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Impact of international expansion strategy on the performance of Japanese banks

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ABSTRACT

The effect of cross-border diversification on bank performance is part of the broader debate on how multinational banking and financial integration affect the global financial economy. Previous studies that examined this relationship present mixed results - namely that cross-border diversification improves bank performance but also increases bank risks that could lead to systemic failure. Even so, this line of debate has not been examined in the case of Japanese banks conducting international operations. The present study questions whether cross-border diversification improves the performance of Japanese banks and to what extent each cross-border expansion activity affects bank performance. The latter was largely ignored in previous studies. Our results show that cross-border diversification improves cost efficiency but decreases/harms the profit efficiency of the banks analyzed. In addition, we find that the expansion of foreign assets and foreign branch operations present funding risks and operational inefficiency. We offer two important recommendations. First, as a major player in international lending, the current expansion activities of Japanese banks require close monitoring and supervision to prevent systemic risk resulting from aggressive and risky overseas expansion activities. Second, the current expansion strategies of Japanese banks, especially the expansion of overseas assets and branch operations (retail banking), should be re-examined.

1. Introduction

Cross-border banking has grown significantly within the last four decades following the removal of investment restrictions on capital flows, deregulation, financial integration, technological progress, and financial innovations (de Jonghe et al., 2015; Gulamhussen et al., 2017; Mulder and Westerhuis, 2015). Consequently, the question of why and how banks internationalize has received considerable attention in the literature (Batten and Szilagyi, 2011; Gulamhussen et al., 2016; He et al., 2019; Hsieh et al., 2010; Kabongo and Okpara, 2019; Mariotti and Piscitello, 2010; Mariscal et al., 2012; Mulder and Westerhuis, 2015; Qian and Delios, 2008; Yamori, 1998; Zapotichna, 2017). According to the resource exploitation theory (also called Dunning's eclectic theory), multinational banks (MNBs) with superior technology and financial power expand to international markets to exploit location-specific, ownership-specific, and internalization-specific factors that enable them to maintain a competitive advantage over the financial institutions of host countries (He et al., 2019; Mariotti and Piscitello, 2010; Mariscal et al., 2012). However, leader-followership or defensive expansion theory suggests that MNBs follow their existing clients to overseas markets to service them and achieve economies of scale in their application of intangible assets (Mulder and Westerhuis, 2015; Qian and Delios, 2008; Yamori, 1997). Some strands of the literature suggest that MNBs may expand to international markets to avoid strict domestic regulations, thereby engaging in regulatory arbitrage (Houston et al., 2012; Ongena et al., 2013; Yamori, 1997), or to augment shrinking domestic financial markets (Lam, 2015; Mulder and Westerhuis, 2015). Existing empirical literature reveals four major channels for internationalization of MNBs: international investments (FDI), mergers and acquisitions, partial acquisition via shareholding, and direct establishment of international branch operations (Lopes et al., 2017).

The effects of cross-border diversification on the performance of MNBs are of practical significance in the cross-border banking literature. Many empirical studies have examined this question with diverse findings and conclusions. According to the diversification (expansion) hypothesis, cross-border diversification leads to improved earnings, shareholder value creation, reduced systemic risk exposure, and economies of scale and scope. Substantial empirical studies have confirmed

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these benefits. Demsetz and Strahan (1997) showed that cross-border diversification provides large bank holding companies (BHCs) with a size advantage, greater leverage, and reduced risks. In another study (Deng and Elyasiani, 2008), it was found that cross-border diversification leads to value enhancement and risk reduction in BHCs and that the geographic proximity of branches relative to BHCs plays a significant role in value-enhancing and risk-reducing potentials. Additionally, depending on the country's local institutional setting, non-interest income was found to reduce the systemic risk exposure of diversified MNBs (de Jonghe et al., 2015). Moreover, a recent study of 384 banks in 56 countries shows that the cross-border activities of MNBs create shareholder value (Gulamhussen et al., 2017).

However, consistent with the market risk hypothesis, which suggests that diversification increases bank risk due to market-specific factors in host countries, some researchers have found that cross-border banking does not always provide the desired benefits. Battiston et al. (2012) studied the dynamics of default cascades in a network of credit interlinkages (hypothetical diversified credit institutions) and found that individual risk diversification across counterparties does not reduce systemic risks. A related study of twenty-two major banks in Asia and the Pacific after the global financial crisis showed that the spillover effect of the crisis was mainly driven by heightened risk aversion and liquidity squeezed in the global financial markets originating from the US subprime crisis (Huang et al., 2012). The risk reduction from portfolio diversification by MNBs can be offset by incentives going in the opposite direction, leading to excessive risks (Gulamhussen et al., 2014). Using zscore, expected default frequency, and other measures of risk to analyze 384 banks across more than 50 countries, the authors find that international diversification increases bank risk. Finally, Berger et al. (2017). found that international banks in the US have a much higher risk than purely domestic banks because of lower lending standards for corporate borrowers. Moreover, the authors showed that a greater marginal degree of internationalization within the subset of internationalized banks is associated with higher risk, concluding that internationalization increases bank risk, especially during market crises.

Some studies have analyzed the internationalization process and strategy of Japanese banks. Yamori (1997, 1998) found that foreign direct investment (FDI) of manufacturing industries determined the location choice of Japanese financial institutions in the near east, whereas Japanese banks led manufacturing in the process of internationalization in Asia and Oceania. Qian and Delios (2008) examined the expansion activities of Japanese banks between 1980 and 1998 and found that Japanese banks undertake FDI to secure internalization benefits by following their existing clients and to achieve economies of scale in their intangible assets. Batten and Szilagyi, (2011) found that Japanese banks reduced their international presence mainly to mitigate the effect of failed loans in the Asia-Pacific region between 1995 and 2008. Lastly, Lam (2015) found that Japanese banks scaled up foreign exposure between 2000 and 2012 due to their resilient balance sheet and that global and regional factors played prominent roles in the growth of cross-border claims.

The above can be summarized into two stylized facts: (1) considerable empirical studies have examined the trend, determinants, and effects of cross-border diversification on the performance of banks globally, and (2) some empirical studies have also examined the cross-border diversification activities of Japanese banks. However, the effects of cross-border diversification on the performance of Japanese banks have not been precisely investigated. The recent rise in overseas expansion activities of Japanese banks, especially in the Asia-Pacific region in the post-GFC period, and the possible overseas market risk exposure of these banks (Lam, 2015) make it imperative to systematically examine the relationship between overseas expansion activities and performance of Japanese banks under various diversification-specific activities.

Using various measures of internationalization, we examine the effects of cross-border diversification activities on the performance of some Japanese banks conducting international operations. Our results show that generally cross-border diversification improves cost efficiency, lending efficiency, and bank-level stability but decreases the profit efficiency of the banks examined. diversification-specific activities such as the expansion of *foreign assets* and *foreign branches* decrease bank-level stability and lending efficiency which implies possible funding risks and operational inefficiency. All diversification-specific activities examined decreased profit efficiency of the banks examined. These results agree with those of previous studies that there exist both benefits and risks in cross-border diversification. This study contributes to the literature in three ways: First, it covers the period from 2003 to 2020, providing the most recent empirical analysis of major Japanese banks' international operations and performance. Therefore, the results are useful to decision-makers and evaluators in policy formulation. Second, to the best of our knowledge, this research is the first study, especially in post-GFC, to empirically examine the direct impact of overseas expansion activities on the performance of Japanese banks under various performance measures. Finally, this study empirically confirms a contention by an earlier study that the rapid overseas expansion activities of Japanese banks could lead to funding risks (Lam, 2015). The remainder of this paper is organized as follows. Section two presents a brief note on the internationalization of Japanese banks. Section three presents the theoretical considerations and the hypotheses. Section four presents the empirical strategy, data, and summary statistics. Section five presents the estimated results. Finally, a summary of the findings and concluding remarks are presented in Section six.

2. A note on cross-border expansion, motives, and strategies of Japanese banks

The cross-border expansion of Japanese banks has a long history that was shaped by several factors including socioeconomic changes – namely customer migration, and global financial events – namely financial integration and /or local and international financial shocks. Earlier cross-border expansion of Japanese banks was partly based on the so-called defensive expansion strategy (follow-the-client) where Japanese banks expand abroad mainly to serve their customer especially multinational companies with a knitted relationship with the banks (often called "the main bank system") (Mulder and Westerhuis, 2015; Qian and Delios, 2008). However, an empirical study by Yamori (1997) found that the defensive expansion hypothesis may have applied to Japanese banks' expansion in the Near East. On the other hand, the author found that Japanese banks led their corporate customers such as the manufacturing industry in the process of internationalization in Asia and Oceania and that regulatory arbitrage seems to be the motive for expanding to US and European markets. Similar empirical studies have suggested that, in addition to the defensive expansion strategy, seeking market opportunities in host countries was another motive. Yamori (1998) found that although the location choice of Japanese financial institutions depends on the FDI of the manufacturing industry, this choice is also partially based on local opportunities in the host countries. For instance, Japanese bank expansion in California after the second world war was to serve Japanese immigrants and trade. However, soon afterward, the banks adopted the beachhead strategy by acquiring mostly non-Japanese clients. Consequently, by the 1980 s half of the 10 largest banks in California were Japanese banks, this is in addition to being the dominant banks in the US, Germany, and the UK (Mulder and Westerhuis, 2015).

Several offsetting events between the late 1980s and 1990s, namely, increased taxation, the Basel capital requirement of 1988, asset bubbles of the early 1990s, the big bang deregulation of the financial system in Japan, the 1998 revised capital adequacy rules, and the Asian financial crisis led to a shift in international expansion strategies of Japanese banks (Batten and Szilagyi, 2011; Mulder and Westerhuis, 2015; Qian and Delios, 2008). These events made Japanese banks reduce their international presence to mitigate their huge losses, especially from

Table 1
Selected literature on the internationalization of Japanese banks.

Authors	Research focus	Key conclusion
(Yamori, 1997, 1998)	Do Japanese banks lead or follow manufacturing industries to international markets? Location choice of Japanese financial institution.	Banks led manufacturing in the process of internationalization in Asia and Oceania. FDI of manufacturing industries determined the location choice of Japanese financial institutions in the near east
(Qian and Delios, 2008)	Relationship between internalization and experience (1980–1998)	Banks undertake FDI to secure internalization benefits by following their existing client and to achieve economies of scale in their intangible assets
(Batten and Szilagyi, 2011)	Changing roles and direction of Japanese bank internationalization (1995–2008)	Japanese banks reduced their international presence mainly to mitigate the effect of failed loans in the Asia-Pacific regions
(Mulder and Westerhuis, 2015)	The determinants of bank internationalization in times of financial globalization (1980–2007)	Japanese banks retreated briefly from international markets in the late 1980s and 1990s due to the home country's macroeconomic slowdown
(Lam, 2015)	Determinants of Japanese banks' recent overseas' expansion activities: opportunities and risks (2000–2012)	Japanese banks are well-positioned and have scaled up foreign exposure due to their resilient balance sheet. Increasing cross-border activities could pose funding risks and supervisory challenges.
(Yaguchi et al., 2018)	Financial deepening and integration in Asia: the role of Japanese banks' entry	Financial techniques, spillover of financial technologies, and regulatory know-how from Japanese banks have contributed to financial integration and deepening in Asia.

nonperforming assets in the Asia Pacific, and to strengthen their balance sheets between the late 1990s and early 2000s. However, by the late 2000s, Japanese banks began to increase their international exposure - doing so in low-risk international investments such as bank deposits and security purchases in Europe and the US, and by 2008 Japanese banks became net international lenders (Batten and Szilagyi, 2011). The post-GFC saw a further significant increase in cross-border expansion activities of Japanese banks, especially in the Asia region. Lam (2015) found that cross-border consolidated claims of Japanese banks increased by 15% of total banking and trust assets, of which claims from the Asia region alone account for 16% of total consolidated foreign claims in 2012 - a level comparable to pre-GFC. It turns out that a large share (15–20%) of the foreign claims was from the growing overseas loans to Asia. In addition, the author found that decreasing global uncertainty, favorable regional factors (real growth differential and interest rates), and resilient home factors (domestic credit, bank soundness, CAR, and NPL) have contributed to increased international expansion activities and significant foreign claims. However, the author contended that increasing cross-border activities could lead to funding risks and supervisory challenges in the future. Recent expansion activities of Japanese banks in ASEAN countries have been linked to the gradual withdrawal of European mega banks post-GFC and enhanced regional financial market integration. For instance, Yaguchi et al. (2018) found that the UK and Euro Area bank credit to Asian-5 (Indonesia, Malaysia, the Philippines, Singapore, and Thailand) in 2017 was 20%, and US banks contributed 15% whereas Japanese banks contributed 47%.

Another pertinent issue concerns the mode of internationalization of Japanese banks. A notable mode of cross-border expansion activities in recent times has been through takeover and lending. For instance, Lam (2015) showed that the mode of recent cross-border expansion of Japanese banks is mainly through lending, project finance, and overseas acquisitions of financial institutions. Remolona and Shim (2015) argued that, unlike European and U.S. banks, Asian banks in general (including Japanese banks) when expanding overseas tend to establish branch operations rather than subsidiary operations. In the ASEAN region, an additional strategy includes business alliances with local banks facilitated by regional financial integration. Business alliance with local banks in the ASEAN region enables Japanese banks to carry out distribution channel finance: financing to local sellers and suppliers and guarantee against sales risks of Japanese companies in the host country's market (Yaguchi et al., 2018). Table 1 provides the summary of some selected literature on the internationalization process of Japanese banks and key conclusions.

Against the backdrop of the increasing level and sophistication of international expansion activities, several issues arise. First, the recent expansion activities have some resemblance with previous episodes that have resulted in overpriced and risky overseas assets and failed loans. Therefore, examining the market risk exposure of these banks in the light of these aggressive expansion activities is imperative. Second, recent expansion strategies appear to be well defined: lending, acquisition (local branch networking), and project finance. We contend that the impact of these expansion strategies on the performance of these banks may differ and if so, should provide incentives and direction for future corporate expansion strategies as well as financial policies.

3. Theoretical consideration and hypotheses development

3.1. Measures of bank performance

This study adopts the resource exploitation theory to understand bank performance measures. The theory suggests that banks expand abroad to exploit market opportunities enabling them to maximize their revenue and profits. In line with this contention, and consistent with the empirical literature on banking, we consider cost efficiency and profit efficiency as important measures of bank performance to evaluate Japanese banks. Furthermore, bank stability is used in cross-border banking literature to measure the risk of international operations (Berger et al., 2017; Gulamhussen et al., 2014). Consistent with this argument, we employ the z-score to measure the risks of international expansion activities of the banks in our sample. Furthermore, we introduce a new measure of bank performance, and *lending efficiency*, based on the financial intermediation services indirectly measured (FISIM) drawn from the system of national accounts (SNA). FISIM is the spread between the loan interest rate and deposit interest rate relative to the market spread rate and focuses only on the productive activities of banks (Aduba and Izawa, 2021). This spread provides management efficiency for MNB in international markets as the bank can exploit interest rate differentials across various markets, transfer funds internally, and reap generous profits (Havrylchyk & Jurzyk, 2011; Qian & Delios, 2008).

3.2. Measures of international diversification (internationalization)

To examine the cross-border diversification of multinational enterprises or banks, researchers have derived different measures called the degree of internationalization (DOI) (Sullivan, 1993; Tschoegl, 1983). One of the most important DOIs used in the literature is the amount of overseas investment. This could be to direct overseas investments or banks' accumulated FDI in host countries. Direct overseas investment or banks' FDI requires a more extensive and long-term transfer of resources to foreign countries and, therefore, shows deliberate overseas diversification activities of banks (Yamori, 1997, 1998). However, recent studies have considered more direct measures of MNBs' overseas diversification. For example, Mulder and Westerhuis (2015) considered foreign sales, foreign assets, and foreign employment as measures of

bank internationalization. Besides foreign assets expansion, Berger et al. (2017) also considered foreign loans and foreign deposits as important measures of bank internationalization. In line with these empirical studies, this study considers six measures of international diversification: foreign investment, foreign sales, foreign loan, foreign loan interests, foreign assets return, and foreign branch expansion.

Foreign investment (including, but not limited to, accumulated FDI) is one of the major strategies used by banks to expand to international markets. Studies on cross-border banking find that direct foreign investments such as equity joint ventures, greenfield investments, direct acquisitions, and project finance have been used by MNBs to expand abroad with the primary goal of reaping potential benefits (higher returns) in host countries (Lopes et al., 2017; Mariscal et al., 2012). Similar to overseas investments, the amount of foreign assets in host countries provides MNBs with adequate footing and financial power to conduct international lending activities easily and effectively and exploit local liquidity markets (Moshirian, 2001). Moreover, the acquisition of local banks through mergers and acquisitions (M&As) and/or the establishment of new branch operations enables MNBs to benefit from local opportunities in foreign financial markets, where they maintain a competitive advantage (Clarke et al., 2003). Foreign branch operations and the acquisition of local banks increase the asset base of MNBs, which is expected to positively affect their performance.

The foregoing shows that there is an a priori expectation of a positive relationship between cross-border diversification and bank performance. This suggests that the motivation to expand abroad is largely related to resource exploitation, revenue generation, and profit maximization. Therefore, to address the research questions on the effect of cross-border diversification on the performance of Japanese banks, we test the following four hypotheses by examining the relationship between overseas expansion activities and four measures of bank performance.

Hypothesis 1. Overseas expansion activities have a positive effect on the cost efficiency of Japanese banks.

Hypothesis 2. Overseas expansion activities have a positive effect on the profit efficiency of Japanese banks.

Hypothesis 3. Overseas expansion activities have a positive effect on the z-score of Japanese banks.

Hypothesis 4. Overseas expansion activities have a positive effect on the lending efficiency of Japanese banks.

4. Empirical strategy and econometric model

4.1. Measuring cross-border diversification: degree of internationalization

To measure the degree of internationalization, we take the ratio of each bank's cross-border expansion activity (divestments or returns) to the total value of such activity (including the domestic value) on a bi-annual basis, as reported by each bank. Thus, the following estimation equation emerged.

$$Expansionspecificactivity = ESA_i = \frac{Foreignactivity(i)}{Foreignactivity(i) + Domesticactivity(i)} \tag{1}$$

As noted in the previous section, following related literature on firm internationalization, we identified six international diversification activities, namely, foreign investment, foreign sales, foreign loan, foreign loan interests, foreign assets return, and foreign branch expansion. Based on these, we compute six diversification-specific activities (ESA). And following a procedure similar to that used by Mulder and Westerhuis (2015), we calculate the unweighted average of all six diversification-specific activities. This represents the overall diversification index (DOI) used to address the research questions captured by the hypotheses.

$$Degreeofinternationalization = DOI = \sum_{i=1}^{6} ESA_i \Big/ 6 \tag{2}$$

Previous studies have used the DOI in Eq. 2 to examine the effects of international diversification on bank performance. However, this approach does not address the effect of each diversification-specific activity on bank performance. This study will examine the effect of each of the six diversification-specific activities on the performance of Japanese banks.

4.2. Measuring bank performance

The four bank performance measures identified in this study were estimated using different empirical strategies. The cost and profit efficiency scores were estimated using a stochastic frontier analysis (SFA) approach. Empirical studies suggest that SFA is better suited for efficiency estimation because it allows measurement errors in the data structure and provides firm-specific efficiency estimates (Yamori et al., 2017). Therefore, with the usual linear homogeneity restriction in input prices, we apply the standard trans-log function to estimate *cost efficiency* as.

$$\ln\left(\frac{C_{it}}{p_{lit}}\right) = \theta_0 + \sum_j \theta_j \ln Y_{jit} + \sum_{k\neq l} \beta_k \ln\left(\frac{p_{kit}}{p_{lit}}\right) + \tau_1 T + \frac{1}{2}\sum_j\sum_m \theta_{jm} \ln Y_{jit} \ln Y_{mit} +$$

$$\frac{1}{2}\sum_{k\neq l}\sum_{n\neq l} \beta_{kn} \ln\left(\frac{p_{kit}}{p_{lit}}\right)\ln\left(\frac{p_{nit}}{p_{lit}}\right) + \frac{1}{2}\tau_2 T^2 + \sum_j\sum_{j\neq k} \varphi_{jk} \ln Y_{ijk} \ln\left(\frac{p_{kit}}{p_{lit}}\right) + \upsilon_{it} + u_{it} \tag{3}$$

where $\theta_{jm} = \theta_{mj} for all j and m, and \beta_{kn} = \beta_{nk} for all k and n$, C_{it} is the observed total cost, $p_i (i = 1, 2, 3)$ denotes the three input prices: labor, deposit, and capital, $Y_j (j = 1, 2)$ are two outputs: total loans and total security investments. T represents the time trend. θ, β, τ, and φ are parameters to be estimated. v_{it} is a standard statistical error term, independently and identically distributed as $N(0, \sigma_v^2)$, and u_{it} is a non-negative error term that represents technical inefficiency. Regarding the a priori distributional assumptions for the inefficiency term, we employ half-normal and exponential distributions.

From Eq. (3), the profit efficiency score can be estimated by making the necessary transformation in the dependent variable and the error structure, known as the alternative profit function specification (Berger and Mester, 1997). Thus, the profit efficiency score can be estimated as.

$$\ln(\widetilde{\pi}_{it}) = \theta_0 + \sum_j \theta_j \ln Y_{jit} + \sum_{k\neq l} \beta_k \ln\left(\frac{p_{kit}}{p_{lit}}\right) + \tau_1 T + \frac{1}{2}\sum_j\sum_m \theta_{jm} \ln Y_{jit} \ln Y_{mit} +$$

$$\frac{1}{2}\sum_{k\neq l}\sum_{n\neq l} \beta_{kn} \ln\left(\frac{p_{kit}}{p_{lit}}\right)\ln\left(\frac{p_{nit}}{p_{lit}}\right) + \frac{1}{2}\tau_2 T^2 + \sum_j\sum_{j\neq k} \varphi_{jk} \ln Y_{ijk} \ln\left(\frac{p_{kit}}{p_{lit}}\right) + \upsilon_{it} - u_{it} \tag{4}$$

where $\widetilde{\pi}_{it} = (\pi + |\pi|^{min} + 1)$, and $|\pi|^{min}$ is the absolute value of the minimum profit for all banks in the sample. This transformation allows for a nonzero value of the natural log of the dependent variable π_{it}. All other variables are as defined.

We consider lending efficiency, based on the FISIM framework, as an important measure of bank performance, where lending efficiency is the residual earnings resulting from the spread between interest on loans and interest paid on deposits relative to interbank rates. The lending efficiency can be estimated as follows:

$$LE = fisim = (r_l - r_r)^* G_L + (r_r - r_d)^* G_D \tag{5}$$

Where r_l r_d and r_r are loan, deposit, and reference rate, respectively. G_L and G_D are total loans and total deposits, respectively. The reference rate

Table 2
Summary statistics of variables.

		Full sample					Multination banks only				
	Unit	Mean	SD	Min	Max	CV	Mean	SD	Min	Max	CV
Panel A. Summary of banking operations											
Total assets	bil¥	85,125.72	62,596.66	9037.39	251,500.00	0.735	118,100.00	51,426.17	23,378.50	251,500.00	0.435
Domestic investment	bil¥	60,485.65	38,866.62	8394.27	151,500.00	0.643	82,280.35	29,069.06	21,191.95	151,500.00	0.353
Overseas investment	bil¥	16,405.95	19,433.97	41.38	70,537.34	1.185	24,698.78	19,157.38	365.27	70,537.34	0.776
Sales on domestic investment	bil¥	33,186.22	19,346.83	4624.52	67,116.64	0.583	43,995.45	14,196.93	17,051.50	67,116.64	0.323
Sales on overseas. investment	bil¥	9775.98	11,989.40	3.20	44,760.34	1.226	14,736.21	12,015.11	365.27	44,760.34	0.815
Domestic lending	bil¥	18,343.47	14,535.38	710.20	59,445.16	0.792	26,044.25	11,915.25	3763.29	59,445.16	0.458
Overseas lending	bil¥	1595.69	1998.16	0.00	8596.43	1.252	2375.55	2056.88	0.00	8596.43	0.866
Sales on domestic lending	bil¥	365.78	238.33	3.09	1235.65	0.652	492.72	189.56	154.07	1235.65	0.385
Sales on overseas lending	bil¥	90.20	73.68	1.58	312.35	0.817	129.13	60.57	14.61	312.35	0.469
Domestic security investment	bil¥	242.73	157.51	1.60	908.73	0.649	317.74	139.49	93.22	908.73	0.439
Overseas security investment	bil¥	150.71	182.06	0.02	797.31	1.208	226.86	181.42	5.60	797.31	0.800
Sales on domestic security	bil¥	220.85	266.02	0.13	1173.06	1.205	331.72	265.56	5.60	1173.06	0.801
Sales on overseas security	bil¥	19.87	23.03	-0.08	93.47	1.159	29.05	23.44	0.00	93.47	0.807
Panel B. Dependent variables											
Lending efficiency/VA (FISIM)	bil¥	46,720.97	31,390.08	6613.55	112,200.00	0.672	62,413.21	27,081.83	13,620.78	112,200.00	0.434
Bank stability (zscore)	score	81.311	61.097	1.461	335.015	0.751	76.638	57.700	3.921	335.015	0.753
Cost efficiency	score	0.827	0.128	0.214	0.967	0.155	0.826	0.135	0.296	0.967	0.164
Profit efficiency	score	0.767	0.192	0.000	1.000	0.250	0.726	0.203	0.000	1.000	0.280
Panel C. Predictor variables											
DOI (overall)	ratio	15.768	14.707	0.229	43.031	0.933	23.217	12.726	1.662	43.031	0.548
Investment	ratio	13.863	13.225	0.337	38.934	0.954	20.479	11.591	0.632	38.934	0.566
Sales	ratio	24.043	22.035	0.212	68.676	0.916	34.990	19.403	1.982	68.676	0.555
Loans	ratio	14.794	14.476	0.060	43.235	0.978	22.145	12.500	1.373	43.235	0.564
Loan interest	ratio	25.455	24.276	0.038	71.183	0.954	37.774	20.964	2.519	71.183	0.555
Asset returns	ratio	0.682	0.136	0.226	0.930	0.199	0.694	0.062	0.538	0.822	0.090
Branches	ratio	11.668	24.422	0.000	112.121	2.093	17.627	28.238	0.000	112.121	1.602
Bad loans	ratio	2.366	2.271	0.516	13.890	0.960	2.347	2.219	0.516	11.137	0.945
Capital adequacy (BIS)	ratio	12.423	2.841	2.270	23.050	0.229	13.048	2.885	8.000	23.050	0.221
Non-interest revenue (NIIR)	ratio	18.496	4.668	5.680	31.059	0.252	17.338	4.345	5.680	26.542	0.251

r_r is taken as the interbank lending rate. The loan interest rate refers to the ratio of loan interest to total loans, and the deposit interest rate is the ratio of interest paid to loanable funds divided by the total deposit.

Finally, our measure of bank soundness or stability (z-score) was calculated following the strategies employed in empirical studies on cross-border banking (Gulamhussen et al., 2014; Laeven and Levine, 2009). We computed zscore as follows:

$$zscore = \frac{ROA + EQT}{\sigma(ROA)} \tag{6}$$

where *ROA* and *EQT* denote three years moving average (equivalent to six consecutive periods for biannual data) of returns on total assets and the equity-to-asset ratio, respectively. σ represents the standard deviation of returns on total assets during the same period. For the equity-to-asset ratio, we consider the BIS capital-risk-asset ratio, calculated as Basel capital regulations. Since z-score represents a bank's distance from insolvency, a higher zscore indicates greater banking stability.

4.3. Econometric model

To investigate the effect of cross-border diversification on bank performance, we use the following empirical model.

$$\Pi_{it} = \alpha + \beta \mathrm{DOI}_{it-1} + \delta controls_{it-1} + \varepsilon_{it} \tag{7}$$

where Π_{it} is the performance of bank i at time t, DOI_{it_1} is the lagged diversification index of bank i in time $t-1$, and α, β, and δ are the parameters to be estimated. The model *controls* for each bank's financial condition using bad-loan-ratio (*BLR*), capital adequacy ratio (*BIS*), and non-interest income ratio (*NIIR*).

The bad loan ratio is an important quasi-fixed input often used to control for asset quality in empirical banking studies. The level of non-performing assets is known to have a significant impact on bank performance, especially in cross-border banking, and not controlling for this in the empirical model could bias the results (Hughes and Mester, 2014). The capital adequacy ratio enables banks to absorb losses from credit, markets, and operational risks. Beyond being a regulatory requirement, the bank capital adequacy ratio affects lending, investment drive, and bank outputs (Hassan et al., 2016) and, as a result, provides a good control measure in our econometric model. The definition of BIS is identical to EQT used in computing the z-score in Equ. (11). Moreover, 'non-interest income' is the return from non-interest-bearing assets and other bank services which is an important measure of non-risky divestment that contributes to bank performance. These control variables are crucial for avoiding omitted variable bias in our econometric estimation results.

Common econometric issues such as simultaneity bias/reverse causality, unobserved heterogeneity as well as time-specific common shocks arise when estimating Eq. 7. While several methods for dealing with simultaneity bias have appeared in the literature (Leszczensky and Wolbring, 2022), we deal with this issue using the lagged value of the independent variable. The problem of unobserved heterogeneity is minimal since banks in our sample are considered homogeneous in terms of origin, operations, and corporate culture, yet we account for this issue by introducing bank fixed effects (BFEs). BFEs also cancels out historic dependency such as merger and acquisitions or major change in investment and lending policies. We use a time dummy to account for common shocks experienced by banks over time such as exchange rates and global or regional financial crises which, in principle, deal with year-specific effects.

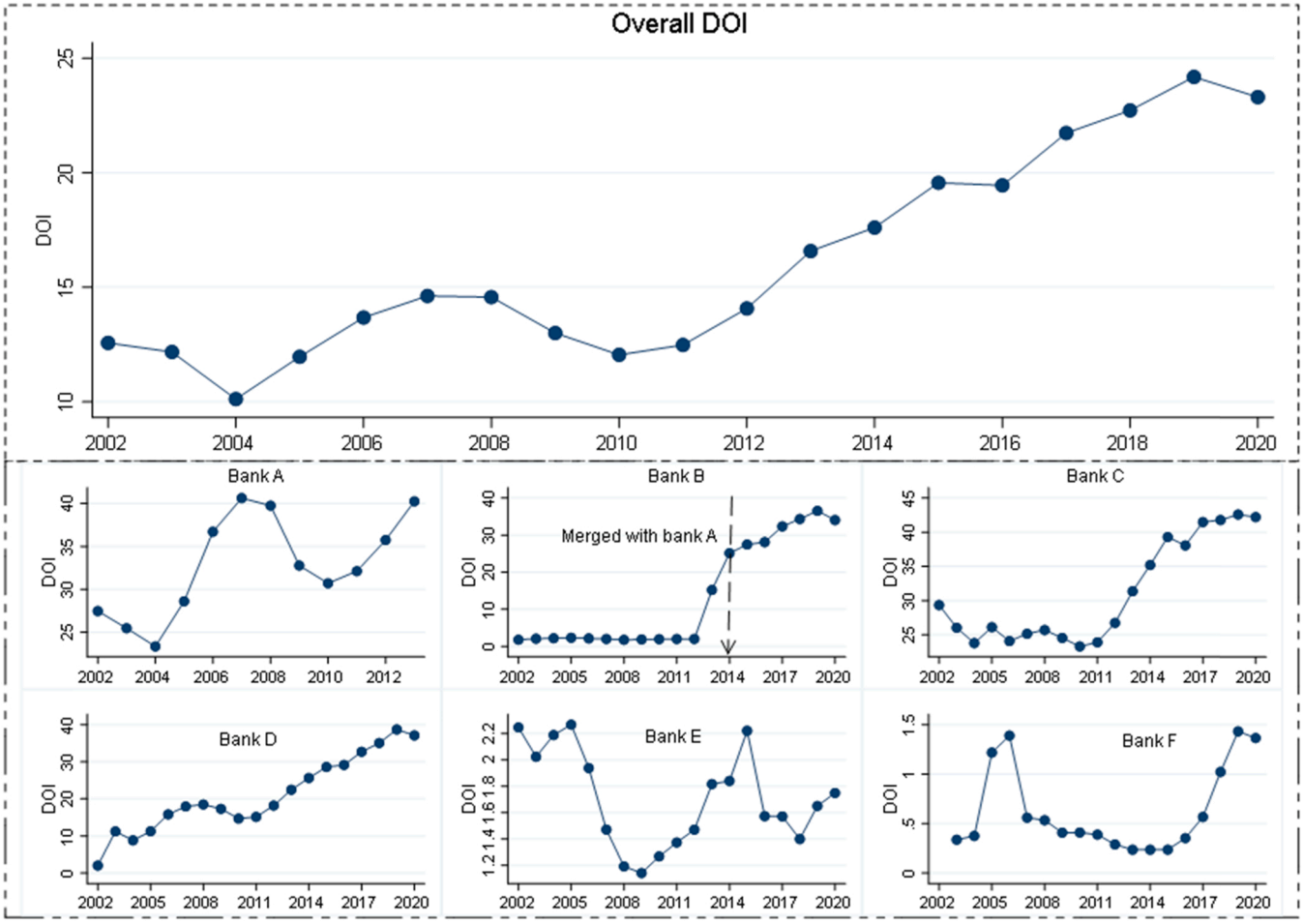

Fig. 1. Trend in overall degree of internationalization.

4.4. Data description and summary statistics

The data used in this study were obtained from the bi-annual financial reports of seven Japanese city banks which conducted international operations between 2002 and 2020. Two separate mergers occurred between two set of banks in our sample: the first merger was between two banks in the fall of 2006 and the second merger was between another two banks in the fall of 2013.[1] Both acquired banks ceased independent operations, bringing the total sample of banks to five post-2013. The reports of these banks provide information on both domestic and overseas activities between 2003 and 2020, about two decades-long data, which provide a systematic view of the international activities of these banks before and after the GFC. These reports contain the aggregated data of all international operations and do not contain information on the specific geographical location of business operations. However, it separates domestic operations from overseas operations for all variables of interest, which enable us to investigate the effect of international diversification activities on bank performance. Three of the banks (including the merged banks) are multinational banks with overseas branches and offices (subsidiaries), whereas two of the banks are considered megabanks conducting international operations such as investment banking. The latter banks do not operate overseas branches. We used data on total assets, average domestic and overseas loans and securities, outstanding domestic and foreign investment management accounts, non-performing loans, capital adequacy ratio, non-interest income, and the number of overseas branches. All financial data are deflated using the gross domestic product deflator published by the Japan Statistical Agency.

Table 2 Panel A presents the summary statistics of both domestic and overseas operations of the banks. Here, an important trend emerged. First, comparing the coefficient of variance (CV) between domestic and international operations suggests that international diversification activities such as investment, sales on investment, and lending vary substantially among banks regardless of whether it is the full sample (all banks) or multinational banks only. This implies that these banks have varying degrees of expansion strategies in their international operations. Second, in both samples, while about a fifth of investment is in overseas, a quarter of sales (interest) on investments comes from overseas operations. This indicates a higher return on overseas investment compared to domestic investment. In general, this higher return on overseas investment is expected as it provides incentives for cross-border investment which is comparatively riskier than domestic investment. In addition, overseas security investment accounts for between 38% and 40% of total security investments in both samples.

The summary statistics of dependent and predictor variables estimated using various empirical strategies are presented in Panels B and C of Table 2. We examine the trend analysis of these expansion variables using line charts (Fig. 1 through 4). Based on the first panel of Fig. 1 the overall DOI shows a steady increase in international expansion activities, especially from 2011 to 2020. Under bank-level evaluation, this

[1] Concerning the first merger (2006), the length of data for the acquired bank before 2006 was insufficient to illustrate its activities independently when examining bank specific analysis. However, the acquired bank information before the merger was treated independently during the empirical estimation (for the reason given in Footnote 2).

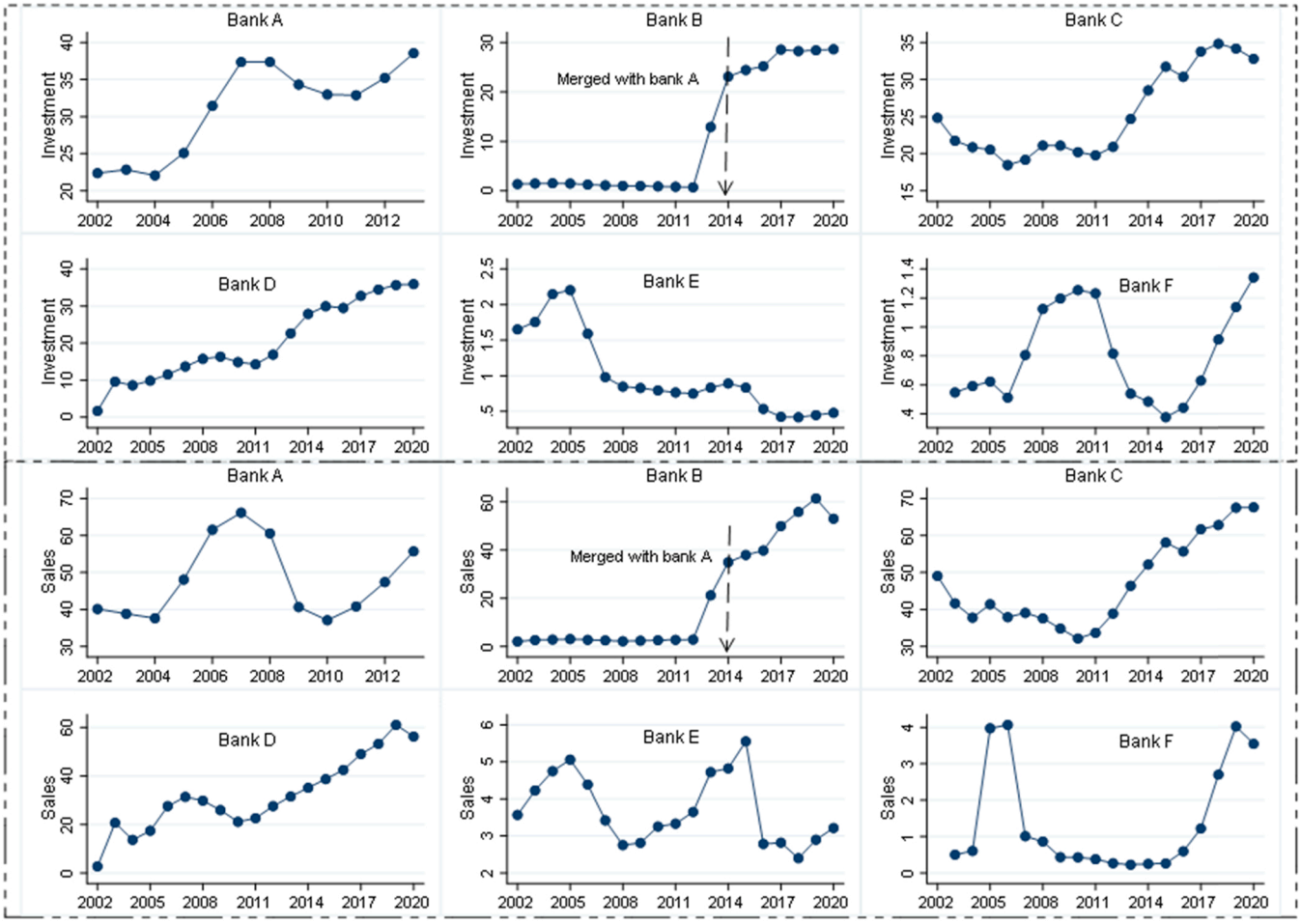

Fig. 2. Trend in overseas investment and sales (% of total investment/sales).

observation is also consistent with the trend of individual banks' DOI except for Bank E which shows a downward trend between 2015 and 2018.[2] This implies that although the degree of international expansion activities varies from bank to bank, in general, there is an increasing trend in overall expansion activities by most banks between 2012 and 2020, historically above pre-GFC. This conclusion is supported by graphs of expansion-specific activity. For example, both panels of Fig. 2 (investment and sales on investment) exhibit increasing trends for all banks except Bank E. However, in terms of lending and sales (interest) on lending, Fig. 3 shows a steady increase from 2011onward for all banks. Remarkably, interest in overseas lending for Bank E grew significantly between 2011 and 2020, indicating a possible increased international lending relative to domestic lending in these periods.

In Fig. 4, overseas return on assets relative to the return on total assets shows a steady increase for Bank C, Bank E, and Bank F. Remarkably, Bank D which shows a consistent steady increase in all other overseas expansion activities demonstrates decreasing return on overseas assets between 2008 and 2014. Bank B also exhibits a sharp decrease in overseas assets returns in 2014. Finally, the number of overseas branches increase rapidly from 2011 onward for all three multinational banks, althought decreasing slightly from 71 to 61 between 2017 and 2020 for bank C. The two megabanks do not maintain international branches.

In sum, the graphical illustrations of international expansion activities lead to a simple conclusion: there is an overall increasing cross-border expansion activity of Japanese banks. A similar trend in overseas expansion activities of Japanese financial institutions was observed by Lam (2015).

5. Empirical results and discussions

5.1. Effect of overall cross-border expansion on bank performance

An important empirical concern is that banks in our sample exhibit varying degrees of cross-border expansion activities. For instance, multinational banks generally maintain a higher international presence and higher degrees of international activities than megabanks and this could present bias in the estimation results. We address this concern by using a split-sample-estimation strategy where we first estimate the full sample (all banks) and then the split sample (multinational banks only). The presented results in Table 3 show that in both samples the results remain stable, and at times more robust when considering only multinational banks. The baseline regression using pooled OLS (1) shows that the overall expansion measure (DOI) has a significant effect on all performance measures. However, based on model specification and robustness test, we re-estimate our model using the feasible generalized least square regression method, controlling for bank fixed effect (2),

[2] Although Bank A and B merged in fall of 2013, our empirical analysis requires that we treat these banks as independent units. This is similar to having unbalance panel data which, in principle, has no effect on the outcome of the panel data analysis. An alternative approach is to pool all data of these two banks together in the period leading to merger as if they were one bank. This approach will introduce bias in the efficiency score estimation because efficiency is based on frontier analysis and sensitive to data pooling between units being analyze.

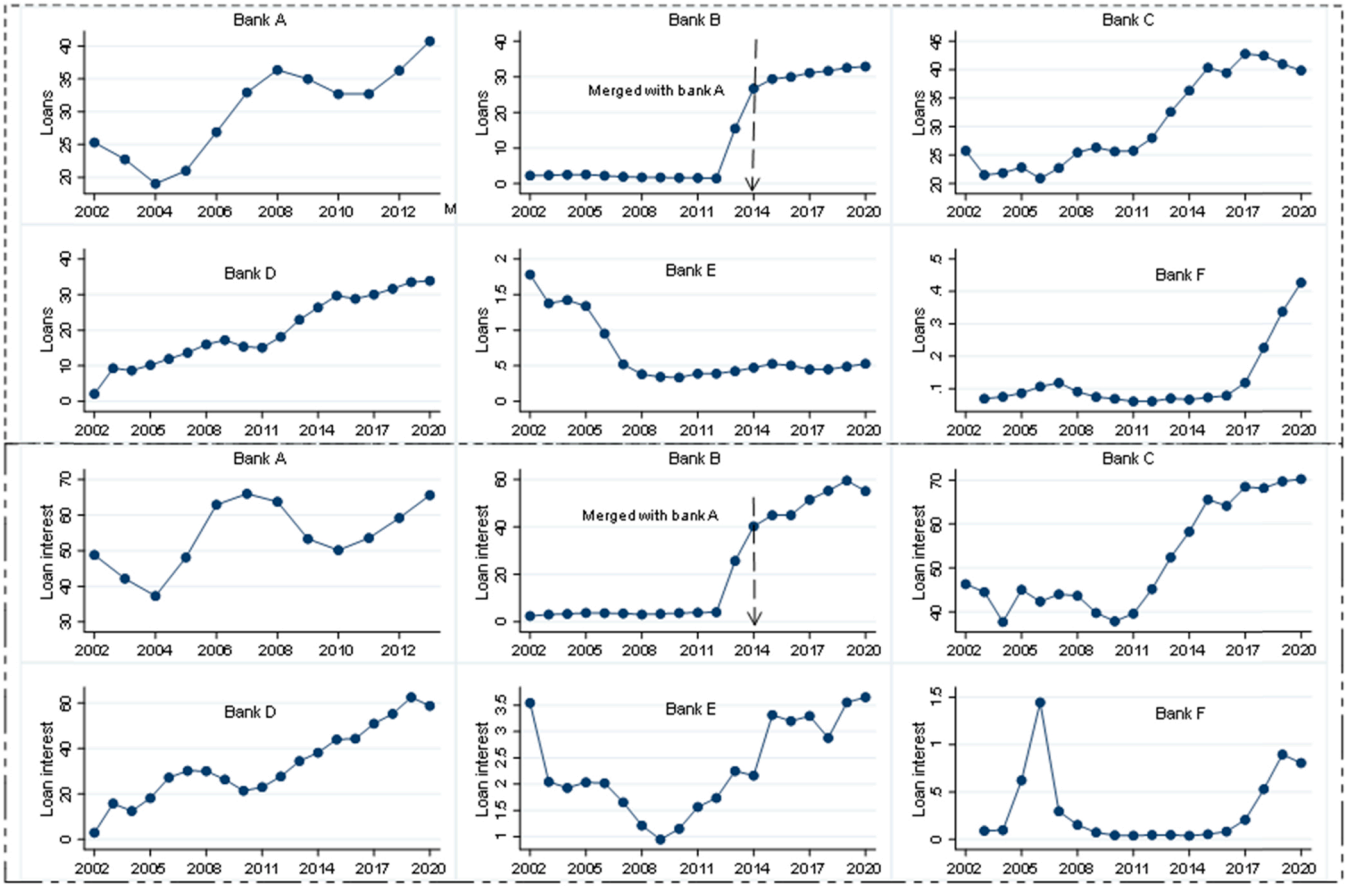

Fig. 3. Trend in overseas loan and loan sales (% of total loans/loan sales).

bank and time fixed effect (3), and bank fixed effect with time trend (4). The results show robust estimates, largely confirming the OLS results. We adopt the latter empirical results hereafter.

Table 3 shows that the control variables exhibit the expected signs, depending on the association of output with a risk measurement index. For example, the bad loan ratio (BLR) has a significant negative effect on all outputs except lending efficiency, whereas the capital adequacy ratio (BIS) has a significantly negative effect on cost and profit efficiency. Interestingly, none interest income (NIIR) has significant positive effects on all outputs.

Panel A of Table 3 reveals that the overall cross-border expansion measure (DOI) has a significantly positive effect on cost efficiency in both sample estimations. Similarly, the results in Panel B show that overall cross-border diversification has a significantly positive effect on lending efficiency in both sample estimations. These results imply that cross-border expansion activities improve the overall cost and lending efficiency. However, in terms of bank-level stability (risk), the full sample results in panel C show a significant negative effect when controlled for bank and time fixed effect, and bank fixed effect and time trend, implying that cross-border expansion increases bank risk when considering the overall bank sample. However, when considering only multination banks, the result shows a positive effect regardless of the estimation strategies, which implies that an increase in overall cross-border diversification results in positive bank-level stability for multinational banks in our sample. It then means that the negative association between expansion activities and bank stability is caused by the activities of the mega banks in our sample.

These results are consistent with empirical findings on the effects of cross-border diversification on bank performance. For example, Deng and Elyasiani (2008) found that overseas (geographical) diversification is associated with value enhancement and overall risk reduction. Several other studies, including a recent one, Gulamhussen et al. (2017) also agree with our results that banks enjoy a diversification advantage that comes with improved earnings (including excess value).

Panel D of Table 2 shows a significant negative effect of overseas diversification on profit efficiency. The results are consistent and robust across all empirical tests and in both sample estimations. This implies that an increase in overseas diversification significantly decreases or harms banks' profit efficiency. This is consistent with findings from a recent study that showed lower mean profitability for internationalized banks operating in the US (Berger et al., 2017). However, our results contradict those of previous a study. Using ROA as a measure of profit (Havrylchyk and Jurzyk, 2011) found that diversification provides leverage to foreign banks operating in Central and Eastern Europe to earn a higher average ROA due to interest rate differentials in foreign markets.

The above findings are not without a caveat. For instance, the effect of the overall diversification measure on bank performance suggests that cross-border expansion improves cost efficiency. This result, however, does not reveal the effect or contribution of individual cross-border expansion activities on cost efficiency. In the section that follows, we examine the effect of individual cross-border expansion activities on bank performance.

5.2. *Effect of individual cross-border diversification activities on bank performance*

This section examines the effects of individual diversification activities on bank performance. We re-estimate our model by regressing each

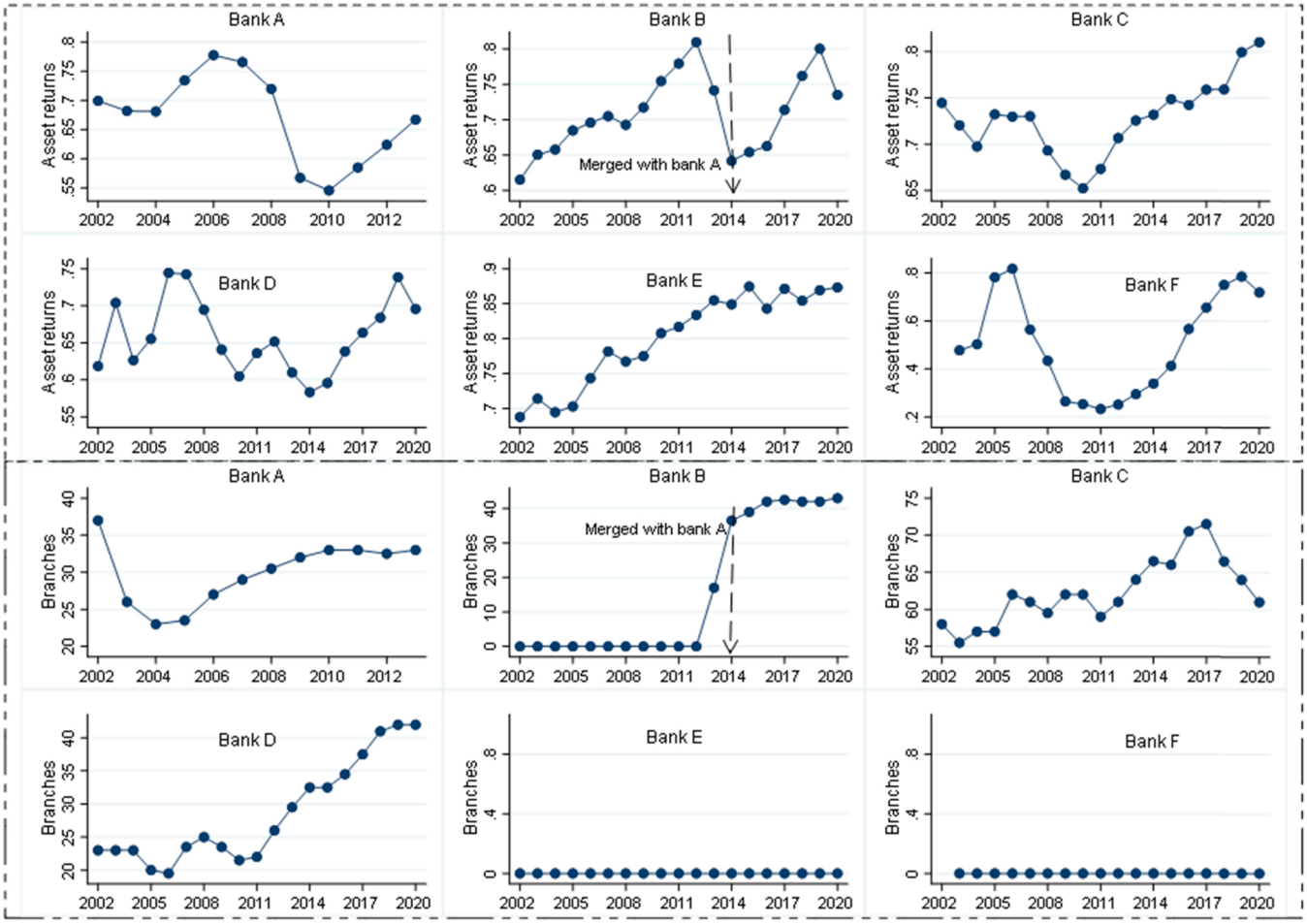

Fig. 4. Trend in overseas asset returns (% of total returns) and no of overseas branches.

performance measure on each of the six expansion activities under different empirical tests. The new estimates presented in Table 3 are robust, largely confirm the earlier results, and provide additional insights.[3] Panel A of Table 3 shows cost efficiency results for both samples. All expansion activities, namely, investment, sales, loan, loan sales (interest), asset returns, and foreign branch expansion have significantly positive effects on cost efficiency. These results support earlier results that cross-border diversification has a positive and significant effect on cost efficiency. The results of individual expansion activities on lending efficiency show that, except for the foreign branch expansion, all overseas expansion activities have a significantly positive effect on lending efficiency, which largely confirms earlier findings. However, the significant negative effect of overseas branch expansion on FISIM implies that an increase in overseas branches decreases lending efficiency by at least one percentage point. Several factors could account for this finding, including operational inefficiency, host country infrastructure, human capital skills, technology, and the local institutional environment.

On the effect of individual expansion activities on bank risks, the results show that all expansion activities increase bank risks when all banks are considered. Notably, this effect is caused by the activities of the mega banks because when considering only multinational banks the result shows that investment, sale, loan, loan interest, and asset returns have significantly positive effects on bank stability (Table 4, Panel C). Only foreign branch expansion has significantly negative effects on bank stability. These results imply that, on the one hand, investment, loans (including their sales), and asset returns significantly improve the stability of multinational banks. And on the other hand, branch expansion decreases bank-level stability. These findings suggest possible funding risks and a confirmation of an earlier contention that the rapid expansion activities of Japanese banks through takeovers and lending especially in the Asian region could present funding risks (Lam, 2015). Finally, the profit efficiency results show that all expansion measures, except foreign asset returns, have significantly negative effects on profit efficiency, implying that an increase in each affected expansion activity decreases or harms the profit efficiency (see Table 4, Panel D). However, the expansion of foreign assets appears to significantly improve the profit efficiency of the banks analyzed.

5.3. Robustness check

We undertake two robustness checks to evaluate the validity of the presented results. First, on simultaneity bias - a notion that either of our main variables (performance or expansion index) could both be a cause and an effect on the other. The causal effect between diversification and firm-level performance is well established in international diversification literature. Indeed, consistent with the literature, diversification directly improves or harms firm-level performance and not the other way round (Berger et al., 2017; Gulamhussen et al., 2017; Havrylchyk and Jurzyk, 2011). This is in line with the diversification hypothesis - that firms diversify to improve their performance. Nevertheless, we deal with this issue by taking the lag of the response variable (DOI) and re-estimating the model. Table 5 shows that the main effect remains the same. Second, we employ an alternative measure of cross-border

[3] *To simplify* Table 3*, we excluded control variables and other regression statistics. The full regression results are presented in appendixes B1-B4.*

Table 3
Effect of overall expansion activities on bank performance.

	Panel A. Dependent variable: Cost efficiency								Panel B. Dependent variable: FISIM							
	Full sample				Multinational banks only				Full sample				Multinational banks only			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR	-.024737**	-.02165***	-.027386***	-.023681***	-.025366**	-.024138***	-.030449***	-.028512***	.084329***	.03715***	.095706***	.024853**	.041811**	.031754*	.104797***	.057683***
	(.00962)	(.004564)	(.005482)	(.004856)	(.011513)	(.006694)	(.007426)	(.006967)	(.025767)	(.011322)	(.019017)	(.011527)	(.018032)	(.016948)	(.018218)	(.016825)
BIS	-.004104	-.005906**	-.000566	-.005142*	-.003784	-.006967**	.012829**	-.00628*	.039241**	.051249***	.06109***	.051859***	-.003392	.012143	.036064**	.005246
	(.002739)	(.002751)	(.003215)	(.002772)	(.003266)	(.003417)	(.005298)	(.003339)	(.01773)	(.013556)	(.018501)	(.012952)	(.012725)	(.011282)	(.014797)	(.01061)
NIIR	.003827**	.005803***	-.001896	.007736***	.001731	.002863	-.004899	.006692**	.033025**	-.000933	.041318***	.011483	.0865***	.060863***	.115316***	.048191***
	(.001819)	(.00183)	(.002242)	(.002331)	(.002116)	(.002489)	(.003129)	(.003035)	(.013446)	(.009213)	(.01298)	(.010483)	(.009036)	(.009027)	(.009286)	(.009888)
DOI	.001503***	.001672***	.000344	.002008***	.002591***	.002475***	-.000055	.003938***	.038085***	.035767***	.043093***	.038065***	.010656***	.013516***	.008954***	.003429
	(.000525)	(.000541)	(.000556)	(.000592)	(.000973)	(.000833)	(.000867)	(.001072)	(.002622)	(.002645)	(.002981)	(.002758)	(.002576)	(.002447)	(.003044)	(.003373)
tm				-.001403				-.00331**				-.010491**				.02***
				(.001088)				(.00158)				(.004274)				(.004979)
_cons	.839846***	.81439***	.973146***	.793757***	.839245***	.859161***	.866932***	.817362***	15.478118***	16.279756***	14.740593***	16.223377***	16.032268***	16.264407***	14.963436***	16.378627***
	(.068704)	(.057244)	(.078556)	(.058427)	(.088523)	(.081017)	(.106295)	(.081435)	(.387572)	(.281891)	(.408449)	(.277148)	(.292063)	(.264977)	(.298979)	(.25635)
Observ	212	212	212	212	140	140	140	140	212	212	212	212	140	140	140	140
F-stat	11.116121	8.76429	13.35451	43.11306	9.322435	19.0428	13.35451	34.6295	63.882544	42.97762	25.120936	24.2240	32.738332	13.8858	25.120936	32.571
Adj R^2	.280952	.326954	.357375	.481568	.221584	.326019	.298621	.30108	.43076	.273867	.302146	.292146	.44696	.463455	.484413	.318211
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No
	Panel C. Dependent variable: zscore								Panel D. Dependent variable: Profit efficiency							
	Full sample				Multinational banks only				Full sample				Multinational banks only			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR	-.218091***	-.217812***	-.147003***	-.135583***	-.122029***	-.134576***	-.012806	-.08705***	-.029879***	-.034541***	-.03781***	-.029852***	-.024821**	-.028188***	-.030188***	-.01778***
	(.030148)	(.029114)	(.030131)	(.026292)	(.038465)	(.03353)	(.033202)	(.031217)	(.006785)	(.004449)	(.00533)	(.004861)	(.010274)	(.00612)	(.006577)	(.006491)
BIS	.070211***	.06107***	.025377	.054168***	.035398*	.044112**	-.017235	.040325**	-.004931	-.005418	-.016086***	-.006012	-.00037	.001958	.006032	.000724
	(.02036)	(.018859)	(.020009)	(.015463)	(.01975)	(.019416)	(.025365)	(.017076)	(.003867)	(.003871)	(.004304)	(.003867)	(.00444)	(.004825)	(.006138)	(.004403)
NIIR	.077162***	.061125***	.026213*	-.000949	.092083***	.064368***	.072587***	.027782*	.016934***	.012113***	.00533*	.007994**	.024413***	.021131***	.016802***	.011471***
	(.015165)	(.014013)	(.014173)	(.014901)	(.019416)	(.015794)	(.015373)	(.016878)	(.002705)	(.002443)	(.003069)	(.003166)	(.003239)	(.003523)	(.00373)	(.003973)
DOI	.010275***	.013544***	.002596	-.00202	.027228***	.027555***	.01888***	.009927	-.003322***	-.003028***	-.003667***	-.003779***	-.002653**	-.002254**	-.007298***	-.006458***
	(.003508)	(.003838)	(.003754)	(.004176)	(.005695)	(.005106)	(.004705)	(.006763)	(.000731)	(.000705)	(.00075)	(.000778)	(.001221)	(.001046)	(.001199)	(.001321)
tm				.049958***				.038462***				.003307**				.009078***
				(.006833)				(.008929)				(.001419)				(.001976)
_cons	2.020459***	2.389877***	3.534016***	2.79511***	1.544367**	1.987324***	2.207963***	2.285629***	.640399***	.753344***	1.0724***	.777167***	.421977***	.457882***	.7296***	.551731***
	(.495696)	(.418865)	(.46936)	(.363645)	(.601695)	(.47149)	(.511623)	(.441128)	(.087582)	(.077416)	(.099967)	(.080068)	(.113226)	(.109378)	(.120606)	(.104146)
Observ	212	212	212	212	140	140	140	140	212	212	212	212	140	140	140	140
F-stat	43.11306	42.360899	37.5289	36.52891	39.282167	84.094	37.5289	69.2003	25.005743	9.775174	13.35451	8.425065	22.622187	63.2635	13.35451	56.5692
Adj R^2	.481568	.512758	.546846	.556846	.442357	.477106	.45585	.54985	.42664	.373242	.357375	.370017	.457974	.443658	.46539	.370017
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No

Robust standard errors in parentheses, *** p<.01, ** p<.05, * p<.1, (1) ≈ Pooled OLS estimation, (2)-(4) ≈ FGLS estimation with AHCD correction

Table 4
Effect of individual diversification activities on bank performance.

	Panel A. Dependent variable: Cost efficiency								Panel B. Dependent variable: FISIM							
	Full sample				Multinational banks only				Full sample				Multinational banks only			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Investment	.00182**	.002025***	.000702	.002419***	.003122***	.003121***	.000367	.004834***	.040026***	.040026***	.047036***	.042805***	.009798***	.013922***	.005779*	.000931
	(.000704)	(.000617)	(.000646)	(.000674)	(.001039)	(.000922)	(.001054)	(.001169)	(.00311)	(.00311)	(.003666)	(.003194)	(.003443)	(.002785)	(.003506)	(.00374)
Sales	.001038**	.001156***	.000205	.001392***	.001696***	.001621***	-.000142	.002535***	.023314***	.023314***	.029124***	.024565***	.006813***	.0086***	.00579***	.002227
	(.000412)	(.000357)	(.000376)	(.000391)	(.000613)	(.000541)	(.000561)	(.000689)	(.001782)	(.001782)	(.002046)	(.001843)	(.001995)	(.001584)	(.001974)	(.002156)
Loans	.001324**	.001466***	.000258	.001745***	.002341**	.002178***	-.000028	.003501***	.036206***	.036206***	.041874***	.03905***	.012447***	.014819***	.01047***	.006339*
	(.000625)	(.000544)	(.000534)	(.000596)	(.00095)	(.000838)	(.000846)	(.001088)	(.002491)	(.002491)	(.00271)	(.002675)	(.003024)	(.002425)	(.002992)	(.003332)
Loan interest	.000885**	.000994***	.000168	.001186***	.001518***	.001447***	-.000054	.002216***	.021334***	.021334***	.025687***	.022563***	.006257***	.008094***	.005516***	.00164
	(.00038)	(.000329)	(.000336)	(.000359)	(.00058)	(.000511)	(.000515)	(.000647)	(.001598)	(.001598)	(.001792)	(.001678)	(.001888)	(.001535)	(.001829)	(.002063)
Asset Returns	.095413	.110736**	.070488*	.111264**	-.153041	-.165153	-.275823**	-.191864	.465956	.465956	.928067**	.386535	-.014898	-.426657	-.453465	-1.308498***
	(.059936)	(.044336)	(.042147)	(.044694)	(.176965)	(.160232)	(.138123)	(.164803)	(.430014)	(.430014)	(.448681)	(.435882)	(.586026)	(.55245)	(.494704)	(.469644)
Branches	.001294***	.001579***	.001145***	.001582***	.001369**	.001642***	.0011**	.001651***	-.011309***	-.011309***	-.016038***	-.012076***	-.01223***	-.01393***	-.011015***	-.012896***
	(.000437)	(.000421)	(.000365)	(.000423)	(.000548)	(.000492)	.000367	(.000494)	(.002196)	(.002196)	(.002289)	(.002121)	(.001524)	(.001511)	(.001487)	(.001287)
Time trend	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No
Panel C. Dependent variable: zscore									Panel D. Dependent variable: Profit efficiency							
	Full sample				Multinational banks only				Full sample				Multinational banks only			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Investment	.010266**	.014093***	.002072	-.003222	.027845***	.028779***	.023047***	.007941	-.003831***	-.003526***	-.004267***	-.004332***	-.003191**	-.002795**	-.008783***	-.007097***
	(.004875)	(.004362)	(.004209)	(.004551)	(.006179)	(.005655)	(.00535)	(.007337)	(.000874)	(.000807)	(.000854)	(.000885)	(.001319)	(.001168)	(.001325)	(.001449)
Sales	.006765**	.008803***	.002047	-.0016	.017144***	.017054***	.011266***	.005444	-.002209***	-.002032***	-.002495***	-.00257***	-.00166**	-.001425**	-.004519***	-.004158***
	(.002846)	(.002536)	(.002525)	(.002753)	(.003598)	(.003317)	(.003082)	(.004275)	(.000513)	(.000467)	(.000507)	(.000517)	(.000777)	(.000677)	(.000787)	(.000841)
Loans	.010428**	.01339***	.00224	-.001483	.027352***	.027928***	.019072***	.010373	-.002976***	-.002727***	-.003285***	-.003363***	-.002281*	-.001933*	-.006861***	-.005823***
	(.00429)	(.003836)	(.003648)	(.00421)	(.005517)	(.005133)	(.004615)	(.006888)	(.00078)	(.000704)	(.000732)	(.000775)	(.001203)	(.001058)	(.001196)	(.00136)
Loan Interest	.006499**	.008584***	.001704	-.000767	.017***	.017077***	.011027***	.006927*	-.002067***	-.001883***	-.002266***	-.002339***	-.001667**	-.001422**	-.004306***	-.003934***
	(.002613)	(.002336)	(.002287)	(.00256)	(.003368)	(.003119)	(.002834)	(.004052)	(.00047)	(.000429)	(.000456)	(.000473)	(.000732)	(.000643)	(.000728)	(.000802)
Asset Returns	-.689129*	-.641051	-1.158912***	-1.095742***	2.494204**	2.276822**	-.587745	.661536	-.149554*	-.111319*	-.082526	-.116031*	.066238	.118507	.211967	-.026723
	(.412797)	(.401615)	(.297295)	(.349023)	(1.074569)	(1.007344)	(.798887)	(.851169)	(.076383)	(.065653)	(.062502)	(.06687)	(.222615)	(.214014)	(.210504)	(.219936)
Branches	-.006361**	-.005417	-.007365***	-.006091*	-.004699	-.004872	-.006788**	-.003605	-.004123***	-.004276***	-.00425***	-.004264***	-.003922***	-.004037***	-.004798***	-.003971***
	(.003045)	(.003677)	(.002237)	(.003182)	(.003439)	(.00389)	(.002856)	(.003334)	(.000494)	(.000506)	(.00044)	(.000509)	(.000618)	(.000619)	(.000605)	(.000621)
Time trend	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No

Robust standard errors in parentheses, *** p<.01, ** p<.05, * p<.1, (1) ≈ Pooled OLS estimation, (2)-(4) ≈ FGLS estimation with AHCD correction

Table 5
Robustness check: lagged DOI effect on bank performance.

	Cost efficiency				FISIM			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR_1	-.023436***	-.016197***	-.023372***	-.01638***	.08856***	.03616***	.094072***	.019722*
	(.007967)	(.004562)	(.006882)	(.004866)	(.024267)	(.010613)	(.02134)	(.01147)
BIS_1	-.000368	-.000711	.004061	-.000648	.037757**	.04176***	.05176***	.048118***
	(.003327)	(.002896)	(.003226)	(.002952)	(.017043)	(.01306)	(.018175)	(.012753)
NIIR_1	.003301*	.004962**	-.002591	.005129**	.038937***	.00193	.054009***	.01655
	(.001963)	(.001957)	(.00246)	(.002485)	(.0133)	(.009148)	(.014663)	(.010644)
DOI_1	.001134**	.00135**	-.000023	.001376**	.038817***	.036392***	.044508***	.038744***
	(.000548)	(.000581)	(.000559)	(.000629)	(.002611)	(.00267)	(.003035)	(.002731)
tm				-.000127				-.013215***
				(.001167)				(.004656)
_cons	.808362***	.763471***	.878082***	.761981***	15.385691***	16.334935***	14.584011***	16.243122***
	(.065339)	(.060333)	(.082664)	(.061827)	(.380031)	(.274476)	(.455944)	(.27068)
Observ.	205	205	205	205	205	205	205	205
F-stat	11.085255	35.488333	35.833877	60.430544	32.473226	38.659488	44.279288	38.659488
Adj R^2	.220683	.302709	.284998	.303982	.394781	.438362	.472846	.438362
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No
	zscore				Profit efficiency			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR_1	-.232209***	-.233273***	-.118667***	-.172338***	-.016714**	-.020686***	-.011467	-.016036***
	(.02874)	(.025751)	(.034878)	(.02446)	(.007735)	(.004977)	(.007866)	(.005372)
BIS_1	.089345***	.081578***	.040872**	.070912***	-.006659	-.00511	-.012758***	-.005691
	(.017238)	(.017309)	(.019807)	(.014602)	(.004334)	(.003777)	(.004371)	(.00375)
NIIR_1	.075969***	.06246***	.006105	.013229	.023095***	.019947***	.015393***	.016665***
	(.01483)	(.013032)	(.015646)	(.014036)	(.002775)	(.002613)	(.003519)	(.003197)
DOI_1	.005805*	.008556**	-.001731	-.002719	-.001966***	-.001733**	-.001805**	-.00247***
	(.003185)	(.003593)	(.003874)	(.003881)	(.000726)	(.000714)	(.000816)	(.0008)
tm				.038697***				.002934**
				(.006524)				(.001446)
_cons	1.981022***	2.291224***	4.143068***	2.642987***	.503665***	.556301***	.762339***	.569769***
	(.447051)	(.382694)	(.505655)	(.339395)	(.079602)	(.079569)	(.111694)	(.08032)
Observ.	205	205	205	205	205	205	205	205
F-stat	25.775129	309.56954	83.670868	36.52891	28.16985	25.172135	34.576295	24.833835
Adj R^2	.449642	.484079	.520276	.556846	.402721	.368132	.265	.262607
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No

expansion that considers the index of overall growth in international earnings assets relative to the total earning asset growth of a bank. This is similar to the notion of international share index used by Gulamhussen et al., (2017). This is expressed as.

$$DOI_{alternative} = 1 - \left(\frac{Totalearningasset - foreignearningassets}{Totalearningasset}\right)$$

The above relation is bounded between 0 and 1, with values close to 1 indicating higher international diversification. The result of the alternative measure is presented in Table 6. Again, the findings on the main effects of cross-border expansion on bank performance remain the same (except for higher estimates parameter coefficients), which support our earlier findings. Based on these consistent and robust estimates we conclude that the earlier presented results are valid.

6. Discussion, implications, and concluding remarks

6.1. Discussion and implications

In recent years, Japanese banks have increased their cross-border expansion activities globally, especially in the Asia-Pacific region due, in part, to the withdrawal of other megabanks from this region post-GFC (Yaguchi et al., 2018). Unlike previous episodes of expansion, the recent expansion of Japanese banks can be linked to shrinking domestic lending and investment opportunities caused by socio-demographic structural changes and financial regulatory frameworks such as low-interest rate regimes, among others. It has been noted that this recent aggressive overseas expansion trend resembles the trend observed in the late 1980s and 1990 during which Japanese banks were exposed to foreign market risks and incurred heavy losses (Lam, 2015). This paper examined the effect of these recent expansion activities on the performance of some Japanese multinational banks and megabanks conducting international operations. The findings provide empirical evidence on the effect of cross-border expansion activities on bank performance. The analysis of how expansion-specific activity affects bank performance, which was largely ignored in previous studies, provides interesting insights. Corroborating previous studies on diversification benefits, we find that cross-border expansion, in general, is desirable for improving the cost efficiency of Japanese banks. Using different measures of bank performance, Deng and Elyasiani (2008) found that geographical diversification leads to value enhancement and lower risk. In addition, using shareholder value as a measure of bank performance, Gulamhussen et al. (2017) show that banks enjoy a cross-border diversification advantage that comes with improved earnings and excess value.

Unlike cost efficiency, however, the profit efficiency of Japanese banks was negatively impacted by increasing cross-border expansion activities. This empirical evidence remains consistent and robust irrespective of whether it is overall expansion or specific expansion activity. Only foreign assets expansion seems to improve profit efficiency. These findings shed more insights on a recent report on the cross-border activities of Japanese banks which show declining profits and increasing overall funding costs (NRI, 2020). And given the recent decision by a Japanese multinational bank to exit US retail banking (Kelly, 2021), it can be argued that the overseas business environment of Japanese banks is becoming increasingly competitive thereby decreasing significantly revenue, profit, and consequently, profit efficiency of these banks. Besides overseas competition, it has been noted that deregulations and business environments have significant effects on profit (Humphrey and Pulley, 1997). In this case, both factors (the local regulatory framework

Table 6
Robustness check: alternative measure of overall expansion activity.

	Cost efficiency				FISIM			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR_1	-.024668**	-.021611***	-.02677***	-.023771***	.082791***	.034***	.084226***	.018043
	(.009631)	(.004569)	(.005507)	(.004856)	(.026102)	(.011731)	(.019611)	(.011563)
BIS_1	-.004269	-.006118**	-.000742	-.005343*	.03626**	.051975***	.060786***	.051639***
	(.002729)	(.002759)	(.003214)	(.002772)	(.018295)	(.013712)	(.018387)	(.012788)
NIIR_1	.003817**	.005751***	-.001502	.007842***	.030966**	-.002875	.037193***	.014397
	(.001813)	(.001822)	(.002234)	(.002334)	(.013517)	(.009249)	(.013102)	(.010553)
DOI_alt	.183943***	.203074***	.061151	.248251***	4.490018***	4.277049***	5.173993***	4.684641***
	(.061964)	(.0648)	(.067902)	(.071616)	(.313606)	(.321496)	(.37321)	(.336928)
tm				-.001517				-.013924***
				(.001098)				(.004353)
_cons	.841928***	.817922***	.962553***	.796015***	15.578681***	16.341248***	14.920163***	16.266531***
	(.067924)	(.05695)	(.078374)	(.058075)	(.392844)	(.282635)	(.410612)	(.274193)
Observ.	212	212	212	212	212	212	212	212
F-stat	11.517479	9.519571	10.685105	10.685105	61.686447	36.781732	27.627302	27.627302
Adj R^2	.281526	.323047	.346229	.346229	.421653	.319496	.324374	.324374
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No
	zscore				Profit efficiency			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
BLR_1	-.219822***	-.220448***	-.149497***	-.136034***	-.029492***	-.034364***	-.037808***	-.029696***
	(.030228)	(.029096)	(.030266)	(.026159)	(.006821)	(.004467)	(.00532)	(.004875)
BIS_1	.069893***	.06079***	.026141	.054654***	-.004764	-.005546	-.016485***	-.006202
	(.020476)	(.018911)	(.02008)	(.015434)	(.003869)	(.003897)	(.004343)	(.003895)
NIIR_1	.075888***	.059247***	.024006*	-.003529	.017252***	.01232***	.005684*	.008207***
	(.015127)	(.013977)	(.014051)	(.014802)	(.002711)	(.002443)	(.003056)	(.003179)
altDOI_1	1.14293***	1.511569***	.214108	-.403916	-.378486***	-.349755***	-.43126***	-.441259***
	(.404469)	(.457477)	(.447787)	(.488899)	(.08705)	(.084804)	(.090496)	(.094135)
tm				.051501***				.003319**
				(.006952)				(.001432)
_cons	2.066765***	2.455227***	3.593606***	2.834784***	.627935***	.747883***	1.066131***	.771961***
	(.491311)	(.415664)	(.465272)	(.357928)	(.087649)	(.077538)	(.099779)	(.080183)
Observ.	205	205	205	205	205	205	205	205
F-stat	42.682957	54.298903	33.6578	33.6578	25.077471	19.167878	133.74137	133.74137
Adj R^2	.479836	.507682	.547233	.547233	.433252	.370332	.367091	.367091
BFE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
TFE	No	No	Yes	No	No	No	Yes	No

and host countries' business environment) could also be having negative effects on the profit efficiency of Japanese banks conducting international operations.

Empirical banking literature suggests that profit efficiency is a more important and informative measure of bank performance than cost efficiency since it considers the degree of competition, different regulatory environments, product or service quality, and specialization, all of which exact significant influence on inputs cost and revenue (Isik and Kabir Hassan, 2002; Maudos and Pastor, 2001). Moreover, maximizing profits requires that, in addition to minimizing cost, revenue must also be maximized, making profit efficiency score an important piece of information for bank management (Maudos et al., 2002). In fact, profit efficiency requires that adequate managerial attention be paid to raising a marginal dollar of revenue as well as reducing a marginal dollar of cost' (Isik and Kabir Hassan, 2002; Schaeck and Martin Čihák, 2008). It then means that our established findings on cross-border expansion decreasing profit efficiency presents a broad and deeper insight into the recent expansion activities of Japanese banks and if so indicate that a change in strategy is required, namely, a deliberate combination of outputs that maximizes net revenue and appropriate pricing of inputs.

The finding that most expansion activities improve lending efficiency is intuitive and again consistent with the diversification hypothesis. Lending efficiency as used here has the same meaning as FISIM which is the residual earnings from lending adjusted by deposit costs and interbank rates and can loosely translate to the efficiency with which such service is rendered. Therefore, cross-border expansion is expected to yield positive lending efficiency as it offers banks the advantage and flexibility to pool deposits from one geographical location to another using subsidiary. However, as presented, overseas branch expansion appears to decrease lending efficiency. This is indicative of a rapid wave of overseas branch expansion of multinational banks in our sample. For instance, all multinational banks in our sample rapidly increased international branch expansion by 30–50% within a decade (between 2011 and 2020). Three sources of lending inefficiency could result from this rapid expansion: local exchange rate influence, human capital skills, and the host country's market risks.

Following the aftermath of the GFC, there has been a renewed interest in cross-border diversifications and the risk of multinational and mega banks. Empirical findings on this issue present divergent conclusions. For instance, while some studies such as (Battiston et al., 2012; Berger et al., 2017; Gulamhussen et al., 2014; Huang et al., 2012) argued that cross-border diversification is associated with systemic risk, other researchers showed that geographical diversification is associated with risk reduction (Deng and Elyasiani, 2008). Our empirical findings support both arguments. On the one hand, we find that expansion activities increase bank risks when we examined all banks, and on the other hand, we find that cross-border expansion activities improve bank-level stability (reduce bank risk) when examining only multinational banks. However, the result indicates that rapid expansion of foreign assets negatively affects bank-level stability irrespective of banks. While the acquisition of foreign assets in general, could provide banks with a strong footing and greater advantage in carrying out overseas operations and earning revenue, these activities could be offset by overly priced overseas assets and funding risk (Lam, 2015). Moreover, overseas assets and operations are subject to the host countries' local financial market risk, infrastructure, regulatory framework, technology, and technical expertize. Hence, it has been argued that Japanese banks conducting international operations must improve their risk assessment and management approach to enable them to withstand overseas market stress, including infrastructural upgrades and human resources (Aduba and

Izawa, 2021).

6.2. Concluding remarks

This study examined the effect of overseas expansion activities on bank performance using bi-annual data on the overseas operations of some Japanese banks between 2003 and 2020. We empirically examined the effect of six measures of cross-border expansion activities: investment, sales, loans, loan interests, assets return, and branch networks on four measures of bank performance: cost efficiency, profit efficiency, bank stability, and lending efficiency.

The findings show that cross-border diversification improves cost efficiency, lending efficiency, and in some cases, bank stability. Conversely, cross-border diversification tends to decrease or harm the profit efficiency of the analyzed banks. Our findings also suggest that different cross-border expansion-specific activities have varying effects on the various bank performance measures investigated: some expansion activities have a positive effect while others have a negative effect. Notably, there was evidence of funding risks, as suggested by the negative effect of overseas assets expansion on bank-level stability. Furthermore, we found that rapid overseas branch expansion presents operational inefficiency which harms lending efficiency.

Consistent with previous studies, this paper showed that there exist both benefits and risks in cross-border expansion activities of Japanese banks. In addition, the paper further showed that expansion-specific activity matters in the cross-border expansion strategies of banks. Based on our findings, we offer two important conclusions and recommendations. First, as a major player in international lending, the current expansion activities of Japanese banks require close monitoring and supervision to prevent systemic risk resulting from aggressive and risky overseas expansion activities. Second, the current expansion strategies of Japanese banks, especially the expansion of overseas assets and branch operations (retail banking), should be re-examined.

The study has some limitations mainly related to the data used. First, it used aggregated data from all overseas transactions. Hence, the effect of the host countries' specific characteristics on the results could not be tested. Second, Japanese firms (including banks) are known for their long-term investment horizons. However, our data covers approximately two decades which might not be sufficient to reflect the potential gain of a long-term investment horizon beyond two decades. Future studies with similar research questions should address these limitations.

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CRediT authorship contribution statement

AJJ designed, analyzed, and drafted this manuscript. HK provided the data, translated the data from Japanese to English, and redraft the paper.

Declarations of interest

none.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.japwor.2022.101173.

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