the squared terms of foreign ownership are associated with positive significant coefficients. To get a clearer look at the individual effects of risk and foreign ownership on profit economies of scope, we provide the plots in Figures 1-A and 1-B.

Figure 1-A plots the profit economies of diversification measure (profit premium) against the measure of risk (volatility), based on statistical results from the third regression in each group in Table 5. Because we focus on the relationship between risk and profit premium here, we replace the values of other variables in the equation with their mean values. Here we find that the shapes of the curves tend to be dominated by a positive relationship between risk and profit premium (though some concavity is still noticeable), and this observation holds across the four different portfolio diversification measures. On average, banks tend to gain more profit economies of diversification when their operations are associated with higher risk.

Figure 1-B depicts the relationship between foreign ownership and profit premium, based on statistical results from the third regression in each group in Table 5. From the shape of the four curves corresponding to each of the four portfolio diversification, we find patterns of strong nonlinearity for the effect of foreign ownership on profit premium. Specifically, except for the liability diversification curve which shows a monotonically (but nonlinear) positive relationship between foreign ownership and profit premium, the other three curves clearly exhibit convexity: the profit premium tends to decrease when foreign ownership increases from zero to a small positive number,

[7] The underlying assumption for using one-year lag of *foreign* is that it might take some time for foreign ownership to impact firm performance, while the relationship between performance and such terms as risk and capital ratio are mostly concurrent.

but at some point when foreign ownership increases to a higher percentage, the profit premium tends to increase (so the banks enjoy more profit economies of diversification). It is possible that when foreign owners enter a bank as minority shareholders, that bank may lose its privileged position within a business group or vis-à-vis authorities, which would then lead to lower profits in the short run. But when a foreign owner acquires a majority stake in a bank, the new owner can exert much greater influence on the operations of the bank from the very start. New owners are likely to bring in better know-how and may be of help in improving corporate governance, leading to a higher profit premium.

In Table 6, the same sets of regressions as for Table 5 are run for the cost discount. From the first regression in each group of portfolio diversification, which only includes the linear terms of firm characteristics, we find that both risk and foreign ownership are significantly and positively correlated with the cost discount; in other words, the banks tend to achieve more cost economies of diversification when they are associated with higher risk and more foreign ownership when a linear relationship is imposed. In the second regression in each group, the positive significant coefficient associated with this interaction term across all portfolio diversifications seems to suggest that foreign ownership tends to strengthen the marginal effects of risk on cost economies of diversification. For the third regression in each group, we find that the squared risk terms are associated with negative significant coefficients, while the squared foreign ownership terms are associated with positive significant coefficients. Again, in order to gain a better understanding of the individual effects of the risk and foreign ownership, we provide Figures 2-A and 2-B based on Table 6 results.

Figure 2-A depicts the relationship between risk and the cost discount. For the cost economies measure based on asset diversification, we find that risk tends to exert a strong positive impact on cost discount; in other words, with increased risk, the differences in costs between the focused banks and the diversified banks tend to increase (holding other factors at mean value). However, for the other three portfolios (loan, liability, deposit), the curves are nearly flat and horizontal, which tends to suggest a very marginal effect of risk on the cost discount when banks diversify in these portfolios. In Figure 2-B, the pattern of the relationship between foreign ownership and the cost discount is also interesting. We find that foreign ownership has hardly any effect on the cost discount as regards loan portfolio diversification, and foreign ownership is positively correlated with the cost discount when banks diversify their deposit and liability portfolios. Finally, when banks diversify their asset portfolios, foreign ownership tends to have a nonlinear (convex) relationship with the cost discount.

5.2 Tests of effects of risk, focus indices, and foreign ownership on bank performance

We turn now to the conventional (inverse) measure of diversification, the Focus Index. The Focus Index is described in Section 4.3, and summary statistics are presented in Table 7. The magnitudes of standard deviations relative to means seem to suggest that the Russian banks are generally characterized by large variations in their diversification strategies for asset, deposit, liability, and deposit portfolios.

Given that any clear interpretation of the effect of diversification on bank performance must be based on the risk-return tradeoff, the complete analysis will ideally examine the overall role of a bank's diversification strategy on its return and risk in an integrated framework. Conceptually speaking, if diversification serves to increase (decrease) bank returns and decrease (increase) bank risk, we interpret this as implying that diversification improves (weakens) bank performance. When bank return and bank risk either both increase or both decrease with the degree of diversification, the overall effects on bank performance are ambiguous and cannot be determined without taking a stand on what constitutes an efficient risk-return trade-off. Let us start the analysis with a highly simplified linear regression model:

$$return_{i,t} = \alpha + \beta_1 \times risk_{i,t} + \beta_2 \times FI_{i,t-1} + \beta_3 \times foreign_{i,t-1} + \delta \times z_{i,t} + \varepsilon_{i,t} \quad \ldots (7)$$

In Equation (7), we test whether focus (measured by Focus Indices, or FI) is harmful to bank returns ($\beta_2 < 0$) while controlling for risk, foreign ownership, and other factors. We measure bank return by the ratio of pre-tax profit to total assets, which is the closest measure to ROA that we can get from the financial data on Russian banks. We complement this measure with the ratio of total expenses to total assets, as an alternative measure of bank performance. We use the one-year lagged term of Focus Indices to partially address the issue of endogeneity of focus measures, and later we complement this analysis with an important robustness check that treats the focus measures as endogenously determined. We adjust returns for risk by also employing the risk measure (standard deviation of quarterly pretax profits/total assets) as an explanatory variable.[8] Consistent with the estimations in Table 5 and 6, we use one-year lagged term of *foreign*, to allow an elapse of time before the effects of the changes in this variable begin to show up in performance. As mentioned earlier, the year dummies help us to control for the possible effects of changes in macroeconomic

[8] We also test for the robustness of our results over the alternative risk measures, including the ratio of nonperforming loans to total assets and the ratio of loan loss provisions to total assets (tables available on request).

conditions, among other things. The vector *z* represents an array of control variables, which are the same as in Tables 5 and 6, including location, *capital ratio*, and log of bank size.

The results are presented in the first regression in each group of portfolio definitions (see columns 1, 4, 7, and 10 in Table 8). They show that risk, Focus Index, and foreign ownership are significantly and positively correlated with pre-tax ROA when the other factors are taken into account. In particular, the positive signs of coefficients of Focus Index across the four different measures of diversification suggest that banks on average enjoy higher pre-tax ROA when they focus. Again, we note that these observations are based on the assumption of a linear relationship between firm characteristics and performance.

After the simple test of a linear relationship between bank performance and the Focus index, as specified in equation (7), we test whether the diversification-performance relationship depends linearly on the level of bank risk and foreign ownership, based on the following equations:

$$return_{i,t} = \alpha + \beta_1 \times risk_{i,t} + \beta_2 \times risk_{i,t}^2 + \beta_3 \times FI_{i,t-1} + \beta_4 \times FI_{i,t-1}^2 + \beta_5 \times foreign_{i,t-1} + \beta_6 \times foreign_{i,t-1}^2 + \beta_7 \times FI_{i,t-1} \times risk_{i,t} + \beta_8 \times FI_{i,t-1} \times foreign_{i,t-1} + \delta \times z_{i,t} + \varepsilon_{i,t} \quad \ldots(8)$$

$$\text{Thus } \frac{\partial(return)}{\partial(FI)} = \beta_3 + 2\beta_4 \times FI_{i,t-1} + \beta_7 \times risk_{i,t} + \beta_8 \times foreign_{i,t-1} \quad \ldots(9)$$

In Equation (8), bank return is modeled as being dependent not only on the linear terms in the Focus Indices, risk and foreign ownership but also on their squared terms, because of the possibility (mentioned above) of nonlinear effects of these factors on bank performance. Meanwhile, the interaction terms between Focus Indices and risk and foreign ownership are included in Equation (8) because we intend to test whether the effects of focus on performance depend linearly on bank risk and foreign ownership, as specified by equation (9), which gives the first derivative of return with respect to the Focus Index.

The results of these regressions are presented in columns 2, 5, 8, and 11 of Table 8. We find that the marginal effects of focus on pre-tax ROA are negatively related to the extent of focus and positively related to the level of risk and foreign ownership, and the associated coefficients are statistically significant. In other words, with a decrease in the degree of focus measures and/or increase in the level of risk and/or foreign ownership, each additional unit of increase of a focus measure is associated with a higher (positive) increase in pre-tax ROA.

The above findings are based on results of estimations when we impose the linear form of risk and other factors on the marginal effect of focus strategy on performance. However, some stud-

ies (e.g., Winton 1999) point out that the diversification-performance relationship may in fact depend on bank risk in a nonlinear way. Acharya et al. (2006) also argue that the conflict of interest between bank owners and bank creditors might also impose a U-shape relationship between diversification -performance and bank risk, because an increase in the probability of insolvency reduces bank owners' incentive to monitor loans. At the same time, the effect of diversification on performance may also depend on ownership in a nonlinear way. Banks might enjoy different benefits associated with changes in foreign ownership in a minority foreign-owned bank versus a majority foreign-owned bank. Therefore, to try to capture the implied U-shaped (nonmonotonic) nature of the diversification-performance relationship as a function of bank risk and foreign ownership, we modify equation (8) by introducing more interaction terms:

$$\begin{aligned} return_{i,t} = \alpha + \beta_1 \times FI_{i,t-1}(1 + \beta_2 \times FI_{i,t-1} + \beta_3 \times risk_{i,t} + \beta_4 \times risk_{i,t}^2 + \beta_5 \times foreign_{i,t-1} \\ + \beta_6 \times foreign_{i,t-1}^2 + \beta_7 \times foreign_{i,t-1} \times risk_{i,t}) + \beta_8 \times risk_{i,t}(1 + \beta_9 \times risk_{i,t}) \\ + \beta_{10} \times foreign_{i,t-1}(1 + \beta_{11} \times foreign_{i,t-1}) + \delta \times z_{i,t} + \varepsilon_{i,t} \qquad \ldots(10) \end{aligned}$$

and so $$\begin{aligned} \frac{\partial(return)}{\partial(FI)} = \beta_1 + 2\beta_1\beta_2 \times FI_{i,t-1} + \beta_1\beta_3 \times risk_{i,t} + \beta_1\beta_4 \times risk_{i,t}^2 + \beta_1\beta_5 \times foreign_{i,t-1} \\ + \beta_1\beta_6 \times foreign_{i,t-1}^2 + \beta_1\beta_7 \times risk_{i,t} \times foreign_{i,t-1} \qquad (11) \end{aligned}$$

In Equation (10), we further include the two-way interaction terms between Focus Indices (FI) and risk-squared, FI and foreign-squared, as well as the three-way interaction term among FI, risk, and foreign ownership in addition to all the independent factors in Equation (8). This specification allows us to examine whether the effects of diversification on bank performance depend nonlinearly on the level of risk and foreign ownership, as shown by Equation (11), which gives the first derivatives of return with respect to Focus Index. If, for example, the effect of a bank's focus on its returns is U-shaped in risk, then $\beta_1\beta_4$ should be statistically significant. Similarly, if the marginal effect of a bank's focus strategy on its return is U-shaped, then $\beta_1\beta_6$ should be statistically significant.

The results of these regressions are presented in columns 3, 6, 9, and 12 of Table 8. We find that the coefficient(s) associated with the interaction terms between Focus Index and squared terms of risk are negative significant, which points to a concave relationship between the marginal effects of focus on pre-tax ROA and risk . Similarly, the negative significant coefficient of the interaction terms of Focus Index and squared terms of foreign ownership indicate concavity of the

impact of foreign ownership on the marginal effects of focus on performance (pre-tax ROA). To illustrate these results, we present Figures 3-A, and 3-B.

Figure 3-A plots the marginal effects of Focus Indices on pre-tax ROA against risk based on the coefficients reported by the third regression in each group of portfolio diversification in Table 8, and setting the value of each of the other variables at their means. The upward sloping curves in this graph show that the marginal effects of Focus Indices on pre-tax ROA tend to increase with higher risk. In other words, banks benefit more from being focused in terms of pre-tax profits when they operate at a higher risk level, holding other factors constant. Figure 3-B plots the marginal effects of Focus Indices on pre-tax ROA against foreign ownership, and the underlying data are also based on the statistics reported on the third regression in each group of portfolio diversification. Here a different pattern is detected for the role of foreign ownership: except for the liability Focus Index curve, which shows a monotonically upward sloping trend, the other three curves are clearly characterized by nonlinearity, i.e., concavity. In other words, at a lower level of foreign ownership, the banks benefit from being focused, as pre-tax profits tend to be greater with the increase in foreign ownership. However, this positive role of foreign ownership, after a certain point, turns negative. Based on the graph and the underlying data, the level of foreign ownership associated with the largest marginal effects of Focus Index on performance ranges from 0.43 to 0.52.

Table 9 presents the OLS regressions of cost ratio (total expenses-to-total assets) on risk, Focus Indices, foreign ownership, and other firm characteristics. Specifications of the regressions and definitions of the variables are as in Table 8. In the first regression in each group of portfolio diversification (columns 1, 4, 7, and 10), we find that the cost ratio is positively and significantly correlated with risk, negatively significantly correlated with Focus Indices, and positively significantly correlated with foreign ownership, when the linear assumption is imposed. The second and third regressions in each group, however, tend to suggest a nonlinear relationship between the cost ratio and these variables. In particular, in the second regression in each group (columns 2, 5, 8, and 11) we find that all the squared terms of the three key variables (i.e., risk, Focus Index, and foreign ownership) are associated with negative significant coefficients, which indicates concavity. In the third regression in each group (columns 3, 6, 9, and 12), we find that both the interaction between Focus Index (lagged) and squared volatility and the interaction between Focus Index and squared foreign ownership are associated with positive significant coefficients, which indicates that the relationship between risk/foreign ownership and the marginal effects of Focus Index on cost ratio is convex. To illustrate these results, we present Figures 4-A and 4-B.

Figure 4-A plots the marginal effects of Focus Indices on cost ratio against risk, based on results of on the third regression in each group of portfolio diversification in Table 9. We find that for asset and liability portfolio diversification, an increase in risk tends to monotonically reduce the marginal effects of Focus Indices on cost whereas, for the loan and deposit portfolio diversification, the relationship between risk and marginal effects of Focus Indices on cost is convex. In other words, banks on average tend to enjoy greater cost savings by being focused on asset and liability at lower risk level, while for loan and deposit diversification, the relationship between the impact of focus on costs and risk is less straightforward. Figure 4-B plots the marginal effects of Focus Indices on cost ratio against foreign ownership. This graph shows that, except for the curve representing loan portfolio diversification, which exhibits strong upward slope along the increase of foreign ownership, the other three curves display only modest convexity, indicating that banks on average benefit more in cost savings by being focused when the level of foreign ownership is approximately between 0.35 and 0.62.

5.3 Simultaneous equations of bank performance and focus

To this point, we have employed focus measures with one-year lag to partially address the endogeneity issue. Arguably, this is appropriate for the accounting returns that we use, since any monitoring-related effects of focus may get captured in book returns only with a lag. However, given that it is possible that the concurrent practice of diversification strategy is endogenous with respect to bank performance (e.g., Acharya et al. (2006)), and to the extent that there might be some correlation between current diversification strategy and past strategy (because the evolvement of strategy is path-dependent or takes time to change the structures of portfolios), we may obtain more efficient and/or less biased estimates if we address the endogeneity of the Focus Indices more explicitly.

We estimate a simultaneous equations system in which both bank return and the Focus Indices are treated as variables to be explained, while the error terms of the two equations in the system are allowed to be correlated with each other. This is essentially a seemingly unrelated regression (SUR) approach. Our simultaneous equations are specified as follows:

$$\begin{aligned} return_{i,t} = \alpha &+ \beta_1 \times FI_{i,t-1}(1 + \beta_2 \times FI_{i,t-1} + \beta_3 \times risk_{i,t} + \beta_4 \times risk_{i,t}^2 + \beta_5 \times foreign_{i,t-1} \\ &+ \beta_6 \times foreign_{i,t-1}^2 + \beta_7 \times foreign_{i,t-1} \times risk_{i,t}) + \beta_8 \times risk_{i,t}(1 + \beta_9 \times risk_{i,t}) \\ &+ \beta_{10} \times foreign_{i,t-1}(1 + \beta_{11} \times foreign_{i,t-1}) + \delta \times z_{i,t} + \varepsilon_{i,t} \end{aligned} \quad \ldots(12)$$

$$FI_{i,t} = \delta + \gamma_1 \times risk_{i,t-1} + \gamma_2 \times risk^2_{i,t-1} + \gamma_3 \times foreign_{i,t-1} + \gamma_4 \times foreign^2_{i,t-1} + \lambda \times z_{i,t} + \mu_{i,t} \quad \ldots(13)$$

For the endogenous determination of Focus Indices, we treat ln(assets) and risk (and risk-squared) as the independent explanatory variables as instruments. The large body of banking literature which shows the positive relationship between diversification and size gives us the ex ante rationale for the use of bank size (ln(assets)) as one of the instruments for focus measures.[9] At the same time, purely from the standpoint of Markowitz portfolio theory, banks with relatively higher risk may have more incentive to diversify their portfolios.

Table 10 (both Panels A and B) presents the estimation results for the simultaneous equation framework described above, with pre-tax ROA as the dependent variable for the first equation, and the focus index as the dependent variable in the second equation. To obtain a full comparison with the results obtained earlier via OLS regressions, we employ the same set of the variables as in Table 8 and enter them in the same way here as the first equation (the pre-tax ROA regressions) within each group of simultaneous equations. In general, we find that the results mirror what we find in Table 8, indicating that our results in Table 8 are robust if we explicitly control for potential endogeneity of the diversification decisions of Russian banks.

Table 11 presents the results of the estimations of the simultaneous equations where the first equation uses the cost ratio (total expenses-to-total assets ratio) as the dependent variable, and the second equation uses the Focus Index as the dependent variable. When comparing the results in this table with Table 9, we find that, in general, our results in Table 9 are robust after controlling for endogeneity of diversification decisions.

5.4 Tests of effects of diversification on bank risk

To more explicitly study the effects of diversification on bank monitoring effectiveness and, in turn, on the quality of bank loan portfolios as banks expand the scope of their portfolios, we consider the risk of bank loans as the dependent variable in the regressions. The regression model is specified as follows, and the results are presented in Table 12.

$$risk_{i,t} = \alpha + \beta_1 \times FI_{i,t-1}(1 + \beta_2 \times FI_{i,t-1} + \beta_3 \times foreign_{i,t-1} + \beta_4 \times foreign^2_{i,t-1}) + \beta_5 \times foreign_{i,t-1}(1 + \beta_6 \times foreign_{i,t-1}) + \delta \times z_{i,t} + \varepsilon_{i,t} \quad \ldots(14)$$

[9] The standard arguments of this literature are based either on the finiteness of good projects or on diminishing returns to scale within an industry, and on the risk avoidance induced by relatively high franchise values of large banks.

In Table 12, we find that when we impose a linear relationship (in the first regressions within each group), the Focus Indices are negatively significantly related to risk, and foreign ownership is positively significantly related to risk, while controlling for the location, capital ratio, previous pre-tax ROA, and bank size. However, when the regressions include quadratic terms and interaction terms (in the second and third regressions in each group), the effects of focus indices on risk exhibit nonlinearity, while the nonlinearity of the effect of foreign ownership on risk is not as clear (as the quadratic terms of foreign ownership do not usually have significant coefficients). To illustrate these results, we provide Figures 5-A, and 5-B based on Table 12.

Figure 5-A plots risk against the four Focus Indices. We find here that risk is nonlinearly related to Focus Indices, and the convexity of the shape of the curves suggests that the initial increase of the Focus Indices from zero (completely diversified) to a small number tends to be positively correlated with risk, but after a certain point, the increase of Focus Indices tends to be negatively related to risk. Based on statistics from Table 12, the threshold where the Focus Index is usually positively correlated with risk ranges from 0.28 to 0.56. Figure 5-B plots the marginal effects of Focus Indices on risk against foreign ownership based on statistics reported in Table 12. The graph shows that, except for asset portfolio diversification, the changes in foreign ownership have only a modest effect on the marginal effects of Focus Indices on risk. In other words, foreign ownership does not seem to play a big role in affecting how focus strategy and risk are related, with one the exception of the asset portfolio. For the Asset Focus Index curve, it is clear that an increase in foreign ownership tends to intensify the marginal effects (in absolute value terms) of the focus strategy on risk.

5.5 Simultaneous equations of bank risk and focus

Similar to the framework of Section 5.3, which serves as robustness tests for Tables 8 and 9, we also estimate a system of simultaneous equations (estimated by Seemingly Unrelated Regressions) specified as follows, for robustness testing of our results in Table 12:

$$risk_{i,t} = \alpha + \beta_1 \times FI_{i,t-1}(1 + \beta_2 \times FI_{i,t-1} + \beta_3 \times foreign_{i,t-1} + \beta_4 \times foreign^2_{i,t-1}) + \beta_5 \times foreign_{i,t-1}(1 + \beta_6 \times foreign_{i,t-1}) + \delta \times z_{i,t} + \varepsilon_{i,t} \quad \ldots(15)$$

$$FI_{i,t} = \delta + \gamma_1 \times risk_{i,t-1} + \gamma_2 \times risk^2_{i,t-1} + \gamma_3 \times foreign_{i,t-1} + \gamma_4 \times foreign^2_{i,t-1} + \lambda \times z_{i,t} + \mu_{i,t} \quad \ldots(16)$$

Table 13 presents the results of the simultaneous model estimations where we trace the effects of the Focus Indices on risk, with the correction for endogeneity of diversification choices. The first regression in each simultaneous estimation is specified by equation (15), while the second regression is specified by equation (16). Comparing the results in this table with those in Table 12, we conclude that, in general, our results are robust to the potential endogenous bias of the diversification decision on the risk of the banks.

In addition to the robustness tests of the potential bias of the endogeneity issue in the diversification decisions of Russian banks, we also conduct robustness tests in which we replace volatility by other proxies for bank risk in all the regressions. The other proxies for risk that we consider are the non-performing loans-to-total assets ratio (an ex ante measure) and the loan loss provisions ratio (an ex post measure). In general, we find that our results are robust to alternative risk measures. These tables will be provided on request.

6 Conclusions

The past decade has witnessed rapid movement of financial institutions around the world towards greater diversity of products and services. Since the recent financial crisis brought an unprecedented spate of bank failures on a global scale, the issue of banks' optimal diversification strategy has gained renewed attention among legislators, regulators, practitioners, and academics.

The existing studies on banking diversification, however, tend to oversimplify the analysis by assuming a linear relationship between diversification strategy and performance. Moreover, the existing studies tend to concentrate on banking industries of developed economies and largely ignore the banks in emerging economies. This paper strives to fill the gap in the literature by investigating the relationship between diversification strategies and the risk-return tradeoff in the banking industry of Russia. In recent years, the Russian economy has been marked by robust growth, a rapidly expanding banking sector, and a more favorable regulatory/legislative environment. In addition, lower barriers for foreign investment and cross-border acquisitions not only heightened competition in the domestic market, but also upgraded the Russian banking sector within an integrated global market. All these factors might have compelled Russian banks to change or to contemplate restructuring their asset-liability strategies.

Based on a large sample of Russian banks over the period 1999-2006, we find that performance tends to be nonmonotonically related with diversification strategy, and the marginal effects of the focus indices on banks' performance are also nonlinearly associated with the level of risk and foreign ownership. Specifically, we find that the banks tend to enjoy higher profits and lower risk when they move from a complete diversification strategy towards less diversification. However, the benefit of being less diversified tends to be negated when the extent of focus exceeds a certain threshold. Further, we find that the diversification strategy tends to have a stronger impact on performance when banks operate at higher risk level. As for the role of foreign ownership, our results suggest that there is a range of foreign ownership in which banks benefit most from being focused. When foreign ownership is very high or very low, banks tend to benefit more from being diversified.

We also offer some explanations for our results. First of all, agency costs of banking institutions have been regarded as relatively high in Russia, as this country has yet to develop its institutional environment, including rule of law, creditors' rights, transparency of the market and banks (e.g., Perotti and Gelfer (2001)). The lack of market discipline and monitoring, along with usually high transaction costs in emerging markets (in forms of bribery and corruption), means that managers of the Russian banks may not always be motivated to pursue the diversification strategy that maximizes shareholder value. In other words, the Russian banks do not always face effective market discipline or are not always actively monitored by shareholders who have voting rights and/or controlling rights. Under such circumstances, bank managers can be either entrenched and/or motivated to pursue empire building, and in both cases diversification strategies can be value-decreasing rather than value-increasing. Such failures in corporate governance can happen for several reasons. First, dominance by a few of the largest state-owned banks in the market might dampen their managers' motivation to pursue optimized portfolio management, while they can be easily rewarded by monopolistic or oligopolistic positions in both financial and nonfinancial terms (see Gilbert (1984), Neumark and Sharpe (1992), De Bandt and Davis (2000), Fungacova and Weill (2009) for discussions of the effect of market structure on bank behavior).[10] Second, the strong ties between the state-owned or state-controlled banks and (central or local) government can distort the market-discipline for bank managers, and they might be given more incentive to follow the government policies or "pet projects" instead of conducting independent analysis of the projects when allocating their portfolios (see La Porta et al. (2002), Sapienza (2004), Berger et al. (2005) for discussions of

[10] Nonfinancial rewards to managers of the largest banks might be, for example, the chance to be promoted to a higher position (or even a political career), reputation, "elite" social status, etc.

the effect of state ownership on the behavior of banks). In addition, the opaqueness of Russian banking practices, coupled with the corruption and bribery that plague the country, also contributes to the challenge that the Russian banks must meet in order to achieve efficiency in portfolio allocation (see Lerner and Schoar (2005), Beck et al. (2006), Weill (2009), Haselmann et al. (2010) for discussions of corruption and bank behavior).[11]

We hope our empirical analysis of Russian banks provides some insight on the issue of how bank diversification strategies affect performance in a broader perspective. Some aspects of the macroeconomic environment, characteristics, and practices of Russian banking industry are not only shared by other emerging economies, but also tend to have a greater influence on the global market, given the increasing integration financial markets around the world.

[11] For example, Transparency International (2009) ranks countries' according to peoples' perceptions of their corruption level, and in recent years Russia has received very poor rankings. In 2009, Russia was ranked 146th (of 180 countries), on par with poor developing countries such as Zimbabwe.

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Table 1 Russian banking industry

Table 1 presents the total number of banking institutions by various types in each year from 1999 to 2006. The information provided in this table is from the Central Bank of Russia.

Variables	1999	2000	2001	2002	2003	2004	2005	2006
Total Number of:								
-- Credit Institutions Registered	2,113	2,124	2,001	1,817	1,653	1,507	1,404	1,344
-- Banks Registered	2,073	2,084	1,953	1,764	1,600	1,455	1,351	1,291
-- Banks with License to Operate	1,274	1,274	1,276	1,282	1,278	1,246	1,199	1,138
-- Banks with Ability to take Household Deposits	1,238	1,239	1,223	1,201	1,189	1,162	1,026	921
-- Banks with the ability to Conduct Business in Foreign Currency	769	764	810	844	846	839	826	754
-- State Banks	34	34	34	34	34	32	31	31
-- Banks with Minimum Foreign Stake (>1%)	130	130	126	122	128	128	136	153
-- Foreign Banks (100%)	23	22	23	27	32	34	42	52
-- Majority Foreign Banks (over 50% ownership)	12	11	12	10	9	9	11	15
-- Banking License Cancelled	677	806	677	477	321	212	155	159
-- Branches	3,765	3,433	3,793	3,308	3,218	3,233	3,297	3,286
Bank Asset to GDP Ratio	33.3	33.4	35.3	38.3	42.3	41.9	45.1	52.4

Table 2 Summary statistics of observations and bank assets by year, location, amount of assets, and foreign ownership

Table 2 shows the distribution of our sample across year, location, size, and foreign ownership. Panel A displays the distribution of our sample in terms of total observations, while Panel B presents the distribution of our sample in terms of total assets. Assets are in thousands of rubles and inflation-adjusted to the price level of year 1996.

Panel A: Total observations of sample Russian banks across year, grouped by location and size

	1999	2000	2001	2002	2003	2004	2005	2006	All years
Total observations	1,302	1,293	1,304	1,321	1,321	1,245	1,201	1,010	9,997
By location:									
Moscow	382	389	399	418	429	413	410	393	3,233
St. Petersburg	30	30	30	30	30	30	30	28	238
Other locations	890	874	875	873	862	802	761	589	6,526
By size (in millions of rubles)									
Assets ≤ 10	142	81	66	49	35	17	7	4	401
10 < assets ≤ 100	536	431	352	317	246	182	118	49	2,231
100 < assets ≤1,000	493	579	622	618	611	586	533	384	4,426
1,000 < assets ≤ 10,000	110	177	227	296	371	383	437	433	2,434
10,000 < assets ≤ 100,000	19	23	32	36	51	69	93	113	436
Assets > 100,000	2	2	5	5	7	8	13	27	69
By foreign ownership									
Foreign ownership =0	1,220	1,209	1,221	1,239	1,238	1,161	1,121	932	9,341
0 < foreign ownership ≤ 0.25	20	20	17	16	15	15	14	13	130
0.25 < foreign ownership ≤ 0.50	21	21	20	20	21	20	17	14	154
0.50 < foreign ownership ≤ 0.75	7	7	7	7	6	6	7	5	52
0.75 < foreign ownership ≤ 1	34	36	39	39	41	43	42	46	320

Panel B: total assets (in millions of rubles) of sample Russian banks across year, grouped by location and size

	1999	2000	2001	2002	2003	2004	2005	2006	All years
All observations	1,327,155	2,097,468	2,872,131	3,796,751	5,223,668	6,659,524	9,088,661	13,000,000	44,065,358
(percentage)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
By location:									
Moscow	969,482	1,533,873	2,120,532	2,863,291	3,922,985	5,005,732	6,618,089	9,753,006	32,786,990
(percentage)	(73.05%)	(73.13%)	(73.83%)	(75.41%)	(75.10%)	(75.17%)	(72.82%)	(75.02%)	(74.41%)
St. Petersburg	135,844	197,920	264,609	327,847	448,938	626,540	974,071	1,253,012	4,228,780
(percentage)	(10.24%)	(9.44%)	(9.21%)	(8.63%)	(8.59%)	(9.41%)	(10.72%)	(9.64%)	(9.60%)
Other locations	221,829	365,675	486,990	605,613	851,745	1,027,252	1,496,501	1,993,982	7,049,588
(percentage)	(16.71%)	(17.43%)	(16.96%)	(15.95%)	(16.31%)	(15.43%)	(16.47%)	(15.34%)	(16.00%)
By size (in thousands of rubles)									
Assets ≤10	739	358	332	234	173	97	32	19	1,985
(percentage)	(0.06%)	(0.02%)	(0.01%)	(0.01%)	(0.00%)	(0.00%)	(0.00%)	(0.00%)	(0.00%)
10 < assets ≤ 100	23,987	19,871	16,725	16,358	12,316	9,646	6,389	2,678	107,969
(percentage)	(1.81%)	(0.95%)	(0.58%)	(0.43%)	(0.24%)	(0.14%)	(0.07%)	(0.02%)	(0.25%)
100 < assets ≤ 1,000	160,168	202,286	230,836	242,949	251,378	255,895	241,445	188,732	1,773,689
(percentage)	(12.07%)	(9.64%)	(8.04%)	(6.40%)	(4.81%)	(3.84%)	(2.66%)	(1.45%)	(4.03%)
1,000 < assets ≤ 10,000	294,487	469,479	596,913	841,862	1,146,771	1,159,674	1,275,040	1,387,137	7,171,362
(percentage)	(22.19%)	(22.38%)	(20.78%)	(22.17%)	(21.95%)	(17.41%)	(14.03%)	(10.67%)	(16.27%)
10,000 < assets ≤ 100,000	475,384	742,135	787,827	1,028,172	1,360,807	1,827,787	2,360,128	3,144,146	11,726,386
(percentage)	(35.82%)	(35.38%)	(27.43%)	(27.08%)	(26.05%)	(27.45%)	(25.97%)	(24.19%)	(26.61%)
Assets > 100,000	372,391	663,340	1,239,498	1,667,177	2,452,223	3,406,425	5,205,626	8,277,287	23,283,967
(percentage)	(28.06%)	(31.63%)	(43.16%)	(43.91%)	(46.94%)	(51.15%)	(57.28%)	(63.67%)	(52.84%)
By foreign ownership									
Foreign ownership =0	745,646	1,231,906	1,700,797	2,220,453	3,105,618	3,848,558	5,390,887	7,727,621	41,919,107
(percentage)	(56.18%)	(58.73%)	(59.22%)	(58.48%)	(59.45%)	(57.79%)	(59.31%)	(59.44%)	(95.13%)
0 < foreign ownership ≤ 0.25	392,925	581,848	807,114	1,120,864	1,519,923	2,027,749	2,591,807	3,677,175	1,449,645
(percentage)	(29.61%)	(27.74%)	(28.10%)	(29.52%)	(29.10%)	(30.45%)	(28.52%)	(28.29%)	(3.29%)
0.25 < foreign ownership ≤ 0.50	35,153	73,055	94,559	100,442	186,683	242,839	331,782	85,692	141,490
(percentage)	(2.65%)	(3.48%)	(3.29%)	(2.65%)	(3.57%)	(3.65%)	(3.65%)	(0.66%)	(0.32%)
0.50 < foreign ownership ≤ 0.75	1,551	3,427	4,143	5,485	10,446	16,062	25,095	101,624	18,175
(percentage)	(0.12%)	(0.16%)	(0.14%)	(0.14%)	(0.20%)	(0.24%)	(0.28%)	(0.78%)	(0.04%)
0.75 < foreign ownership ≤ 1	151,879	207,232	265,518	349,507	400,998	524,316	749,090	1,407,888	536,942
(percentage)	(11.44%)	(9.88%)	(9.24%)	(9.21%)	(7.68%)	(7.87%)	(8.24%)	(10.83%)	(1.22%)

Table 3 Summary statistics of firm-level characteristics variables

Panel A of Table 3 presents the summary statistics of pre-tax ROA, total expenses to total assets, volatility of quarterly earnings, nonperforming loans to total assets, net provisions to total assets, foreign ownership, and capital ratio. Panel B of Table 3 displays the summary statistics of the disaggregated components in asset, loan, liability, and deposit portfolios. All financial items are in thousands of rubles and inflation-adjusted to the price level of year 1996.

Panel A: Summary statistics of firm-level characteristics variables						
	Obs	Mean	Median	Std. D.	Min	Max
Pre-tax ROA (pre-tax profit to total assets)	9988	0.023	0.143	0.017	-13.209	1.532
Total expenses/total assets	9988	0.078	0.065	0.066	0.002	0.403
Volatility of quarterly earnings	9703	0.018	0.007	0.131	0.000	11.413
Nonperforming loans/total assets	9988	0.012	0.002	0.041	0.000	0.984
Net provisions/total assets	9965	-0.008	-0.004	0.040	-1.090	1.437
Foreign ownership	9997	0.043	0.000	0.183	0.000	1.000
Capital ratio (total capital to total assets)	9976	0.294	0.230	0.209	0.000	2.235
Panel B: Decomposition of asset, loan, liability, and deposit portfolios						
	Obs	Mean	Median	Std. D.	Min	Max
Asset Portfolios						
Total assets (in thousands of rubles)	9988	4411.179	55027.570	357.786	0.158	3475808
% of assets in government securities	9988	2.59%	7.13%	0.00%	0.00%	88.70%
% of assets in total loans	9988	73.93%	17.86%	77.21%	5.18%	100.00%
% of assets in promissory notes	9988	6.28%	9.05%	2.00%	0.00%	79.96%
% of assets in foreign assets	9988	2.88%	7.13%	0.00%	0.00%	87.83%
% of assets in other assets	9988	14.31%	15.40%	10.99%	0.00%	94.30%
Loan Portfolios:						
Total loans (in thousands of rubles)	9988	3071.333	39786.010	262.628	0.009	2655671
% of loans to other banks	9988	36.41%	26.51%	29.45%	0.00%	100.00%
% of loans to government	9988	0.85%	3.86%	0.00%	0.00%	86.87%
% of loans to firms and entrepreneurs	9988	53.17%	26.12%	57.84%	0.00%	100.00%
% of loans to individuals	9988	9.56%	14.49%	4.00%	0.00%	99.85%
% of loans to foreigners	9988	0.01%	0.04%	0.00%	0.00%	0.96%
Liability Portfolios						
Total liabilities (in thousands of rubles)	9982	3797.528	49540.480	251.352	0.000	3143617
% of liabilities in total deposits	9982	85.29%	17.66%	91.36%	0.00%	100.00%
% of liabilities in non-bond debt securities	9982	10.26%	13.89%	4.61%	0.00%	99.01%
% of liabilities in bond issued	9982	0.16%	2.40%	0.00%	0.00%	98.63%
% of foreign liabilities	9982	0.81%	2.29%	0.06%	0.00%	44.48%
% of other liabilities	9982	3.47%	11.59%	0.46%	0.00%	100.00%
Deposit Portfolios:						
Total deposits (in thousands of rubles)	9961	3281.801	45647.060	210.846	0.000	2930779
% of deposits in correspondent accounts	9961	4.57%	14.50%	0.00%	0.00%	100.00%
% of deposits in interbank account	9961	8.18%	16.66%	0.00%	0.00%	100.00%
% of deposits by government	9961	1.77%	7.06%	0.00%	0.00%	99.50%
% of deposits by firms	9961	62.13%	26.54%	64.30%	0.00%	100.00%
% of deposits by individuals	9961	23.33%	21.67%	17.72%	0.00%	100.00%

Table 4 Summary statistics of economics of diversification measures for asset, loan, liabilities and deposit portfolios

Table 4 presents the summary statistics for profit premium and cost discount measured by economics of diversification for asset, loan, liability and deposit portfolios. The decomposition of each portfolio is defined as in Table 3. Profit premium is defined as the proportional difference in predicted profits between the observed diversified bank and the corresponding hypothetical quasi-focused bank, given the same total output, whereas the hypothetical quasi-focused bank is defined in our paper as a bank which focuses on one product while maintaining the production of other products at the minimal level. Cost discount is defined as the proportional difference in predicted costs between a hypothetical quasi-focused bank and the observed diversified bank.

Panel A: Summary Statistics of Profit Premium						
Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Profit premium of asset diversification	9961	-0.145	-0.110	0.262	-0.619	0.588
--- assets in government securities	9961	-0.220	-0.245	0.236	-0.797	0.517
--- assets in total loans	9961	-0.134	-0.028	0.128	-0.822	0.543
--- assets in promissory notes	9961	-1.181	-0.717	0.170	-1.449	0.221
--- assets in foreign assets	9961	-0.140	-0.148	0.197	-1.177	0.538
--- assets in other assets	9961	-0.115	-0.198	0.494	-1.068	0.237
Profit premium of loan diversification	9555	-0.204	-0.189	0.268	-0.798	0.254
--- loans to other banks	9555	-0.264	-0.499	0.206	-0.934	0.620
--- loans to government	9555	-0.230	-0.201	0.158	-0.705	0.987
--- loans to firms and entrepreneurs	9555	-0.014	-0.032	0.106	-0.254	0.579
--- loans to individuals	9555	-0.413	-0.400	0.134	-0.399	0.883
--- loans to foreigners	9555	-0.374	-0.332	0.159	-0.334	0.064
Profit premium of liability diversification	9961	-0.091	-0.008	0.127	-0.334	0.301
--- liabilities in total deposits	9961	-0.092	-0.056	0.112	-0.218	0.933
--- liabilities in non-bond debt securities	9961	-0.136	-0.138	0.160	-0.817	0.840
--- liabilities in bond issued	9961	-0.059	-0.505	0.349	-0.732	0.649
--- foreign liabilities	9961	-0.095	-0.083	0.151	-0.174	0.693
--- other liabilities	9961	-0.068	-0.075	0.364	-0.140	0.546
Profit premium of deposit diversification	9961	-0.379	-0.345	0.322	-0.795	0.301
--- deposits in correspondent accounts	9961	-0.271	-0.218	0.327	-0.750	0.779
--- deposits in interbank account	9961	-0.330	-0.355	0.140	-0.647	0.535
--- deposits by government	9961	-0.343	-0.364	0.129	-0.623	0.017
--- deposits by firms	9961	-0.409	-0.461	0.180	-0.536	0.304
--- deposits by individuals	9961	-0.350	-0.295	0.174	-0.960	0.665
Panel B: Summary Statistics of Cost Discount						
Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Cost discount of asset diversification	9961	0.215	0.203	0.139	-0.537	0.651
--- assets in government securities	9961	0.048	0.046	0.033	-0.232	1.130
--- assets in total loans	9961	0.186	0.177	0.069	-0.280	1.669
--- assets in promissory notes	9961	0.252	0.283	0.142	-0.389	1.196
--- assets in foreign assets	9961	0.370	0.384	0.103	-0.790	1.022
--- assets in other assets	9961	0.208	0.200	0.169	-1.300	1.981
Cost discount of loan diversification	9555	0.006	0.008	0.025	-0.067	0.064
--- loans to other banks	9555	0.027	0.027	0.035	-0.097	0.956
--- loans to government	9555	0.003	0.001	0.003	-1.866	1.110
--- loans to firms and entrepreneurs	9555	0.017	0.013	0.032	-0.130	0.828
--- loans to individuals	9555	0.002	0.006	0.008	-0.383	0.962
--- loans to foreigners	9555	0.008	0.008	0.003	-1.860	0.021
Cost discount of liability diversification	9961	0.046	0.048	0.067	-0.151	0.238
--- liabilities in total deposits	9961	0.039	0.039	0.086	-0.528	1.890
--- liabilities in non-bond debt securities	9961	0.048	0.050	0.034	-0.425	1.121
--- liabilities in bond issued	9961	0.065	0.096	0.023	-1.626	1.091
--- foreign liabilities	9961	0.037	0.036	0.011	-0.111	1.695
--- other liabilities	9961	0.021	0.023	0.012	-0.661	1.898
Cost discount of deposit diversification	9961	0.014	0.011	0.031	-0.101	0.092
--- deposits in correspondent accounts	9961	0.015	0.016	0.090	-0.124	0.585
--- deposits in interbank account	9961	0.002	0.008	0.057	-0.330	0.348
--- deposits by government	9961	0.016	0.017	0.055	-0.368	0.152
--- deposits by firms	9961	0.015	0.009	0.031	-0.234	0.235
--- deposits by individuals	9961	0.010	0.012	0.062	-0.494	0.218

Table 5 OLS regressions of economies of diversification (profit premium) on firm-level characteristics

Table 5 presents the ordinary least squares (OLS) regressions of profit economies of diversification (i.e., profit premium) on risk (proxied by volatility of quarterly bank earnings), foreign ownership (a continuous variable representing the ratio of total shares owned by foreign individuals and/or institutional to total shares of the bank), their quadratic terms as well as interaction terms, and control variables, including a location dummy '*Moscow and St. Petersburg*' (equal to 1 if the bank's headquarters are in Moscow or St. Petersburg, 0 otherwise), capital ratio (total capital to total assets), ln(assets) (natural log of total assets of the bank, where assets are denominated in thousands of rubles). Year dummies for 2000 to 2007 are included in all regressions. The profit premiums in columns 1 – 3, 4 – 6, 7 – 9, 10 – 12 are calculated *based* on decomposition of asset, loan, liability and deposit portfolios, respectively, and these decompositions follow the definitions for the previous tables. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Dependent Variable: Profit Premium (Economies of Diversification in terms of pre-tax profits)											
	Asset Diversification			Loan Diversification			Liability Diversification			Deposit Diversification		
Constant	-0.244***	-0.318***	-0.322***	-0.115***	-0.323***	-0.324***	-0.205***	-0.278***	-0.279***	-0.477***	-0.479***	-0.480***
	[19.42]	[20.39]	[20.62]	[8.42]	[19.15]	[19.15]	[34.79]	[37.89]	[37.99]	[33.74]	[33.71]	[33.60]
Volatility	0.157***	0.162***	0.529***	0.179***	0.180***	0.341***	0.101***	0.102***	0.199***	0.199***	0.204***	0.354***
	[3.39]	[3.49]	[5.57]	[3.55]	[3.57]	[3.32]	[4.63]	[4.69]	[4.46]	[3.81]	[3.91]	[3.31]
Volatility^2			-0.259***			-0.114*			-0.068**			-0.106
			[4.43]			[1.81]			[2.48]			[1.61]
Foreign, lagged	0.169***	0.180***	-0.042	0.102***	0.098***	-0.289***	0.013*	-0.009	0.009	0.080***	-0.068***	-0.232***
	[11.33]	[10.93]	[0.62]	[6.32]	[5.52]	[3.89]	[1.89]	[1.18]	[0.29]	[4.75]	[3.67]	[3.01]
(Foreign, lagged)^2			0.245***			0.428***			0.021			0.181**
			[3.32]			[5.37]			[0.60]			[2.18]
(Foreign,		-0.411*	-0.554**		-0.176*	-0.032**		-0.151**	-0.167*		-0.378**	-0.457*
lagged)×Volatility		[1.77]	[2.11]		[1.69]	[2.11]		[2.23]	[1.86]		[2.29]	[1.95]
Moscow and St.	0.085***	0.084***	0.084***	0.082***	0.081***	0.082***	0.029***	0.030***	0.030***	0.144***	0.143***	0.143***
Petersburg	[14.11]	[13.95]	[14.01]	[12.65]	[12.46]	[12.57]	[10.43]	[10.45]	[10.43]	[21.32]	[21.06]	[21.09]
Capital ratio	0.041***	0.040***	0.030**	0.036**	0.033**	0.027*	0.254***	0.254***	0.252***	0.680***	0.681***	0.676***
	[2.81]	[2.71]	[2.01]	[2.25]	[2.07]	[1.70]	[36.88]	[36.64]	[35.96]	[40.83]	[40.61]	[39.96]
ln(assets)	0.012***	0.012***	0.013***	-0.010***	-0.010***	-0.009***	0.009***	0.009***	0.009***	-0.009***	-0.009***	-0.009***
	[7.28]	[7.23]	[7.50]	[5.49]	[5.25]	[5.17]	[11.60]	[11.60]	[11.75]	[5.02]	[4.77]	[4.66]
year dummies	*Yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8296	8242	8242	8296	8242	8242	8296	8242	8242	8290	8236	8236
F-statistics	63.19	57.67	51.8	70.39	64.22	57.54	184.25	168.02	144.57	335.54	304.88	262.03
R-square	0.08	0.08	0.08	0.09	0.09	0.09	0.20	0.20	0.20	0.31	0.31	0.31
Adj R-square	0.08	0.08	0.08	0.08	0.08	0.09	0.20	0.20	0.20	0.31	0.31	0.31

Table 6 OLS regressions of economies of diversification (cost discount) on firm-level characteristics

Table 6 presents the ordinary least squares (OLS) regressions of cost economies of diversification (i.e., cost discount) on risk (proxied by volatility of quarterly bank earnings), foreign ownership (a continuous variable representing the ratio of total shares owned by foreign individuals and/or institutions to total shares of the bank), , their quadratic terms as well as interaction terms, and control variables including a location dummy '*Moscow and St. Petersburg*' (equals to 1 if the bank's headquarter is located in Moscow or St. Petersburg, 0 otherwise), capital ratio (the ratio of total capital to total assets), ln(assets) (natural log of total assets of the bank, where assets are denominated in thousands of rubles). Year dummies of 2000 to 2007 are included in all regressions. The cost discounts in columns 1-3, 4-6, 7-9, 10-12 are calculated based on decomposition of asset, loan, liability and deposit portfolios, respectively, and these decompositions follow the definitions as described in the previous tables. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Dependent Variable: Cost Discount (Economies of Diversification in terms of total expenses)											
	Asset Diversification			Loan Diversification			Liability Diversification			Deposit Diversification		
Constant	-0.086***	0.039***	0.038***	-0.014***	-0.027***	-0.027***	0.088***	0.103***	0.102***	-0.002	0.014***	0.014***
	[14.18]	[5.17]	[5.06]	[10.84]	[17.16]	[17.01]	[27.11]	[25.49]	[25.30]	[1.32]	[7.49]	[7.40]
Volatility	0.087***	0.083***	0.177***	0.013***	0.014***	0.005	0.018**	0.018**	0.042*	0.002**	0.002**	0.004**
	[3.92]	[3.74]	[3.89]	[2.82]	[2.93]	[0.54]	[2.51]	[2.46]	[1.73]	[2.36]	[2.40]	[2.35]
Volatility^2			-0.066**			-0.006**			-0.017**			-0.004***
			[2.36]			[2.02]			[2.15]			[2.63]
Foreign, lagged	0.009**	0.003**	-0.109***	0.002**	0.001***	-0.010	0.045***	0.044***	0.068***	0.024***	0.024***	0.031***
	[2.28]	[2.33]	[3.33]	[2.32]	[2.57]	[1.48]	[11.64]	[10.40]	[3.81]	[13.18]	[11.84]	[3.70]
(Foreign, lagged)^2			0.118***			0.010**			0.026**			0.008*
			[3.34]			[2.39]			[2.36]			[1.89]
(Foreign,		0.465***	0.414***		0.038**	0.038**		0.025**	0.026**		0.002**	0.003**
lagged)×Volatility		[3.72]	[3.30]		[2.44]	[2.46]		[2.38]	[2.39]		[2.07]	[2.09]
Moscow and St.	0.004	0.003	0.003	0.001*	0.001*	0.001*	-0.007***	-0.008***	-0.008***	-0.006***	-0.006***	-0.006***
Petersburg	[1.25]	[1.02]	[1.07]	[1.89]	[1.89]	[1.91]	[4.83]	[4.89]	[4.92]	[8.71]	[8.58]	[8.60]
Capital ratio	-0.043***	-0.044***	-0.047***	0.020***	0.019***	0.020***	-0.108***	-0.108***	-0.108***	-0.015***	-0.015***	-0.016***
	[6.13]	[6.27]	[6.60]	[13.29]	[13.10]	[13.09]	[28.47]	[28.28]	[28.14]	[8.55]	[8.63]	[8.62]
ln(assets)	-0.033***	-0.033***	-0.032***	0.003***	0.003***	0.003***	-0.002***	-0.002***	-0.002***	0.003***	0.003***	0.003***
	[40.73]	[40.56]	[40.36]	[16.23]	[16.36]	[16.24]	[5.23]	[5.17]	[5.07]	[13.15]	[13.03]	[13.05]
year dummies	*Yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8296	8242	8242	8296	8242	8242	8296	8242	8242	8296	8242	8242
F-statistics	224.83	206.76	178.74	50.98	46.98	40.48	102.51	93.27	80.18	107.43	97.95	84.03
R-square	0.23	0.23	0.23	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.12	0.13
Adj R-square	0.23	0.23	0.23	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.12	0.12

Table 7 Summary statistics of Focus Indices of asset, loan, liability, and deposit portfolios

Table 7 presents the summary statistics of Focus Indices, and decompositions of asset, loan, liability, and deposit portfolios by location and by size. The definitions of Focus Indices are described in equation (7), and the definitions of asset, loan, liability and deposit portfolio decomposition remain as in previous tables.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
All observations						
Asset Focus Index	9988	0.647	0.639	0.172	0.226	1.000
Loan Focus Index	9988	0.579	0.538	0.168	0.276	1.000
Liability Focus Index	9982	0.804	0.846	0.171	0.307	1.000
Deposit Focus Index	9926	0.621	0.566	0.204	0.223	1.000
Summary statistics of Focus Indices by location:						
Banks with headquarters in Moscow						
Asset Focus Index	3229	0.622	0.607	0.185	0.226	1.000
Loan Focus Index	3229	0.584	0.548	0.170	0.294	1.000
Liability Focus Index	3226	0.772	0.784	0.175	0.307	1.000
Deposit Focus Index	3206	0.613	0.567	0.210	0.246	1.000
Banks with headquarters in St. Petersburg						
Asset Focus Index	238	0.625	0.615	0.177	0.316	1.000
Loan Focus Index	238	0.568	0.533	0.137	0.310	0.976
Liability Focus Index	238	0.730	0.733	0.154	0.402	0.994
Deposit Focus Index	238	0.568	0.522	0.198	0.248	1.000
Banks with headquarters in other cities/regions						
Asset Focus Index	6521	0.659	0.651	0.163	0.227	1.000
Loan Focus Index	6521	0.578	0.533	0.168	0.276	1.000
Liability Focus Index	6518	0.823	0.875	0.167	0.320	1.000
Deposit Focus Index	6482	0.627	0.568	0.201	0.223	1.000
Summary statistics of Focus Indices by size:						
Banks with total assets less than 10,000 rubles						
Asset Focus Index	401	0.686	0.651	0.175	0.354	1.000
Loan Focus Index	401	0.689	0.613	0.235	0.320	1.000
Liability Focus Index	399	0.873	0.955	0.158	0.376	1.000
Deposit Focus Index	377	0.826	0.932	0.201	0.340	1.000
Banks with total assets between 10,000 and 100,000 rubles						
Asset Focus Index	2231	0.668	0.658	0.167	0.265	1.000
Loan Focus Index	2231	0.593	0.539	0.182	0.276	1.000
Liability Focus Index	2229	0.837	0.921	0.175	0.335	1.000
Deposit Focus Index	2204	0.711	0.696	0.205	0.251	1.000
Banks with total assets between 100,000 and 1,000,000 rubles						
Asset Focus Index	4426	0.657	0.653	0.170	0.226	1.000
Loan Focus Index	4426	0.565	0.527	0.159	0.294	1.000
Liability Focus Index	4424	0.806	0.846	0.169	0.320	1.000
Deposit Focus Index	4415	0.618	0.568	0.193	0.247	1.000
Banks with total assets between 1,000,000 and 10,000,000 rubles						
Asset Focus Index	2434	0.617	0.609	0.172	0.227	1.000
Loan Focus Index	2434	0.573	0.549	0.150	0.325	1.000
Liability Focus Index	2434	0.776	0.801	0.165	0.329	1.000
Deposit Focus Index	2434	0.541	0.505	0.169	0.247	1.000
Banks with total assets between 10,000,000 and 100,000,000 rubles						
Asset Focus Index	436	0.565	0.547	0.167	0.262	1.000
Loan Focus Index	436	0.590	0.570	0.159	0.364	1.000
Liability Focus Index	436	0.723	0.710	0.160	0.307	1.000
Deposit Focus Index	436	0.488	0.452	0.164	0.223	1.000

Table 8 OLS regressions of pre-tax ROA on focus indices, risk, and foreign ownership

Table 8 presents the ordinary least squares (OLS) regressions of pre-tax return on assets on Focus Indices (as defined in Table 7), risk (proxied by volatility of quarterly bank earnings) and foreign ownership (a continuous variable representing the ratio of total shares owned by foreign individuals and/or institutions to total shares of the bank), their quadratic terms as well as their interaction terms, and control variables including a location dummy '*Moscow and St. Petersburg*' (equals 1 if the bank's headquarters are in Moscow or St. Petersburg, 0 otherwise), capital ratio (total capital to total assets), ln(assets) (natural log of total assets of the bank, where assets are denominated in thousands of rubles). Year dummies for 2000 to 2007 are included in all regressions. The Focus Index in the first three columns represents the asset Focus Index, and the same Focus Index is also used to construct the interaction terms between Focus Indices and other variables. The Focus Indices in columns 4-6, 7-9, and 10-12 represent loan Focus Index, liability Focus Index, and deposit Focus Index. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Pre-tax Profit/Total Assets											
	Asset Diversification			Loan Diversification			Liability Diversification			Deposit Diversification		
Constant	0.021***	0.017**	0.016**	0.019***	0.008	0.007	0.016***	0.014	0.014	0.020***	0.036***	0.037***
	[7.07]	[2.41]	[2.27]	[5.28]	[1.35]	[1.24]	[3.73]	[1.43]	[1.37]	[7.27]	[6.25]	[6.38]
Volatility	0.205***	0.482***	0.469***	0.197***	0.462***	0.448***	0.205***	0.478***	0.463***	0.205***	0.477***	0.453***
	[24.21]	[28.21]	[27.06]	[23.67]	[27.31]	[26.06]	[24.26]	[27.99]	[26.75]	[24.16]	[28.02]	[26.18]
Volatility^2		-0.198***	-0.192***		-0.188***	-0.182***		-0.196***	-0.189***		-0.196***	-0.186***
		[18.93]	[18.27]		[18.14]	[17.44]		[18.72]	[17.93]		[18.81]	[17.69]
Focus Index, lagged	0.002**	0.003	0.005	0.003**	0.025	0.025	0.006**	-0.004	-0.003	0.001**	-0.062***	-0.067***
	[2.54]	[0.15]	[0.25]	[2.10]	[1.57]	[1.60]	[2.10]	[0.14]	[0.13]	[2.12]	[3.55]	[3.80]
(Focus Index, lagged)^2		-0.003**	-0.005**		-0.017**	-0.018**		-0.006**	-0.006**		-0.045***	-0.046***
		[2.18]	[2.37]		[2.47]	[2.56]		[2.36]	[2.31]		[3.31]	[3.36]
Foreign, lagged	0.004**	-0.001	-0.137***	0.001**	-0.025*	-0.061	0.003**	-0.022	-0.022	0.004**	-0.028**	-0.220***
	[2.49]	[0.07]	[2.62]	[2.49]	[1.71]	[1.60]	[2.22]	[1.30]	[0.35]	[2.51]	[2.00]	[5.33]
(Foreign, lagged)^2		0.002**	0.147***		0.023*	0.066		0.004**	0.003**		0.004**	0.208***
		[2.19]	[2.69]		[1.77]	[1.59]		[2.30]	[2.04]		[2.28]	[4.72]
(Focus Index, lagged)×Volatility		0.028***	0.082***		0.023***	0.085***		0.042***	0.103***		0.037***	0.128***
		[2.93]	[4.27]		[2.66]	[4.51]		[4.07]	[5.49]		[3.98]	[6.30]
(Focus Index, lagged)×Volatility^2			-0.040***			-0.043***			-0.053***			-0.063***
			[3.49]			[3.86]			[4.33]			[5.31]
(Focus Index, lagged)×(Foreign, lagged)		0.001**	0.218***		0.004**	0.070**		0.030*	0.029		0.051***	0.393***
		[2.03]	[2.66]		[2.27]	[2.05]		[1.81]	[1.37]		[3.80]	[5.52]
(Focus Index, lagged)×(Foreign, lagged)^2			-0.241***			-0.081**			-0.005**			-0.379***
			[2.78]			[2.13]			[2.06]			[5.06]
(Focus Index, lagged)×Volatility×(Foreign, lagged)			0.189***			0.074**			0.129**			0.105*
			[2.64]			[2.15]			[2.29]			[1.69]
Moscow and St. Petersburg	-0.004***	-0.004***	-0.004***	-0.005***	-0.005***	-0.005***	-0.004***	-0.004***	-0.004***	-0.004***	-0.005***	-0.005***
	[3.91]	[4.03]	[4.08]	[4.35]	[4.40]	[4.46]	[3.72]	[3.97]	[4.07]	[3.89]	[4.22]	[4.37]
Capital ratio	0.010***	0.004	0.004	0.011***	0.005*	0.004*	0.011***	0.004	0.004	0.010***	0.004	0.004*
	[3.84]	[1.37]	[1.42]	[4.12]	[1.73]	[1.69]	[3.94]	[1.44]	[1.37]	[3.78]	[1.48]	[1.66]
ln(assets)	0.001	0.001*	0.001**	0.001	0.001**	0.001***	0.001	0.001**	0.001***	0.001	0.001**	0.001***
	[0.22]	[1.84]	[2.20]	[1.10]	[2.45]	[2.74]	[0.81]	[2.46]	[2.76]	[0.29]	[2.35]	[2.93]
year dummies	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8296	8242	8242	8248	8212	8212	8290	8241	8241	8296	8242	8242
F-statistics	56.26	63.88	55.96	54.66	60.92	52.88	56.57	65.07	56.95	56.24	66.17	59.88
R-square	0.08	0.12	0.12	0.07	0.11	0.11	0.08	0.12	0.12	0.08	0.12	0.13
Adj R-square	0.07	0.11	0.12	0.07	0.11	0.11	0.07	0.12	0.12	0.07	0.12	0.13

Table 9 OLS regressions of total expenses/total assets on focus indices, risk, and foreign ownership

Table 9 presents ordinary least squares (OLS) regressions of total expenses/total assets on Focus Indices (defined as in Table 7), risk (proxied by volatility of quarterly bank earnings) and foreign ownership (a continuous variable representing the ratio of total shares owned by foreign individuals and/or institutional to total shares of the bank), their quadratic terms as well as their interaction terms, and control variables including a location dummy '*Moscow and St. Petersburg*' (equal to 1 if the bank's headquarters are in Moscow or St. Petersburg, 0 otherwise), capital ratio (total capital to total assets), ln(assets) (natural log of total assets of the bank, where assets are denominated in thousands of rubles). Year dummies for 2000 to 2007 are included in all regressions. The Focus Index in the first three columns represents the asset Focus Index, and the same Focus Index is used to construct the interaction terms between Focus Indices and other variables. The Focus Indices in columns 4-6, 7-9, and 10-12 represent loan Focus Index, liability Focus Index, and deposit Focus Index. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Total Expenses/Total Assets											
	Asset Diversification			Loan Diversification			Liability Diversification			Deposit Diversification		
Constant	0.146***	0.080***	0.081***	0.188***	0.149***	0.150***	0.157***	0.055***	0.056***	0.149***	0.128***	0.128***
	[39.39]	[9.07]	[9.17]	[42.45]	[19.67]	[19.75]	[29.85]	[4.34]	[4.38]	[43.17]	[17.34]	[17.20]
Volatility	0.064***	0.245***	0.252***	0.069***	0.238***	0.240***	0.060***	0.240***	0.249***	0.069***	0.239***	0.244***
	[6.01]	[11.34]	[11.46]	[6.64]	[11.20]	[11.11]	[5.67]	[11.10]	[11.36]	[6.54]	[11.04]	[11.04]
Volatility^2		-0.125***	-0.128***		-0.118***	-0.118***		-0.124***	-0.128***		-0.119***	-0.121***
		[9.42]	[9.54]		[9.07]	[9.04]		[9.37]	[9.60]		[9.01]	[9.05]
Focus Index, lagged	-0.021***	0.169***	0.167***	-0.067***	0.049**	0.047**	-0.026***	0.260***	0.260***	-0.032***	0.020	0.023
	[5.69]	[6.99]	[6.91]	[21.35]	[2.46]	[2.33]	[7.15]	[7.60]	[7.62]	[8.55]	[0.91]	[1.04]
(Focus Index, lagged)^2		-0.142***	-0.140***		-0.087***	-0.085***		-0.190***	-0.190***		-0.040**	-0.042**
		[7.84]	[7.69]		[5.92]	[5.76]		[8.33]	[8.32]		[2.34]	[2.41]
Foreign, lagged	0.009**	0.047**	0.160**	0.010***	0.021	-0.045	0.013***	0.065***	0.101	0.010***	0.042**	0.092*
	[2.53]	[2.33]	[2.40]	[2.91]	[1.16]	[0.93]	[3.67]	[3.03]	[1.26]	[3.08]	[2.38]	[1.75]
(Foreign, lagged)^2		-0.045***	-0.164**		-0.038**	-0.039*		-0.035**	-0.075*		-0.047***	-0.099*
		[2.68]	[2.36]		[2.30]	[1.75]		[2.05]	[1.85]		[2.79]	[1.75]
(Focus Index, lagged)×Volatility		-0.021*	-0.070***		-0.005**	-0.027**		-0.024*	-0.086***		-0.001**	-0.038**
		[1.76]	[2.83]		[2.43]	[2.14]		[1.88]	[3.59]		[2.12]	[2.48]
(Focus Index, lagged)×Volatility^2			0.032**			0.02**			0.045***			0.024*
			[2.17]			[2.40]			[2.89]			[1.69]
(Focus Index, lagged)×(Foreign, lagged)		0.002**	-0.180*		0.035**	0.154*		0.025**	-0.072		0.016**	-0.077
		[2.11]	[1.74]		[1.98]	[1.85]		[2.20]	[0.72]		[1.93]	[0.85]
(Focus Index, lagged)×(Foreign, lagged)^2			0.192*			0.142***			0.048**			0.091*
			[1.75]			[2.57]			[2.44]			[1.96]
(Focus Index, lagged)× Volatility×(Foreign, lagged)			0.134*			0.142*			0.150**			0.145*
			[1.77]			[1.74]			[2.10]			[1.77]
Moscow and St. Petersburg	-0.020***	-0.018***	-0.018***	-0.016***	-0.015***	-0.015***	-0.020***	-0.019***	-0.019***	-0.019***	-0.019***	-0.019***
	[14.25]	[13.47]	[13.49]	[11.76]	[11.42]	[11.46]	[14.51]	[14.26]	[14.24]	[13.91]	[13.74]	[13.73]
Capital ratio	-0.011***	-0.012***	-0.012***	-0.012***	-0.016***	-0.016***	-0.014***	-0.017***	-0.016***	-0.008**	-0.013***	-0.013***
	[3.17]	[3.40]	[3.40]	[3.57]	[4.81]	[4.72]	[4.22]	[4.89]	[4.79]	[2.38]	[3.71]	[3.68]
ln(assets)	-0.007***	-0.007***	-0.007***	-0.010***	-0.010***	-0.010***	-0.008***	-0.008***	-0.008***	-0.007***	-0.007***	-0.007***
	[18.58]	[17.58]	[17.73]	[24.94]	[24.14]	[24.10]	[19.34]	[19.83]	[20.00]	[18.02]	[17.65]	[17.73]
year dummies	*yes*	*yes*	*Yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8296	8242	8242	8248	8212	8212	8290	8241	8241	8296	8242	8242
F-statistics	96.16	77.59	66.46	136.16	103.95	88.74	97.92	79.42	68.13	100.02	76.26	65.11
R-square	0.12	0.14	0.14	0.17	0.18	0.18	0.12	0.14	0.14	0.13	0.14	0.14
Adj R-square	0.12	0.14	0.14	0.16	0.18	0.18	0.12	0.14	0.14	0.13	0.13	0.13

Table 10 Seemingly unrelated regression (SUR) I: Effects of focus on pre-tax ROA with correction of endogeneity of diversification choices

This table presents the results for the test of whether the focus-performance relationship found in Table 8 (i.e., the OLS regressions of pre-tax ROA) are subject to the endogenous choice of diversification. A simultaneous equations system is specified to correct for the endogeneity of focus measures, i.e., Focus Indices. The specification is a simultaneous system estimated by seemingly unrelated regressions (SUR) of equations (a) and (b), as specified in equations 16 and 17. Panel A of this table presents the SUR regressions of pre-tax ROA on asset Focus Index (leftmost three paired columns) and loan Focus Index (rightmost three paired columns). Panel B of Table 10 presents the SUR regressions of pre-tax ROA on liability Focus Index (leftmost three paired columns) and deposit Focus Index (rightmost three paired columns). The definitions of variables are the same as in the previous tables. Year dummies for 2000 to 2007 are included in all regressions. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

Panel A: Pre-tax Return on Assets on Asset Diversification and Loan Diversification

	(1)		(2)		(3)		(4)		(5)		(6)	
	ROA	A-FI	ROA	A-FI	ROA	A-FI	ROA	L-FI	ROA	L-FI	ROA	L-FI
Constant	0.020***	0.716***	0.018***	0.716***	0.019***	0.001	0.024***	0.479***	0.040***	0.476***	0.043***	0.476***
	[7.90]	[66.96]	[2.82]	[66.70]	[3.01]	[0.01]	[10.35]	[46.25]	[7.26]	[45.84]	[7.66]	[45.84]
Volatility	0.204***		0.479***		0.466***		0.203***		0.473***		0.449***	
	[24.16]		[28.20]		[27.01]		[24.04]		[27.93]		[26.04]	
Volatility^2			-0.197***		-0.191***				-0.195***		-0.184***	
			[18.86]		[18.19]				[18.71]		[17.56]	
Volatility, lagged		-0.035		-0.095*		-0.100*		0.102***		0.260***		0.264***
		[1.21]		[1.75]		[1.85]		[3.64]		[4.97]		[5.05]
(Volatility, lagged)^2				0.045		0.050				-0.126***		-0.129***
				[1.24]		[1.35]				[3.56]		[3.64]
Focus Index, lagged	0.005**		0.005		0.006		0.002***		-0.059***		-0.062***	
	[1.98]		[0.26]		[0.32]		[2.63]		[3.39]		[3.57]	
(Focus Index, lagged)^2			-0.001**		-0.003**				-0.041***		-0.040***	
			[2.06]		[2.21]				[3.02]		[2.98]	
Foreign, lagged	0.004*	-0.044***	0.001	0.077	-0.130**	0.077	0.004*	0.033***	-0.027*	-0.122***	-0.215***	-0.122***
	[1.92]	[4.29]	[0.02]	[1.64]	[2.48]	[1.64]	[1.75]	[3.33]	[1.96]	[2.69]	[5.23]	[2.69]
(Foreign, lagged)^2			0.003**	-0.132***	0.141**	-0.132***			0.003**	0.168***	0.205***	0.168***
			[2.23]	[2.61]	[2.57]	[2.61]			[2.23]	[3.44]	[4.65]	[3.44]
(Focus Index, lagged)×Volatility			0.026***		0.078***				0.037***		0.125***	
			[2.78]		[4.04]				[4.00]		[6.18]	
(Focus Index, lagged) ×Volatility^2					-0.038***						-0.061***	
					[3.31]						[5.16]	
(Focus Index, lagged) ×(Foreign, lagged)			0.001**		0.207**				0.050***		0.385***	
			[2.07]		[2.53]				[3.77]		[5.42]	
(Focus Index, lagged) ×(Foreign, lagged)^2					-0.229***						-0.371***	
					[2.65]						[4.96]	
(Focus Index, lagged)× Volatility× (Foreign, lagged)					0.191***						0.107*	
					[2.68]						[1.67]	
Capital Ratio	0.010***	0.106***	0.001	0.108***	0.001	0.108***	0.011***	0.157***	0.002	0.154***	0.002	0.154***
	[4.07]	[10.51]	[0.47]	[10.64]	[0.38]	[10.65]	[4.41]	[16.04]	[0.74]	[15.76]	[0.72]	[15.75]
Moscow and St. Petersburg	-0.004***	-0.022***	-0.004***	-0.022***	-0.003***	-0.022***	-0.004***	0.001	-0.004***	0.001	-0.004***	0.001
	[3.88]	[5.39]	[3.48]	[5.43]	[3.41]	[5.44]	[4.01]	[0.33]	[3.60]	[0.36]	[3.53]	[0.36]
ln(assets)		-0.011***		-0.011***		-0.011***		0.003***		0.004***		0.003***
		[9.70]		[9.72]		[9.73]		[2.89]		[3.15]		[3.14]
year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	Yes
Observations	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242
R^2 for Equation 1	0.08		0.12		0.12		0.08		0.12		0.13	
R^2 for Equation 2		0.07		0.07		0.07		0.05		0.05		0.05
Breusch-Pagan Chi^2	9.36		7.77		7.37		1.69		1.82		2.35	

	Panel B: Pre-tax Return on Assets on Liability Diversification and Deposit Diversification											
	(1)		(2)		(3)		(4)		(5)		(6)	
	ROA	B-FI	ROA	B-FI	ROA	B-FI	ROA	D-FI	ROA	D-FI	ROA	D-FI
Constant	0.017***	0.001	0.019*	0.001	0.017*	0.001	0.021***	0.001	0.015***	0.895***	0.016***	0.001
	[5.84]	[0.01]	[1.88]	[0.01]	[1.77]	[0.01]	[10.05]	[0.01]	[2.93]	[75.10]	[2.98]	[0.01]
Volatility	0.204***		0.475***		0.460***		0.197***		0.461***		0.447***	
	[24.17]		[27.91]		[26.66]		[23.58]		[27.27]		[26.00]	
Volatility^2			-0.194***		-0.188***				-0.187***		-0.181***	
			[18.62]		[17.83]				[18.09]		[17.38]	
Volatility, lagged		0.006		-0.083		-0.083		0.132***		0.188***		0.186***
		[0.21]		[1.58]		[1.57]		[4.05]		[3.07]		[3.04]
(Volatility, lagged)^2				0.070**		0.070**				-0.047		-0.046
				[1.97]		[1.96]				[1.15]		[1.12]
Focus Index, lagged	0.006**		0.004		0.005		0.003**		0.021		0.021	
	[2.27]		[0.13]		[0.19]		[2.43]		[1.35]		[1.34]	
(Focus Index, lagged)^2			-0.001**		-0.002**				-0.015**		-0.016**	
			[2.00]		[2.09]				[2.28]		[2.38]	
Foreign, lagged	0.004**	0.128***	-0.023	0.024	-0.021	0.024	0.002*	0.008	-0.024*	-0.220***	-0.057	-0.220***
	[2.32]	[13.01]	[1.35]	[0.52]	[0.33]	[0.52]	[1.65]	[0.72]	[1.66]	[4.20]	[1.49]	[4.20]
(Foreign, lagged)2			0.003**	0.116**	0.004**	0.116**			0.023*	0.249***	0.062**	0.249***
			[2.26]	[2.40]	[2.06]	[2.39]			[1.81]	[4.44]	[2.50]	[4.44]
(Focus Index, lagged)			0.040***		0.099***				0.023***		0.082***	
×Volatility			[3.96]		[5.28]				[2.60]		[4.34]	
(Focus Index, lagged)					-0.051***						-0.041***	
×Volatility^2					[4.15]						[3.69]	
(Focus Index, lagged)			0.032*		0.028**				0.003**		0.062	
×(Foreign, lagged)			[1.92]		[2.36]				[2.24]		[0.95]	
(Focus Index, lagged)					-0.002**						-0.073**	
×(Foreign, lagged)^2					[2.03]						[2.02]	
(Focus Index, lagged)×					0.131**						0.073**	
Volatility× (Foreign, lagged)					[2.33]						[2.14]	
Capital Ratio	0.010***	-0.105***	0.001	-0.105***	0.001	-0.105***	0.010***	-0.001	0.002	-0.002	0.002	-0.002
	[4.27]	[10.78]	[0.55]	[10.71]	[0.36]	[10.71]	[4.12]	[0.05]	[0.84]	[0.18]	[0.71]	[0.18]
Moscow and St. Petersburg	-0.004***	-0.037***	-0.003***	-0.037***	-0.003***	-0.037***	-0.004***	0.048***	-0.004***	0.048***	-0.004***	0.048***
	[3.58]	[9.30]	[3.37]	[9.23]	[3.37]	[9.24]	[4.20]	[10.39]	[3.74]	[10.46]	[3.69]	[10.46]
ln(assets)		-0.029***		-0.029***		-0.029***		-0.046***		-0.046***		-0.046***
		[26.13]		[26.24]		[26.24]		[36.08]		[35.91]		[35.92]
year dummies												
Observations	8241	8241	8241	8241	8241	8241	8206	8206	8206	8206	8206	8206
R^2 for Equation 1	0.08		0.12		0.12		0.07		0.11		0.11	
R^2 for Equation 2		0.14		0.14		0.14		0.18		0.18		0.18
Breusch-Pagan Chi^2	0.06		0.05		0.04		0.57		0.74		0.44	

Table 11 Seemingly unrelated regression (SUR) II: Effects of focus on total expenses/total assets with correction of endogeneity of diversification choices

This table presents the results for the test of whether the focus-performance relationship found in Table 9 (i.e., the OLS regressions of total expenses/total assets) are subject to the endogenous choice of diversification. A simultaneous equations system is specified to correct for the endogeneity of focus measures, i.e., Focus Indices. The specification is a simultaneous system estimated by seemingly unrelated regressions (SUR) of equations (a) and (b) as specified in equations 16 and 17 and replacing the dependent variable by the cost ratio. Panel A of this table presents the SUR regressions of total expenses/total assets on asset Focus Index (leftmost three paired columns) and loan Focus Index (rightmost three paired columns). Panel B of Table 10 presents the SUR regressions of total expenses/total assets on liability Focus Index (leftmost three paired columns) and deposit Focus Index (rightmost three paired columns). The definitions of variables are same as in the previous tables. Year dummies for 2000 to 2007 are included in all regressions. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Panel A: Total Expenses/Total Assets on Asset Diversification and Loan Diversification											
	(1)		(2)		(3)		(4)		(5)		(6)	
	ROA	A-FI	ROA	A-FI	ROA	A-FI	ROA	L-FI	ROA	L-FI	ROA	L-FI
Constant	0.081***	0.720***	0.005	0.721***	0.013	0.721***	0.093***	0.001	0.085***	0.001	0.093***	0.476***
	[25.48]	[67.33]	[0.59]	[67.11]	[1.60]	[67.11]	[32.17]	[0.01]	[11.84]	[0.01]	[12.72]	[45.80]
Volatility	0.073***		0.278***		0.280***		0.078***		0.269***		0.268***	
	[6.77]		[12.69]		[12.54]		[7.29]		[12.25]		[11.95]	
Volatility^2			-0.142***		-0.142***				-0.135***		-0.135***	
			[10.53]		[10.48]				[10.04]		[9.89]	
Volatility, lagged		-0.041		-0.106*		-0.105*		0.104***		0.263***		0.263***
		[1.41]		[1.95]		[1.94]		[3.72]		[5.03]		[5.03]
(Volatility, lagged)^2				0.053		0.053				-0.129***		-0.129***
				[1.45]		[1.44]				[3.63]		[3.63]
Focus Index, lagged	-0.006*		0.210***		0.209***		-0.031***		-0.032		-0.030	
	[1.90]		[8.55]		[8.52]		[8.11]		[1.40]		[1.31]	
(Focus Index, lagged)^2			-0.164***		-0.163***				-0.001**		-0.002**	
			[8.89]		[8.82]				[2.04]		[2.12]	
Foreign, lagged	0.001**	-0.043***	0.037*	0.077*	0.122*	0.077*	0.002**	0.033***	0.032*	-0.122***	0.054	-0.122***
	[2.08]	[4.21]	[1.79]	[1.65]	[1.80]	[1.65]	[2.51]	[3.33]	[1.78]	[2.69]	[1.01]	[2.69]
(Foreign, lagged)2			-0.044***	-0.131***	-0.135*	-0.131***			-0.049***	0.168***	-0.071	0.168***
			[2.59]	[2.60]	[1.90]	[2.60]			[2.88]	[3.44]	[1.24]	[3.44]
(Focus Index, lagged)			-0.015**		-0.035**				-0.006**		-0.004**	
×Volatility			[2.22]		[2.43]				[2.49]		[2.14]	
(Focus Index, lagged)					0.013*						0.004**	
×Volatility^2					[1.85]						[2.28]	
(Focus Index, lagged)			0.006**		-0.132				0.021**		-0.022	
×(Foreign, lagged)			[2.31]		[2.25]				[2.23]		[2.23]	
(Focus Index, lagged)					0.144**						0.038**	
×(Foreign, lagged)^2					[2.29]						[2.39]	
(Focus Index, lagged)×					0.129**						0.129**	
Volatility× (Foreign, lagged)					[2.39]						[2.54]	
Capital Ratio	0.013***	0.105***	0.011***	0.106***	0.011***	0.106***	0.016***	0.157***	0.011***	0.154***	0.011***	0.154***
	[4.10]	[10.33]	[3.32]	[10.45]	[3.35]	[10.45]	[5.16]	[16.02]	[3.36]	[15.77]	[3.38]	[15.77]
Moscow and St. Petersburg	-0.028***	-0.022***	-0.027***	-0.022***	-0.027***	-0.022***	-0.028***	0.001	-0.028***	0.001	-0.028***	0.001
	[21.48]	[5.22]	[20.35]	[5.25]	[20.40]	[5.25]	[21.29]	[0.34]	[21.23]	[0.35]	[21.26]	[0.35]
ln(assets)		-0.012***		-0.012***		-0.012***		0.003***		0.004***		0.004***
		[10.18]		[10.23]		[10.24]		[2.86]		[3.19]		[3.19]
year dummies												
Observations	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242
R^2 for Equation 1	0.08		0.11		0.11		0.09		0.10		0.10	
R^2 for Equation 2		0.07		0.07		0.07		0.05		0.05		0.05
Breusch-Pagan Chi^2	5.07		5.31		5.54		0.03		0.00		0.00	

	Panel B: Total Expenses/Total Assets on Liability Diversification and Deposit Diversification											
	(1)		(2)		(3)		(4)		(5)		(6)	
	ROA	B-FI	ROA	B-FI	ROA	B-FI	ROA	D-FI	ROA	D-FI	ROA	D-FI
Constant	0.069***	0.001	0.009	0.001	0.009	1.105***	0.079***	0.921***	0.039***	0.001	0.048***	0.001
	[19.43]	[0.01]	[0.70]	[0.01]	[0.70]	[106.76]	[31.75]	[78.03]	[5.97]	[0.01]	[7.19]	[0.01]
Volatility	0.071***		0.271***		0.275***		0.080***		0.279***		0.278***	
	[6.58]		[12.28]		[12.27]		[7.61]		[12.90]		[12.64]	
Volatility^2			-0.139***		-0.141***				-0.138***		-0.138***	
			[10.28]		[10.32]				[10.46]		[10.32]	
Volatility, lagged		0.005		-0.088*		-0.086		0.128***		0.159***		0.161***
		[0.17]		[1.67]		[1.64]		[3.95]		[2.61]		[2.64]
(Volatility, lagged)^2				0.073**		0.072**				-0.029		-0.031
				[2.06]		[2.02]				[0.72]		[0.76]
Focus Index, lagged	-0.010**		0.188***		0.188***		-0.016***		0.112***		0.109***	
	[2.01]		[5.42]		[5.42]		[5.33]		[5.54]		[5.36]	
(Focus Index, lagged)^2			-0.125***		-0.124***				-0.098***		-0.096***	
			[5.41]		[5.40]				[6.52]		[6.35]	
Foreign, lagged	0.001**	0.129***	0.073***	0.024	0.095	0.024	0.001**	0.012	0.026	-0.217***	-0.068	-0.217***
	[2.17]	[13.10]	[3.35]	[0.53]	[1.15]	[0.53]	[2.12]	[1.10]	[1.37]	[4.14]	[1.40]	[4.14]
(Foreign, lagged)2			-0.042**	0.117**	-0.065*	0.117**			-0.053***	0.251***	-0.055**	0.251***
			[2.40]	[2.40]	[1.72]	[2.40]			[3.14]	[4.47]	[2.04]	[4.47]
(Focus Index, lagged)			-0.012*		-0.045*				-0.001**		-0.019	
×Volatility			[1.92]		[1.87]				[2.10]		[0.77]	
(Focus Index, lagged)					0.023*						0.010*	
×Volatility^2					[1.85]						[1.70]	
(Focus Index, lagged)			0.042**		-0.071				0.034*		0.204**	
×(Foreign, lagged)			[1.99]		[0.69]				[1.90]		[2.42]	
(Focus Index, lagged)					0.027**						0.020**	
×(Foreign, lagged)^2					[2.25]						[2.17]	
(Focus Index, lagged)×					0.131*						0.139*	
Volatility× (Foreign, lagged)					[1.79]						[1.68]	
Capital Ratio	0.012***	-0.108***	0.009***	-0.107***	0.009***	-0.107***	0.013***	-0.013	0.008**	-0.014	0.008**	-0.014
	[3.92]	[11.06]	[2.77]	[10.97]	[2.87]	[10.97]	[3.99]	[1.16]	[2.39]	[1.21]	[2.46]	[1.21]
Moscow and St. Petersburg	-0.028***	-0.036***	-0.028***	-0.036***	-0.028***	-0.036***	-0.028***	0.052***	-0.027***	0.052***	-0.027***	0.052***
	[21.10]	[9.05]	[21.15]	[9.00]	[21.18]	[9.00]	[21.84]	[11.40]	[21.27]	[11.43]	[21.31]	[11.42]
ln(assets)		-0.030***		-0.030***		-0.030***		-0.050***		-0.049***		-0.049***
		[26.83]		[26.91]		[26.91]		[39.15]		[38.89]		[38.87]
year dummies												
Observations	8241	8241	8241	8241	8241	8241	8206	8206	8206	8206	8206	8206
R^2 for Equation 1	0.08		0.1		0.1		0.1		0.11		0.11	
R^2 for Equation 2		0.14		0.14		0.14		0.18		0.18		0.18
Breusch-Pagan Chi^2	11.82		10.77		10.89		158.67		154.88		153.76	

Table 12 OLS regressions of risk on focus indices and foreign ownership

Table 12 presents the ordinary least squares (OLS) regressions of risk (proxied by volatility of quarterly earnings) on Focus Indices, foreign ownership, their quadratic terms as well as interaction terms, and control variables including a location dummy '*Moscow and St. Petersburg*' (equal to 1 if the bank's headquarters are in Moscow or St. Petersburg, 0 otherwise), capital ratio (total capital to total assets), one-year lag of pre-tax ROA, ln(assets) (natural log of total assets of the bank, where assets are denominated in thousands of rubles). The Focus Index in the first three columns represents the asset Focus Index, and the same Focus Index is also used to construct the interaction terms between Focus Indices and other variables. The Focus Indices in column 4-6, 7-9, and 10-12 represent loan Focus Index, liability Focus Index, and deposit Focus Index. The definitions of variables are the same as in the previous tables. Year dummies for 2000 to 2007 are included in all regressions. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Dependent Variable: Volatility of ROA											
	Asset Diversification			Loan Diversification			Liability Diversification			Deposit Diversification		
Constant	0.019***	0.043***	0.043***	0.008**	0.037***	0.038***	0.031***	0.055***	0.055***	0.007	0.023***	0.024***
	[4.88]	[4.93]	[4.92]	[2.13]	[5.02]	[5.20]	[5.64]	[4.11]	[4.12]	[1.43]	[2.87]	[2.92]
Focus Index, lagged	-0.002***	-0.075***	-0.075***	-0.024***	-0.080***	-0.084***	-0.013***	-0.081**	-0.081**	-0.011***	-0.041*	-0.042**
	[2.58]	[3.01]	[3.01]	[6.25]	[3.46]	[3.63]	[3.48]	[2.26]	[2.27]	[3.35]	[1.91]	[1.99]
(Focus Index, lagged)^2		0.060***	0.060***		0.080***	0.083***		0.044*	0.044*		0.038**	0.040**
		[3.19]	[3.20]		[4.54]	[4.67]		[1.86]	[1.86]		[2.45]	[2.51]
Foreign, lagged	0.010***	0.018	0.075	0.009***	-0.001	-0.125**	0.012***	-0.024	-0.041	0.009***	-0.011	-0.061
	[2.97]	[0.87]	[1.08]	[2.70]	[0.05]	[2.30]	[3.38]	[1.08]	[0.48]	[2.64]	[0.58]	[1.19]
(Foreign, lagged)^2		0.004	-0.056		0.004	0.139**		0.004	0.022		0.015	0.071
		[0.22]	[0.78]		[0.21]	[2.37]		[0.23]	[0.24]		[0.86]	[1.26]
(Focus Index, lagged)×		-0.020	-0.111		0.010	0.233**		0.038*	0.059		0.013	0.103
(foreign, lagged)		[1.04]	[1.03]		[0.54]	[2.48]		[1.73]	[0.56]		[0.66]	[1.16]
(Focus Index, lagged)×			-0.098*			-0.240**			-0.023**			-0.102**
(foreign, lagged)^2			[1.86]			[2.42]			[2.20]			[2.05]
Moscow and St. Petersburg	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	[0.07]	[0.34]	[0.35]	[0.23]	[0.44]	[0.46]	[0.35]	[0.44]	[0.44]	[0.51]	[0.61]	[0.62]
Capital ratio	0.033***	0.031***	0.031***	0.029***	0.029***	0.030***	0.032***	0.031***	0.031***	0.033***	0.032***	0.032***
	[9.38]	[8.84]	[8.82]	[8.39]	[8.45]	[8.53]	[9.17]	[9.04]	[9.04]	[9.34]	[9.19]	[9.21]
Pre-tax return on assets,	-0.057***	-0.056***	-0.056***	-0.058***	-0.060***	-0.063***	-0.060***	-0.060***	-0.060***	-0.069***	-0.068***	-0.069***
lagged	[5.16]	[5.09]	[5.08]	[5.27]	[5.48]	[5.66]	[5.37]	[5.31]	[5.31]	[5.99]	[5.94]	[5.99]
ln(assets)	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.001***	-0.001***	-0.001***
	[4.43]	[4.64]	[4.66]	[4.57]	[3.91]	[3.82]	[5.30]	[5.04]	[5.03]	[2.88]	[2.99]	[2.95]
year dummies	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8296	8296	8296	8296	8296	8296	8290	8290	8290	8248	8248	8248
F-statistics	19.26	16.24	15.27	22.58	19.49	18.65	20.43	16.81	15.76	20.1	16.54	15.58
R-square	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Adj R-square	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03

Table 13 Seemingly unrelated regression (SUR) III: Effects of focus on risk with correction of endogeneity of diversification choices

This table presents the results for the test of whether the focus-risk relationships found in Table 12 (i.e., the OLS regressions of risk) are subject to the endogenous choice of diversification. A simultaneous equations system is specified to correct for the endogeneity of focus measures, i.e., Focus Indices. The specification is a simultaneous system estimated by seemingly unrelated regressions (SUR) of equations (a) and (b), as specified in equations 19 and 20. Panel A of this table presents the SUR regressions of risk on asset Focus Index (leftmost three paired columns) and loan Focus Index (rightmost three paired columns). Panel B of Table 13 presents the SUR regressions of total expenses/total assets on liability Focus Index (leftmost three paired columns) and deposit Focus Index (rightmost three paired columns). The definitions of variables are same as in the previous tables. Year dummies for 2000 to 2007 are included in all regressions. Absolute values of t statistics are presented in brackets. *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

	Panel A: Seemingly Related Regressions of Risk (Volatility of ROA) on Asset Diversification and Loan Diversification											
	(1)		(2)		(3)		(4)		(5)		(6)	
	Risk	A-FI	Risk	A-FI	Risk	A-FI	Risk	L-FI	Risk	L-FI	Risk	L-FI
Constant	0.001	0.717***	0.001	0.718***	0.043***	0.718***	0.006	0.478***	0.001	0.001	0.001	0.001
	[0.01]	[66.91]	[0.01]	[66.71]	[4.64]	[66.71]	[1.55]	[46.07]	[0.01]	[0.01]	[0.01]	[0.01]
Volatility, lagged		-0.040		-0.109**		-0.109**		0.094***		0.244***		0.244***
		[1.38]		[2.01]		[2.01]		[3.33]		[4.66]		[4.66]
(Volatility, lagged)^2				0.056		0.056				-0.121***		-0.121***
				[1.52]		[1.52]				[3.40]		[3.40]
Focus Index, lagged	-0.001**		-0.083***		-0.083***		-0.020***		-0.090***		-0.094***	
	[2.14]		[3.29]		[3.29]		[5.17]		[3.85]		[4.02]	
(Focus Index, lagged)^2			0.064***		0.064***				0.086***		0.089***	
			[3.38]		[3.39]				[4.81]		[4.94]	
Foreign, lagged	0.010***	-0.044***	0.019*	0.078*	0.075**	0.078*	0.010***	0.033***	-0.001	-0.124***	-0.125**	-0.124***
	[2.93]	[4.27]	[1.88]	[1.66]	[2.07]	[1.66]	[2.72]	[3.34]	[0.07]	[2.72]	[2.28]	[2.72]
(Foreign, lagged)^2			0.004	-0.132***	-0.056	-0.132***			0.005	0.169***	0.139**	0.169***
			[0.20]	[2.62]	[0.77]	[2.62]			[0.27]	[3.48]	[2.37]	[3.48]
(Focus Index, lagged)×			-0.020		0.111				0.008		0.230**	
(Foreign, lagged)			[1.06]		[1.02]				[0.47]		[2.45]	
(Focus Index, lagged)×					-0.097*						-0.239**	
(Foreign, lagged)^2					[1.85]						[2.40]	
Capital Ratio	0.033***	0.107***	0.031***	0.108***	0.031***	0.108***	0.030***	0.157***	0.030***	0.154***	0.031***	0.154***
	[9.46]	[10.54]	[8.91]	[10.67]	[8.89]	[10.67]	[8.61]	[16.03]	[8.60]	[15.77]	[8.69]	[15.77]
Moscow and St.	-0.001	-0.022***	-0.001	-0.023***	-0.001	-0.023***	-0.001	-0.002	-0.001	-0.002	-0.001	-0.002
Petersburg	[0.05]	[5.43]	[0.34]	[5.46]	[0.34]	[5.46]	[0.16]	[0.40]	[0.39]	[0.42]	[0.41]	[0.42]
Pre-tax ROA, lagged	-0.058***	-0.036	-0.057***	-0.037	-0.057***	-0.037	-0.059***	0.044	-0.061***	0.045	-0.064***	0.045
	[5.20]	[1.13]	[5.14]	[1.16]	[5.13]	[1.16]	[5.30]	[1.43]	[5.55]	[1.45]	[5.73]	[1.45]
ln(assets)	-0.002***	-0.011***	-0.002***	-0.011***	-0.002***	-0.011***	-0.002***	0.003***	-0.002***	0.003***	-0.002***	0.003***
	[4.50]	[9.71]	[4.74]	[9.79]	[4.76]	[9.79]	[4.60]	[2.86]	[3.91]	[3.13]	[3.82]	[3.13]
year dummies	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242	8242
R^2 for Equation 1	0.03		0.03		0.03		0.03		0.03		0.04	
R^2 for Equation 2		0.07		0.07		0.07		0.05		0.05		0.05
Breusch-Pagan chi^2	0.73		1.14		1.09		4.38		2.37		2.36	

	Panel B: Seemingly Related Regressions of Risk (Volatility of ROA) on Liability Diversification and Deposit Diversification											
	(1)		(2)		(3)		(4)		(5)		(6)	
	Risk	B-FI	Risk	B-FI	Risk	B-FI	Risk	D-FI	Risk	D-FI	Risk	D-FI
Constant	0.027***	1.096***	0.052***	1.099***	0.001	0.001	0.012**	0.897***	0.028***	0.001	0.028***	0.001
	[4.95]	[106.11]	[3.91]	[105.89]	[0.01]	[0.01]	[2.48]	[75.41]	[3.38]	[0.01]	[3.44]	[0.01]
Volatility, lagged		0.008		-0.074		-0.074		0.130***		0.171***		0.171***
		[0.28]		[1.40]		[1.40]		[3.96]		[2.78]		[2.78]
(Volatility, lagged)^2				0.064*		0.064*				-0.034		-0.034
				[1.80]		[1.80]				[0.82]		[0.82]
Focus Index, lagged	-0.010**		-0.079**		-0.079**		-0.005*		-0.045**		-0.047**	
	[2.55]		[2.21]		[2.21]		[1.89]		[2.12]		[2.20]	
(Focus Index, lagged)^2			0.045*		0.045*				0.038**		0.039**	
			[1.89]		[1.89]				[2.41]		[2.47]	
Foreign, lagged	0.012***	0.128***	-0.024	0.023	-0.037	0.023	0.009***	0.008	-0.013	-0.220***	-0.063	-0.220***
	[3.25]	[13.00]	[1.09]	[0.50]	[0.44]	[0.50]	[2.64]	[0.72]	[0.66]	[4.20]	[1.23]	[4.20]
(Foreign, lagged)^2			0.004	0.117**	0.018	0.117**			0.017	0.249***	0.073	0.249***
			[0.21]	[2.41]	[0.19]	[2.41]			[0.95]	[4.45]	[1.30]	[4.45]
(Focus Index, lagged)×			0.038*		0.054				0.013		0.104	
(Foreign, lagged)			[1.74]		[0.52]				[0.67]		[1.17]	
(Focus Index, lagged)×					-0.018**						-0.102**	
(Foreign, lagged)^2					[2.15]						[2.05]	
Capital Ratio	0.032***	-0.106***	0.032***	-0.105***	0.032***	-0.105***	0.033***	0.000	0.032***	-0.001	0.032***	-0.001
	[9.28]	[10.81]	[9.14]	[10.74]	[9.14]	[10.74]	[9.32]	[0.00]	[9.18]	[0.11]	[9.20]	[0.11]
Moscow and St. Petersburg	0.000	-0.037***	-0.001	-0.037***	-0.001	-0.037***	0.000	0.047***	-0.001	0.047***	-0.001	0.047***
	[0.26]	[9.24]	[0.35]	[9.18]	[0.36]	[9.18]	[0.32]	[10.27]	[0.43]	[10.34]	[0.44]	[10.34]
Pre-tax ROA, lagged	-0.061***	0.024	-0.060***	0.027	-0.060***	0.027	-0.069***	-0.087**	-0.068***	-0.087**	-0.069***	-0.087**
	[5.38]	[0.76]	[5.32]	[0.86]	[5.32]	[0.86]	[5.96]	[2.32]	[5.93]	[2.33]	[5.98]	[2.33]
ln(assets)	-0.002***	-0.029***	-0.002***	-0.029***	-0.002***	-0.029***	-0.001***	-0.046***	-0.001***	-0.046***	-0.001***	-0.046***
	[5.08]	[26.13]	[4.85]	[26.22]	[4.85]	[26.22]	[3.44]	[36.09]	[3.50]	[35.96]	[3.46]	[35.96]
year dummies	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Observations	8241	8241	8241	8241	8241	8241	8206	8206	8206	8206	8206	8206
R-squared for Equ. 1	0.03		0.03		0.03		0.03		0.03		0.03	
R-squared for Equ. 2		0.14		0.14		0.14		0.18		0.18		0.18
Breusch-Pagan Chi^2	2.41		1.69		1.67		7.75		6.5		6.53	

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Figure 1-A: Plot of profit premium against risk (volatility), based on the statistical results of Table 5

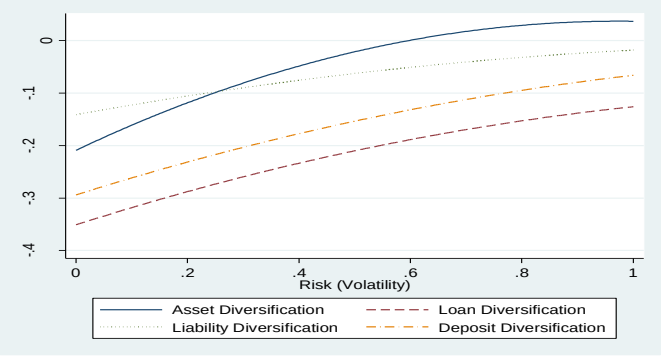


Figure 2-A: Plot of cost discount against risk (volatility), based on statistical results of Table 6

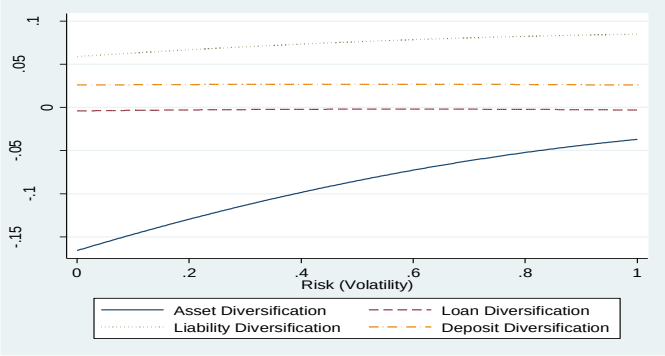


Figure 1-B: Plot of profit premium against foreign ownership, based on the statistical results of Table 5

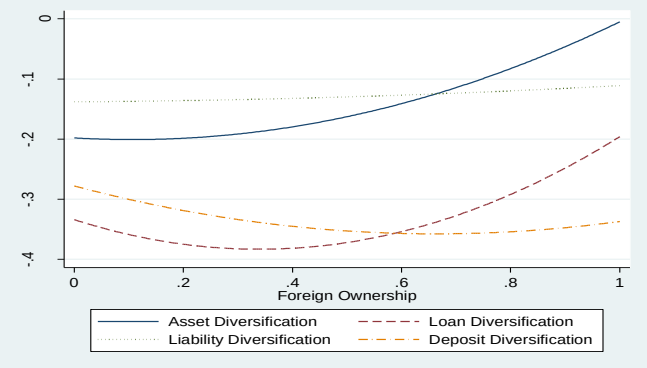


Figure 2-B: Plot of cost discount against foreign ownership, based on statistical results of Table 6

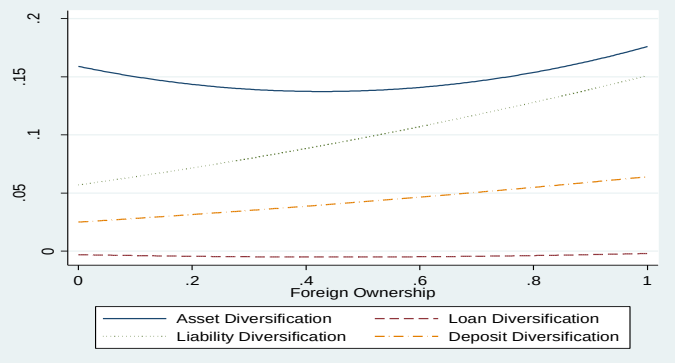


Figure 3-A: Plot of the marginal effects of Focus Indices on pre-tax ROA against risk (volatility), based on statistical results of Table 8.

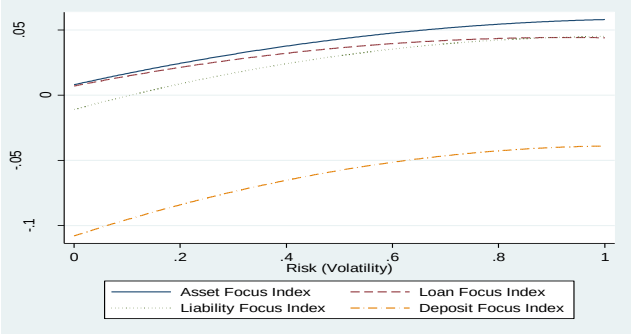


Figure 3-B: Plot of the marginal effects of Focus Indices on pre-tax ROA against foreign ownership, based on statistical results of Table 8.

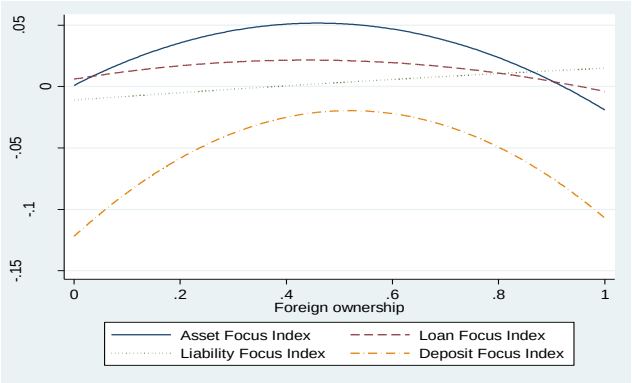


Figure 4-A: Plot of the marginal effects of Focus Indices on cost ratio (total expenses-to-total assets ratio) against risk (volatility), based on statistical results of Table 9.

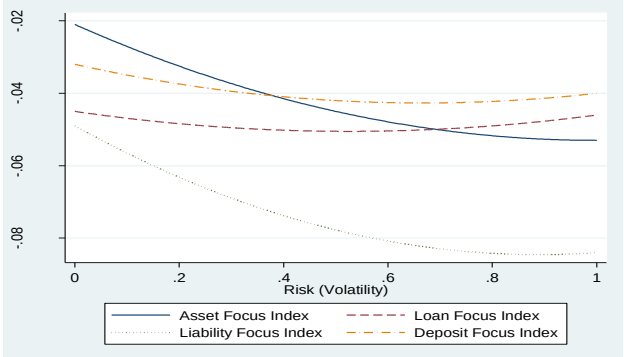


Figure 4-B: Plot of the marginal effects of Focus Indices on cost ratio (total expenses-to-total assets ratio) against foreign ownership, based on statistical results of Table 9.

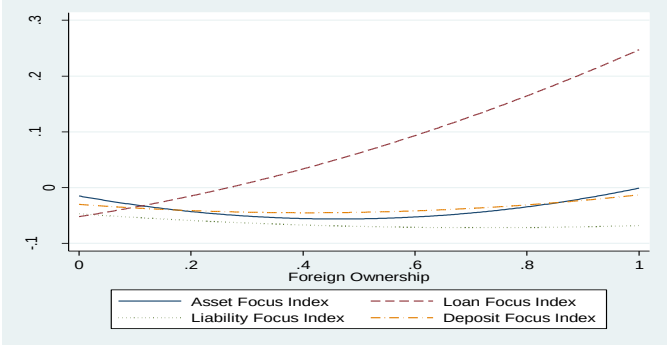


Figure 5-A: Plot of the risk (volatility) against Focus Indices, based on statistical results of Table 12.

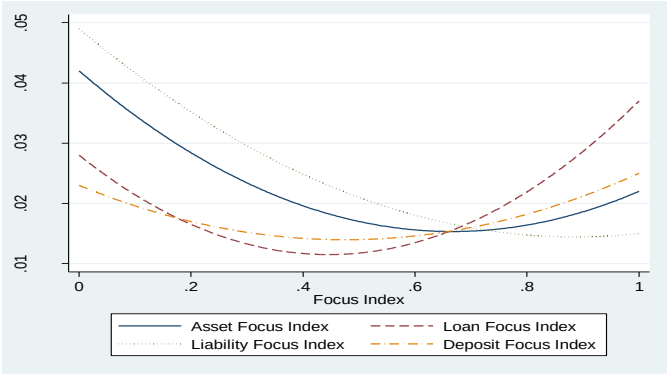
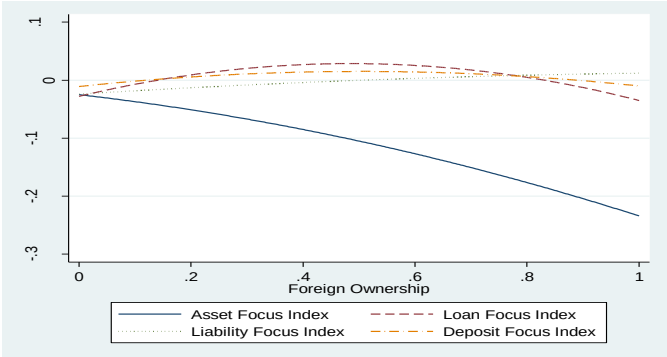


Figure 5-B: Plot of the marginal effects of Focus Indices on risk (volatility) against foreign ownership, based on statistical results of Table 12.



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