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Bank value and geographic diversification: regional vs global☆

Canan Yildirim[a,1], Georgios Efthyvoulou[b,*]

[a] Rennes School of Business, France
[b] University of Sheffield, United Kingdom

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ABSTRACT

This paper analyzes the impact of geographic diversification on bank value by employing a data set comprising the largest banks across the world, originating from both developed and emerging countries. The findings suggest that the value impact of international diversification depends on a bank's home country: higher levels of diversification are associated with changes in valuations only for banks originating from emerging countries. In addition, the locus of destination of the diversification efforts matters for the direction of effects: while higher levels of intra-regional diversification lead to value enhancement, higher levels of inter-regional diversification seem to induce a negative (but statistically less robust) effect on the valuation of emerging country banks.

1. Introduction

From the mid-1990s and up until the onset of the global financial crisis, the internationalization of financial institutions increased dramatically (Claessens and van Horen, 2012b; Claessens, 2017). The main contributing factors to this phenomenon were the liberalization and deregulation of financial markets, the higher demand for international financial services arising from increased economic and financial integration, and the mitigation of geographic distance effects on bank efficiency through technological improvements (Berger et al., 2004).

In recent years, though, the global banking sector has undergone a major transformation, which accelerated in the wake of the global financial crisis (Claessens and van Horen, 2014a; BIS, 2014; Claessens, 2017; Lund et al., 2017). Banks from the Eurozone and other developed economies retrenched from several foreign markets due to lower margins on foreign business in countries where they lacked scale and expertise (Lund et al., 2017). A substantial regulatory overhaul subsequent to the crisis also created disincentives for advanced country multinational banks to maintain large and complex foreign operations. Banks from emerging and developing economies, on the other hand, continued to expand abroad[2] – following the increasing dominance of their countries in the world economy in recent years – and became more regionally integrated. As a result, the current landscape of global banking encompasses a larger variety of players, with banks from emerging markets having an increasingly important role, and is characterized by a rising trend towards greater regional activity. While existing studies have examined this restructuring in global banking at the industry-level, the micro-level adjustments in the geographic diversification of global banks and the performance effects of the recent state of geographic diversification have yet to be considered. Our study aims

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* Corresponding author at: Department of Economics, University of Sheffield, 9 Mappin Street, Sheffield S1 4DT, United Kingdom.
E-mail addresses: canan.yildirim@rennes-sb.com (C. Yildirim), g.efthyvoulou@sheffield.ac.uk (G. Efthyvoulou).
[1] Address: Rennes School of Business, 2 Rue Robert d'Arbrissel, 35065 Rennes, France.

[2] For instance, China's four largest commercial banks (the largest banks in the world based on total assets at the end 2016) quadrupled their share of foreign assets between the years 2007 and 2016 (Lund et al., 2017).

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to fill this gap using data from the largest banks across the world over the period 2004–2013.

We contribute to the literature in three distinct ways. First, while building on previous research on the bank internationalization-performance relationship, this is the first study – to the best of our knowledge – that focuses on the conditionality of this relationship upon the locus of destination of the diversification efforts: regional versus global. Recent advances in the international business (IB) literature note that multinational enterprises (MNEs) tend to be more regional than global, in terms of the breadth and depth of their market coverage, and that most of their international activity is conducted within their home regions (Rugman and Verbeke, 2004, 2007; Oh, 2009).[3] The key insight here is that a region, defined in geographic terms, consists of countries with lower physical, economic, cultural and institutional distance than at the global level (Rugman and Verbeke, 2007; Arregle et al., 2009). The regional focus of firms' international activity can thus be explained by what is referred to as 'compounded distance'; that is, the need to manage various dimensions of distance simultaneously (Rugman et al., 2011).[4] These insights from the IB literature clearly suggest that, in order to gain a better understanding of the performance implications of banks' geographic diversification, it is imperative to account for the existence of regional boundaries. To this end, we employ measures of international diversification that have never been explicitly used in the banking literature, and make a distinction between two types of geographic diversification: intra-regional, referring to diversification within a single region where the bank is already present, and inter-regional, referring to diversification across different regions (Qian et al., 2013).

Second, as opposed to existing studies in international banking which are heavily focused on advanced economies,[5] our sample includes banks originating from a large number of countries with diverse economic and institutional settings. This allows us to uncover systematic differences in diversification trends between developed country banks (DC banks) and emerging country banks (EC banks), and to identify the underlying bank- and country-specific characteristics affecting the diversification-performance relationship.

Third, our work adds to the ongoing regionalization-versus-globalization debate. Previous empirical studies on this debate have failed to reach a consensus, necessitating more research on the geographic limits of international diversification. Furthermore, they have ignored the banking industry,[6] despite its significant differences with the other industries. Banks' internationalization strategies, compared to those of non-financial firms, are subject to additional complexities (Grant and Venzin, 2009) and are highly sensitive to institutional and regulatory proximities. In addition, the performance of banks is a central issue affecting financial stability, business cycle fluctuations and economic growth (Berger and Bouwman, 2017). We thus contribute to the aforementioned debate by looking at a very important industry, where intra-regional settings (associated with lower environmental complexity and similar institutional and regulatory set-ups) can play a crucial role.

Rather than pursuing an analysis of accounting measures of performance, we investigate whether the diversification activities conducted by banks influence their valuations, as captured by Tobin's Q (the ratio of a bank's market value to the replacement value of its assets).[7] Unlike accounting measures, such as return and risk-proxy ratios, Tobin's Q is forward-looking and can better capture the long term strategy and hence the capacity of banks to generate sustainable earnings (ECB, 2010). As outlined by Lang and Stulz (1994), since a bank's market value is an estimate of the present value of its future cash flows, Tobin's Q can be viewed as a measure of the contribution of the bank's intangible assets to this value, including its management's competence in choosing the right diversification strategies. Furthermore, markets' assessment of value drivers, such as capitalization and size, may change over time depending on economic developments and regulatory changes (Calomiris and Nissim, 2014; Chan-Lau et al., 2015). Focusing on Tobin's Q is therefore especially appropriate for our research context, since this measure incorporates markets' capitalization of diversification benefits which may have changed dramatically since the onset of the global financial crisis.

We start our empirical analysis by constructing measures of intra-regional and inter-regional diversification and documenting the evolution of their average values over the period 2004–2013, for both DC banks and EC banks. We then investigate the impact of these measures on Tobin's Q at the bank-level, and test whether the resulting effects vary with respect to home country attributes. To capture the existence of rich dynamics in bank valuations and correct for potential endogeneity problems stemming from simultaneous relationships between bank value and diversification measures,[8] we use a dynamic econometric framework and employ the system Generalized Method of Moments (system-GMM) estimation technique. To make additional inferences about the impact of diversification on the overall bank performance and shed light on the underlying mechanisms, we perform additional analyses: (i) examine the impact of diversification on proxies for profitability and risk; and, (ii) employ an 'institutional' definition of regions. Finally, to ensure robustness, we use alternative proxies for bank value and geographic diversification, and alternative specifications and samples.

Since the main objective of our study is to investigate how bank valuations are affected by changes in intra-regional and inter-regional geographic diversification, we consider large-sized banks which tend to engage in cross-border activities. Small banks, in general, are significantly less likely to diversify across borders as they face additional challenges and costs (Gulamhussen et al., 2014). More importantly, as suggested in other studies (see, for example, Berger et al., 2017) and observed in our data, there is not much intertemporal variation in a bank's international status – the vast majority of banks remain either purely domestic or international over time – and thus only large-sized banks can exhibit significant within-bank variation in geographic diversification within and across different regions. The focus on large (global) banks is also important from a policy perspective, as these banks were the main vehicles through which financial systems globally became more integrated before the global financial crisis and the ones mostly affected by the crisis and the subsequent regulatory overhaul (Claessens and van Horen, 2014a; Claessens, 2017).

[3] García-Herrero and Vázquez (2013), Cetorelli and Goldberg (2014) and Claessens and van Horen (2014a) document an increasing regional focus (or home bias) in multinational banks' assets and operations. More recently, Duijm and Schoenmaker (2017), using data from the 61 largest European banks, show that banks' foreign exposures are heavily concentrated in other European countries and in North America.

[4] As also noted by Rugman et al. (2011), the compounded distance is insufficiently captured in efforts to simply add or aggregate various types of distance, as these are highly interdependent.

[5] One important exception is a single-country study by Berger et al. (2010), which analyses the performance effects of diversification for Chinese banks along four dimensions: loans, deposits, assets and (local) geography. The authors report diversification discount for all four dimensions, partly due to inexperienced management and agency problems.

[6] The only exception is the study by Grosser (2005), which describes the globalization strategies of the ten largest financial service providers.

[7] See Laeven and Levine (2007), Deng and Elyasiani (2008) and Goetz et al. (2013) for a similar approach.

[8] Endogeneity may arise when highly valued banks are more likely to diversify regionally or globally; for instance, due to lower cost of external finance.

Our two main findings can be listed as follows. First, higher levels of geographic diversification are associated with changes in valuations for EC banks, but not for DC banks. Second, the direction of effects depends on the locus of destination of the diversification efforts: while higher levels of intra-regional diversification lead to value enhancement, higher levels of inter-regional diversification seem to induce a negative (but statistically unstable) effect on the valuation of EC banks. Our results also reveal potential explanations of these findings. Banks originating from ECs – being small, growing and operating in economies which are less financially and institutionally developed – can derive efficiency and learning benefits from pursuing a moderate expansion strategy that is concentrated in their home regions, which, due to country similarities and spatial proximities, entails low adaptation costs and risks. On the other hand, by engaging in greater inter-regional diversification, these banks face extensive challenges and high risks (especially in periods of heightened financial distress), which can eliminate or even outweigh the high profitability gains that can be drawn from having access to an expanded multi-regional network.

The rest of the paper proceeds as follows: Section 2 reviews the relevant literature and develops the main hypotheses to be tested; Section 3 presents the measures of intra-regional and inter-regional diversification, outlines the empirical strategy and describes the data and the sampling procedure used; Section 4 reports the empirical results and investigates their robustness; Section 5 provides a discussion of the study's conclusions.

2. Literature review and hypotheses development

2.1. Background: theory and empirical evidence

Geographic diversification can enhance the valuations of financial institutions through a variety of channels. For instance, higher levels of geographic diversification may reduce the exposure to idiosyncratic local shocks (Diamond, 1984; Deng and Elyasiani, 2008; Goetz et al., 2016), enhance managerial efficiency (or x-efficiency) and scale and scope economies (Berger and DeYoung, 2001), diversify sources of funding, and improve internal capital markets (de Haas and van Lelyveld, 2010; Cetorelli and Goldberg, 2012). However, geographic diversification can also lead to a discount in the valuation of financial institutions. Efficiency disadvantages may occur when inferior management practices are spread over a larger amount of resources or when transfers of managerial skills to new geographic markets are not possible (Berger and DeYoung, 2001). Difficulties associated with managing a larger and geographically diverse organization may result in scale and scope diseconomies. As the physical distance between bank headquarters and local offices increases, monitoring the local economic environment becomes more challenging and costly. Agency problems can be intensified as well, since geographic spread makes it more difficult for outsiders to monitor and exert effective corporate control (Deng and Elyasiani, 2008; Goetz et al., 2013).

From a cross-border perspective, geographic diversification provides financial institutions with additional advantages and challenges. Internalization theory claims that firms become multinational as a response to various market failures. Specifically, according to this theory, internationalization takes place when firms internalize their intermediate markets across national boundaries to combine and exploit firm-specific advantages, such as proprietary technology and superior managerial skills, and country-specific advantages, such as access to a large consumer market or better institutional frameworks. International expansion, however, also makes firms subject to the 'liability of foreignness' (LOF); that is, "all additional costs a firm operating in a market overseas incurs that a local firm would not incur" arising mainly due to environmental unfamiliarity, cultural, political and economic differences, and costs associated with spatial distance (Zaheer, 1995, p.343).

Under the internalization theory, the failure of market for knowledge, in particular, creates the strongest incentives for organizing an internal market. Hence, the banking industry is expected to be dominated by multinationals due to its skill-, knowledge- and communication-intensive nature (Williams, 1997). Financial services firms, however, compared to industrial multinationals, experience additional complexities in their internationalization strategies due to the information intensity and institutional sensitivity of the industry, and the difficulties in reconciling the strategic requirements of diverse products and national markets. Geographic and cultural distance between headquarters and local branches makes the collection of soft information and its transmission within the financial organizations harder (Stein, 2002; Mian, 2006). Management and corporate governance problems in global banks tend to be more pronounced due to their larger size and higher organizational complexity.[9] At the same time, differences in regulations and customer demand characteristics across national markets increase local market adaptation needs which, in turn, raise transaction costs and limit exploitation of cross-border economies of scope. As a result, transferring competitive advantages (based on organizational capabilities and resources) from home base to foreign units becomes the primary source of internationalization gains (Grant and Venzin, 2009). Along these lines, banks' cross-border location decisions are argued to be influenced by the geographic, cultural and institutional proximities (in addition to economic links) between the source and the host countries, as these reflect informational problems and the learning costs of dealing with different set-ups across countries (Galindo et al., 2003; Buch and DeLong, 2004; Focarelli and Pozzolo, 2005; Claessens and van Horen, 2014b; Duijm and Schoenmaker, 2017).

Acknowledging that expanding into foreign markets is an important diversification strategy for banks, a large body of literature has offered insights into the motivations and the performance gains of internationalization. Enhanced portfolio diversification benefits, opportunities for regulatory and tax arbitrage, access to markets with better growth prospects and higher profit margins, and internalization of existing bank-client relationships or the so-called 'follow the customer effects' are some of the reasons provided to explain higher levels of internationalization (Focarelli and Pozzolo, 2005; Magri et al., 2005; Karolyi and Taboada, 2015; Merz et al., 2017).

In this context, a particular line of analysis focuses on testing the LOF in global banking. Miller and Parkhe (2002) find that foreign-owned banks are less x-efficient than host country banks, and that a bank's home environment has a strong impact on its efficiency abroad – as suggested by the national competitive advantage perspective. Berger et al. (2000), on the other hand, provide evidence in favor of a 'limited form' of the global advantage hypothesis. According to this variant, some foreign banks can overcome distance-related organizational diseconomies and other cross-border disadvantages and achieve better efficiency compared to domestic banks, due to favorable home-country market, regulatory and supervisory conditions. Consistent with this argument, Lensink et al. (2008) find that greater institutional similarity between the home and the host country can moderate the otherwise negative effect of foreign ownership on efficiency. Claessens and van Horen (2012a), in contrast, report that foreign-owned

[9] Governance of financial institutions can be more challenging than that of non-financial firms due to their opacity and high leverage; regulations resulting in an ineffective market for corporate control; and moral hazard problems associated with deposit insurance (Levine, 2004; Mülbert, 2010).

banks in developing countries are more efficient when they originate from a high income country and when regulations in the host country are relatively weak. The conditionality of the cross-border diversification effects upon home and host country attributes is also emphasized in studies employing wider performance measures. García-Herrero and Vázquez (2013), for instance, using evidence from the largest international banks in developed countries, show that risk-adjusted returns increase when the share of assets allocated to foreign subsidiaries in emerging countries increases, and that these gains are lower when the subsidiaries are concentrated in specific geographic regions. Similarly, Gulamhussen et al. (2017), using evidence from the pre-crisis years, report that the positive effect of diversification on Tobin's Q is stronger when banks diversify into economically less developed countries, and prevails up to the point where higher costs due to higher organizational complexity override benefits.

Given that bank risk is a central issue regarding financial stability, a particular stream of the literature focuses on the impact of international diversification on risk. Berger et al. (2017) develop two alternative hypotheses on the bank internationalization–risk relationship. The diversification hypothesis states that international banks may have lower risks since they are better positioned to diversify away country-specific risks. The market risk hypothesis, conversely, suggests that the LOF, together with the foreign exchange risk on foreign assets and other market specific conditions (such as political and economic instability), may render international banks more risky. The corresponding empirical evidence offers a diverse picture and seems to depend on the sample considered. Consistent with the dominance of the market risk hypothesis over the diversification hypothesis, Berger et al. (2017) report a positive relationship between internationalization and risk for US commercial banks; and similar evidence is provided by Gulamhussen et al. (2014) for a cross-country sample of commercial banks. The existence of agency problems is possibly, according to both studies, the driving force behind their findings. In contrast, Buch et al. (2013) show that international banks headquartered in Germany are not riskier than domestic banks, and that the degree of diversification, rather than the scale of foreign assets, matters for risk. Likewise, Fang and van Lelyveld (2014), employing data from the largest 49 multinational banking groups, report substantial credit risk diversification effects, especially when banking groups located in OECD countries diversify into non-OECD countries. More recently, Duijm and Schoenmaker (2017), focusing on the 61 largest European banks, find evidence that international diversification reduces insolvency risk and income volatility, and that such diversification benefits are stronger when banks diversify into countries with dissimilar economic and financial conditions.

The impact of international diversification on bank performance might be different during periods of financial instability. Global banks may have a relatively lower exposure to balance sheet shocks due to their diversified funding bases and customer pools, and the existence of internal capital markets (Cetorelli and Goldberg, 2012). At the same time, though, they may have a relatively higher reliance on wholesale funding, which may put them at a disadvantage during periods of heightened financial volatility (de Haas and van Lelyveld, 2014). In this context, Berger et al. (2017) find that the positive impact of internationalization on bank risk is stronger for US commercial banks during financial crisis periods.

As the above discussion suggests, the findings on the relationship between international diversification and bank performance are still inconclusive. Nevertheless, the existing studies highlight: first, the importance of simultaneously accounting for all potential gains and costs arising from pursuing a regionally-focused or otherwise strategy; and second, the heterogeneity of diversification effects across banks headquartered in countries with different levels of financial and institutional development. In the next section, we develop the two hypotheses we aim to test.

2.2. Hypotheses development

2.2.1. Intra-regional versus inter-regional geographic diversification

The observed regional nature of multinational enterprises in their sales and asset dispersions (Rugman and Verbeke, 2004, 2007; Oh, 2009), as well as the increasing regional focus (or home bias) in multinational banks' assets and operations (García-Herrero and Vázquez, 2013; Cetorelli and Goldberg, 2014; Claessens and van Horen, 2014a), imply that prohibitive barriers to full globalization may still exist. According to Rugman and Verbeke (2005), an MNE's tendency for regional concentration has transaction cost-related origins. A broader geographic scope is considered to be costly, since each foreign location requires location-specific complementary investments to blend firm-specific advantages with location advantages abroad. The associated challenges, however, become 'compounded' when distance (along different dimensions) increases and regional boundaries can serve as cut-off points separating lower-distance environments from higher-distance ones (Rugman et al., 2011). Arguably, then, intra-regional diversification confers efficiency benefits, since knowledge and experience of one country can be applied to other countries within the same region, which share similarities in terms of geography, economics, institutions and politics (Qian et al., 2010; Banalieva et al., 2012). Expanding into less proximate and dissimilar markets, on the other hand, increases the complexity and diversity of operations and necessitates higher location-specific investments. Hence, while inter-regional diversification helps firms maximise market opportunities by improving strategic flexibility due to access to a wider multinational network, it exposes them to the liability of regional foreignness which reduces efficiency and increases risks (Qian et al., 2010, 2013; Banalieva et al., 2012).

In sum, these arguments outline the substantial distance discontinuities at the region boundary, and suggest that the locus of destination of the diversification activities (intra-regional versus inter-regional) must be carefully considered when investigating the performance effects of geographic diversification. Indeed, failure to do so may be a plausible reason for the mixed results reported in the IB literature (Rugman and Verbeke, 2004).[10]

As discussed in Section 2.1, when multinational banks concentrate their activities in specific geographic regions, risk diversification benefits may be limited due to similar economic fundamentals and exposures to common risk factors within the regions (García-Herrero and Vázquez, 2013; Fang and van Lelyveld, 2014). At the same time, though, they enjoy efficiency gains and lower market risks due to lower environmental complexity and lower coordination and adaptation costs within similar regions. Considering that the financial services industry is information-intensive and institutionally sensitive, and that substantial differences in regulations and demand characteristics across national markets exist, we expect intra-regional diversification benefits (higher efficiency and lower market risks) to dominate costs, in the form of limited risk diversification effects. Inter-regional diversification, conversely, is expected to result in lower bank value overall, due to lower efficiency and higher market risks dominating risk diversification and strategic flexibility benefits. In other words, we hypothesize as follows:

[10] Verbeke and Asmussen (2016) argue that, in international strategy research, the region should be introduced as an explicit geographic level of analysis, in addition to the country- and the global-level.

Hypothesis 1. Bank value increases with intra-regional diversification and decreases with inter-regional diversification.

2.2.2. Developed country banks versus emerging country banks

A number of studies have documented an upward trend in the international expansion activities of EC banks, especially since the onset of the global financial crisis (see, among others, Claessens and van Horen, 2014a; BIS, 2014). EC banks are stated to have the same motivations to exploit ownership and internalization advantages as DC banks, but at the same time, they are found to be smaller, present in fewer countries and with more regional focus. This may suggest that their location choices and performances are more sensitive to the cultural, institutional and geographic proximity to target countries (Van Horen, 2007; Petrou, 2007; BIS, 2014).

Recent theoretical frameworks on EC multinationals, though, postulate that such firms expand internationally not only to exploit their existing competitive advantages, but also to access new markets, strategic assets and knowledge. By internationalizing, they can upgrade their competitive advantages, compete more effectively with global rivals, and avoid institutional voids and market constraints at home (Mathews, 2006; Luo and Tung, 2007). Consequently, the international growth for EC banks can be more of a competence-enhancing strategy than a competence-exploiting strategy, as stated by the traditional accounts of bank internationalization (Mariotti and Piscitello, 2010).

In particular, by establishing a limited international presence, EC banks can obtain a more competitive access to financial resources and/or to intangibles (such as information or knowledge resources and reputation benefits), and, by transferring these firm-specific advantages back home, they can strengthen their domestic market positions (Boehe, 2016). Furthermore, they may have a competitive advantage over DC banks in other EC markets, due to their familiarity with similar (adverse) institutional settings, and in markets which are culturally and geographically close to their home countries (Van Horen, 2007; Cuervo-Cazurra and Genc, 2008).[11] At the same time, a regionally concentrated activity may allow EC banks – which, as already mentioned, are typically smaller and with less internationalization experience – to learn about operating in foreign markets, and thus improve their capabilities and international competitiveness, without facing extensive challenges and high risks. By operating in their home regions, for instance, they may achieve scale and scope economies faster (Rugman and Oh, 2010). As a result, the marginal benefits that can be derived from further intra-regional diversification can be significantly more pronounced for EC banks than for DC banks.

The performance effects of inter-regional diversification for the two bank groups are expected to be different than those of intra-regional diversification. While EC banks can benefit from diversifying into far away and developed markets in search of strategic assets and capabilities, their ability to compete with DC banks in such markets and globally may be limited; for instance, due to more demanding regulatory requirements in these markets and missing unique firm-specific advantages (such as established brands) which can compensate for the liability of regional foreignness. As stressed by Claessens and van Horen (2014b), banks from non-advanced countries may not be able to handle the (informational) disadvantages of distance as well as banks from advanced countries. Hence, the market risk effects associated with increased inter-regional diversification can be stronger for EC banks than for DC banks.

[11] Berger et al. (2001), looking at the Argentinean banking system, find that foreign banks headquartered in other South American countries are more likely to lend to informationally opaque small firms than other foreign-owned banks.

Given these considerations, we expect the valuations of DC banks and EC banks to be affected differently by their diversification activities, and that the overall impact for each bank group to be conditioned by the locus of destination of the diversification efforts. Specifically, we hypothesize as follows:

Hypothesis 2. The positive (negative) effect of intra-regional (inter-regional) diversification on bank value is stronger for banks originating from ECs than for banks originating from DCs.

3. Empirical methodology

We now proceed to test Hypotheses 1 and 2. In this section, we discuss our diversification measures and their evolution over time, describe our data and sampling procedure, and specify the empirical model for carrying out the tests.

3.1. Alternative measures of international diversification

Two of the most commonly used measures of internationalization in the banking literature are *international share* and *international concentration* (see García-Herrero and Vázquez, 2013; Berger et al., 2017; Gulamhussen et al., 2014, 2017). Based on subsidiary presence,[12] international share can be computed as:

$$\text{International share}_{it} = \frac{fn_{it}}{N_{it}} \tag{1}$$

where fn_{it} is the number of foreign subsidiaries and N_{it} is the total number of subsidiaries of bank i in year t. On the other hand, international concentration can be computed as a transformed Herfindahl index (H_{it}):

$$\text{International concentration}_{it} = 1 - H_{it} = 1 - \sum_{j=1}^{J}\left(\frac{n_{ijt}}{N_{it}}\right)^2 \tag{2}$$

where J is the total number of countries in which bank i has subsidiaries, and n_{ijt} is the number of subsidiaries in host country j in year t. Both measures vary in the interval [0, 1], with values close to 0 indicating low geographic diversification and values close to 1 indicating high geographic diversification. The advantage of the latter measure is that it takes into account both the number of countries in which a bank is present and the share of subsidiaries in each country, and thus it can better assess the geographic dispersion of the bank's operations.

The IB literature has proposed a wide range of firm-level internationalization measures that explicitly take into account the locus of diversification activities. Aggarwal et al. (2011) develop a classification system for the degree of a firm's multinationality based on the extent of geographic spread of operations and the degree of exposure to each geographic unit, whereas Banalieva and Santoro (2009) offer a finer-grained classification of a firm's geographic orientation that distinguishes between its local, regional, and global geographic segments. Qian et al. (2010), on the other hand, define total geographic diversification as the sum of two components: intra-regional (diversification across countries within a region) and inter-regional (diversification across different regions). By looking at the regional dimension, all these measures can sufficiently

[12] We acknowledge that banks can undertake international activities in mainly two ways: first, by setting up overseas branches and/or subsidiaries; and second, by operating directly from home. Unlike single country studies, most of the cross-country studies on bank internationalization employ (count or asset size) foreign subsidiary data due to the fact that systematic bank-level data on banks' foreign branches are not available. Recent examples of empirical studies that employ international diversification measures based on foreign subsidiary data – similar to our approach – include Fang and van Lelyveld (2014) and Gulamhussen et al. (2014, 2017).

capture variation in the internationalization activities based on proximities to host countries. As pointed out by Rugman et al. (2011), the high level of complexity involved in integrating multiple types of distance into a simple internationalization measure outlines the importance of using the region as an explicit unit of analysis.

Following Qian et al. (2010) approach, we construct subsidiary presence-based measures of intra-regional and inter-regional diversification, drawing regional boundaries according to six continent-based regions: Africa, Asia, Europe, North and Central America, Oceania and South America. A continent-based regional classification is preferable to other systems, such as using the broad 'triad' markets of NAFTA, the European Union and Asia as in Rugman and Verbeke (2004), for two reasons: first, it encompasses all the countries in the world; and second, it does not change over time as the regions are defined along geographic rather than political lines. These attributes are critical for our analysis since we consider banks from many countries across the world, including banks headquartered or having subsidiaries in non-triad countries, and focus on exploiting time-series variation in their diversification strategies within and across regions which remain the same over time.

Specifically, we calculate inter-regional diversification ('INTER') as:

$$\mathrm{INTER}_{it} = \sum_{m=1}^{M} s_{imt} \ln\left(\frac{1}{s_{imt}}\right), \quad \textit{where} \quad s_{imt} = \frac{n_{imt}}{N_{it}} \tag{3}$$

M is the number of regions in which bank i has subsidiaries in year t, n_{imt} is the number of subsidiaries in region m in year t, and s_{imt} is the proportion of the mth region to the bank's total number of subsidiaries in all regions in year t (N_{it}). Similarly, we calculate intra-regional diversification ('INTRA') as:

$$\mathrm{INTRA}_{it} = \sum_{m=1}^{M} s_{imt} \times \underbrace{\left[\sum_{j=1}^{J} w_{ijmt} \ln\left(\frac{1}{w_{ijmt}}\right)\right]}_{\mathrm{INTRA}_{imt}}, \quad \textit{where} \quad w_{ijmt} = \frac{n_{ijmt}}{N_{imt}} \tag{4}$$

n_{ijmt} is the number of subsidiaries in host country j of region m in year t, and w_{ijmt} is the proportion of the number of subsidiaries in the jth country to the total number of subsidiaries in the mth region in year t (N_{imt}). In other words, INTRA_{it} is the weighted average of the corresponding regional-level entropy values INTRA_{imt}, the weight being previously defined as s_{imt}. We also calculate a modified intra-regional diversification measure, 'INTRA-Home', which accounts for subsidiary presence in the home regions only ($s_{imt} = 0$ if the mth region is not the home region). This allows us to test whether the relationship between 'INTRA' and bank value is driven by diversification within the home region, where the parent banks have the least LOF.

Qian et al. (2010) measures capture a bank's degree of geographic diversification not only in terms of breadth (number of foreign countries and foreign regions), but also in terms of depth (the relative importance of each foreign country and each foreign region) – see also Oh (2009) and Oh et al. (2015). As such, 'INTRA', 'INTER' and 'TOTAL' (the sum of 'INTRA' and 'INTER') are our preferred measures for testing the hypotheses of Section 2.2. However, as a means to address issues related to robustness, we also consider two versions of the Herfindahl-type measure: the first captures global-level concentration as in Eq. (2) ('International Concentration') and the second captures concentration within the region in which the parent bank is headquartered ('Regional Concentration').

3.2. Bank value model specification

To test Hypothesis 1, we employ an empirical specification that builds on the work of Laeven and Levine (2007), Caprio et al. (2007), Deng and Elyasiani (2008) and Gulamhussen et al. (2017), and takes the following form:

$$Q_{\mathrm{int}} = \alpha Q_{\mathrm{int}-1} + \beta \text{'ID'}_{\mathrm{int}} + \gamma \mathbf{X}_{\mathrm{int}} + \delta \mathbf{Y}_{nt} + \xi_n + \lambda_t + u_{\mathrm{int}} \tag{M.1}$$

where Q is the Tobin's Q, calculated as

$$Q = \frac{\text{Market Value of Equity} + \text{Book Value of Assets} - \text{Book Value of Equity}}{\text{Book Value of Assets}},$$

'ID' $\in$ {'TOTAL', 'INTRA', 'INTER'} is a measure of international diversification, as defined in Section 3.1; **X** is a vector of bank-level control variables; **Y** is a vector of country-level control variables; i, n, t index bank, country, and time, respectively; ξ_n and λ_t represent country-specific[13] and year-specific effects, respectively; and u is an $i.i.d$ error term.

Vector **X** contains a broad range of bank-specific traits related to bank value commonly used in previous studies. Specifically, it includes: (i) non-interest income to total operating income ('Income Diversity') to account for differences in the diversity of financial activities that may affect bank risk, margins and value (Stiroh and Rumble, 2006; Goetz et al., 2013); (ii) total equity to total assets ('Capitalization') to account for the interactions between capitalization levels and bank value, and as an indirect proxy for bank risk (Deng and Elyasiani, 2008); (iii) cost to income ('Operational Inefficiency') calculated as total operating expenses to total operating income (Caprio et al., 2007); (iv) non-performing loans to gross loans ('NPL') as a proxy for loan quality and portfolio risk (Berger et al., 2009); and, (v) bank size measured by binary variables that group banks into total asset quartiles, calculated separately for each region to account for size-level differences across regions.

On the other hand, vector **Y** includes the GDP growth rate ('Growth') and the inflation rate ('Inflation') as proxies of macroeconomic fluctuations and institutional effects in the home country of the parent bank (Demirgüç-Kunt and Huizinga, 2010), which are expected to influence not only a bank's market value, but also its capacity to diversify geographically.

The previous period's Tobin's Q is included among the explanatory variables to capture persistence over time. Within this dynamic framework, β is the short-run coefficient, measuring the immediate (within the year) response of Tobin's Q to changes in the diversification measures. The long-run (or steady-state) response of Tobin's Q to changes in the diversification measures can be calculated as $\beta/(1-\alpha)$, where $|\alpha|$ is the portion of the short-run adjustment that is translated to the next year.

To test Hypothesis 2, we re-estimate model (M.1) with 'ID' replaced by the interaction terms 'ID * EC' and 'ID * DC', where 'EC' and 'DC' (1 – 'EC') are binary variables coding banks headquartered in ECs and DCs, respectively.[14] In this way, it is possible to estimate the impact of intra-regional, inter-regional and total diversification on bank value conditional on the origin of the parent bank (headquartered in DCs versus ECs).

Furthermore, to examine which bank- and country-level characteristics are driving the (potentially) different effects between EC

[13] The model includes country dummies for countries with three or more banks and thus sufficient number of bank-year observations.

[14] Our DC group includes countries that are classified as 'advanced economies' by the World Economic Outlook Database (October 2014 Edition), while our EC group includes the remaining countries.

Table 1
Variable description and data sources.

	Description and Source
Dependent variables	
Tobin's Q (*Q*)	Market value of equity plus the book value of assets minus the book value of equity, divided by the book value of assets. BankScope
Return on Assets (ROA)	Ratio of net income to total assets. BankScope
Z-score (log)	Return on assets plus equity to assets, divided by the standard deviation of return on assets. BankScope & OC
Independent variables	
Income Diversity	Ratio of non-interest income to total operating income. BankScope
Capitalization	Ratio of total equity to total assets. BankScope
Operational Inefficiency	Ratio of total operating expenses to total operating income. BankScope
NPL	Ratio of non-performing loans to gross loans. BankScope
Assets Growth	Growth rate of total assets. BankScope
Size dummies	Binary variables that group banks into total asset quartiles. BankScope
Age dummies	Binary variables that group banks into age (number of years since establishment) quartiles. BankScope
GDP Growth	GDP growth rate. WDI
Inflation	Inflation rate. WDI
TOTAL	Entropy measure of total diversification (sum of INTRA and INTER). BankScope & OC
INTRA	Entropy measure of intra-regional diversification (diversification across countries within each geographic region). BankScope & OC
INTER	Entropy measure of inter-regional diversification (diversification across different geographic regions). BankScope & OC
INTRA-Home	Entropy measure of diversification across countries within the geographic region in which the parent bank is headquartered. BankScope & OC
International Concentration	1 minus a Herfindahl index capturing concentration at the global level. BankScope & OC
Regional Concentration	1 minus a Herfindahl index capturing concentration within the geographic region in which the parent bank is headquartered. BankScope & OC
Geographic Distance (log)	Weighted average of the geographic distance (capital city to capital city distance in kilometers) between the home country of the parent bank and the countries of residence of its subsidiaries. CEPII & OC
Language Distance	1 minus the weighted average of the language proximity (CEPII common language index) between the home country of the parent bank and the countries of residence of its subsidiaries. CEPII & OC
Institutional Distance	Weighted average of the institutional distance (difference in the WGI institutional development score) between the home country of the parent bank and the countries of residence of its subsidiaries. WGI & OC
Regulatory Distance	Weighted average of the regulatory distance (difference in the WGI regulatory quality score) between the home country of the parent bank and the countries of residence of its subsidiaries. WGI & OC
Intra-institutional Dispersion	Dispersion within a group of institutionally similar countries. WGI & OC
Inter-institutional Dispersion	Dispersion across groups of institutionally different countries. WGI & OC
Age_m (log)	The median value of bank-level yearly observations of the number of years since establishment. BankScope
$Size_m$ (log)	The median value of bank-level yearly observations of total assets in billions of US dollars. BankScope
$Financial\ Development_m$ (log)	The median value of country-level yearly observations of domestic credit to private sector as % of GDP. WDI
$Institutional\ Development_m$ (log)	The median value of country-level yearly observations of the institutional development score; that is, the average standardized score (percentile rank) of the six WGI items: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. WGI

WDI: World Bank's World Development Indicators; **OC**: Own Calculations; **CEPII**: CEPII's GeoDist Database (Mayer and Zignago, 2011); **WGI**: World Bank's World Governance Indicators.

banks and DC banks, we implement additional tests based on the following extension of the baseline model:

$$Q_{\text{int}} = \alpha Q_{\text{int}-1} + \beta_1 \text{'ID'}_{\text{int}} + \beta_2 \text{'ID'}_{\text{int}} * (W_m)_{in} + \gamma X^{s}_{\text{int}} + \delta \mathbf{Y}_{nt} + \zeta \mathbf{W}_{in} + \lambda_t + u_{\text{int}} \quad \text{(M.2)}$$

where $W_m \in \{\text{'Age'}_m, \text{'Size'}_m, \text{'Financial Development'}_m, \text{'Institutional Development'}_m\}$, measured in logarithms, with the subscript m representing the median value of yearly observations over the sample period; **W** is a vector that includes all four W_m variables; and, $\mathbf{X}^s$ is a sub-vector of **X** which contains the same variables as **X** apart from the dummies for bank size. Estimating this equation separately for each W_m and comparing the estimated coefficients β_1 and β_2 allows us to examine whether the diversification effects on bank value are different for older, more experienced banks, for larger banks, as well as for banks that operate in more financially and institutionally developed markets.

We estimate models (M.1) and (M.2) using the system-GMM estimator proposed by Blundell and Bond (1998). This estimator is designed for short, wide panels (small *T*, large *N*), and to fit linear models with one dynamic dependent variable, additional controls and fixed effects, and hence, it is appropriate for our data and model. In addition, it corrects for the endogeneity of potentially endogenous explanatory variables. By combining equations in first differences with equations in levels, the system-GMM estimator uses lagged levels as instruments for first differencing equations and lagged differences as instruments for level equations. In our estimations, we treat the international diversification measures and the bank-level control variables as endogenous.[15] To improve the precision of the two-step estimators for hypothesis testing, we apply the "Windmeijer finite-sample correction" to the reported standard errors. Furthermore, to reduce the risk of instrument proliferation and make sure that the number of instruments does not exceed the number of groups, we collapse the instrument set using the procedure described in Roodman (2009). The consistency of the system-GMM estimator depends on the condition of no second-order serial correlation and the validity of instruments. To make sure that these conditions are met, we perform two tests: the Arellano-Bond test for second-order serial correlation of the differenced residuals, and the Hansen test for over-identifying restrictions. In a robustness check, we also test the sensitivity our results to alternative estimation techniques using a bank fixed effects framework.

[15] Specifically, the instruments used are lagged levels of the dependent variable and the endogenous covariates for the first differencing equations, and lagged differences of these variables for the level equations. The exogenous covariates (country-level control, year and size dummy variables) are instrumented by themselves in the level equations and by first differences in the first differencing equations.

Table 1 provides an overview of the variables included in models (M.1) and (M.2), and specifies the data sources. Descriptive statistics for the main regression variables are given in Table A.1, while the cross-correlation matrix for these variables is displayed in Table A.2.

3.3. Data, sampling procedure and sample characteristics

Country-level data are collected from three main sources: the World Bank's World Development Indicators (WDI), the World Bank's World Governance Indicators (WGI), and the CEPII's GeoDist Database (Mayer and Zignago, 2011). Bank-level data are retrieved from two commercial databases provided by Bureau van Dijk: BankScope and Zephyr. To assemble our dataset, we first extract yearly accounting data[16] over the period 2004–2013 on all publicly listed banks in BankScope with total assets exceeding US$50 million. We include commercial, savings, mortgage and cooperative banks, and holding companies and exclude investment and state banks, and non-bank credit institutions, which have no compelling reasons to internationalize their activities (Focarelli and Pozzolo, 2005). We also exclude banks headquartered in off-shore centers, such as Andorra, Bermuda, Bahamas, Cayman Islands, Panama and Saint Lucia, because they typically have less standard business models (Gulamhussen et al., 2014). We then match our initial sample of parent banks with the yearly data of their significant subsidiaries; that is, subsidiaries that are at least 50% owned by the parent and account for at least 0.1% of parent-bank assets in the last available year. For each subsidiary (level 1), we check whether it owns sub-subsidiaries (level 2) that are larger than 0.1% of the ultimate bank owner (level 0) in the last available year.[17] If it does, we include the sub-subsidiaries as separate entities of the parent bank. Since ownership data in BankScope reflects the latest status, we use acquisition data from Zephyr to identify the ownership changes that occurred during the sample period.[18] More precisely, for each subsidiary we trace back in which year t it was acquired and include it in the structure of the parent bank from $t+1$ onwards. Similarly, for each parent bank we trace back which subsidiaries it sold in year t and add these subsidiaries to the structure of the parent bank from $t-1$ backwards.

This procedure results in a sample of 160 parent banks[19] headquartered in 56 countries (23 DC and 33 EC). The United States, Japan and China have the highest number of bank-year observations in our sample, with 11%, 8% and 6% of the total number of observations, respectively.[20] Table A.3 in the Appendix provides an overview of the top 30 most diversified parent banks in our sample, based on the maximum value of 'TOTAL'. Even though two EC banks exhibit the highest values of total geographic diversification in our sample (Ecobank Transnational Incorporated in Togo and Standard Bank Group Limited in South Africa), the majority of banks in the top 30 list are headquartered in DCs (21 banks). Furthermore, comparing the characteristics of banks in the top 30 list, we can see that: (i) DC banks are, on average, larger and present in more countries compared to EC banks, and (ii) most of the DC banks are based in Europe, reflecting their relatively small home markets and the European integration process which facilitated cross-border banking.

As a preliminary assessment of the characteristics of the sampled banks in terms of geographic orientation, we classify all bank-year observations into different categories based on the Aggarwal et al. (2011)'s scheme (see Table 2). 254 (24%) are classified as domestic (D) and 289 (28%) as regional (R). Within the regional category, nearly all the observations indicate operations in less than one-third of the home-region countries ($R1$). The trans-regional category (T) is the largest one in our sample, with 499 (48%) bank-year observations. The most common types in the latter category are $T2$ and $T3$, indicating operations in two and three regions, respectively. No observations are categorized as type $R3$ or G, suggesting that no banks in our sample operate in more than two-thirds of the home-region countries or have full global reach. Splitting the sampled banks by origin confirms that DC banks are spread more widely across different regions compared to EC banks, providing support for our motivation to develop Hypothesis 2.

3.4. Evolution of international diversification

In the following, we discuss the evolution of international diversification between the years 2004 and 2013, using the measures described in Section 3.1, for both DC banks and EC banks.

Panels (a) and (b) of Fig. 1 display the two Herfindahl-type indices of geographic concentration. Looking at 'International Concentration' (Panel (a)), a number of conclusions come to front. First, DC banks are more internationally diversified than EC banks, which is not surprising given that EC banks are relatively smaller and late-comers to the internationalization stage. Second, the degree of international diversification starts decreasing with the onset of the global financial crisis for both groups of banks. Third, EC banks experience a sharper drop in geographic diversification during the years 2008 to 2011 compared to DC banks, but manage to recover some of this reduction in the two years that follow (2012 and 2013). Focusing now on 'Regional Concentration' (Panel (b)), we can observe similar trends, even though the fluctuations during the crisis years seem to be less pronounced. Moreover, the gap in geographic diversification between the two bank groups is now negligible (compared to Panel (a)), suggesting that EC banks are more dispersed within their home region than internationally.

Panels (c), (d) and (e) of Fig. 1 present the three geographic diversification measures of 'TOTAL', 'INTRA' and 'INTER' (our baseline measures), whereas Panel (f) displays the modified intra-regional diversification measure 'INTRA-Home'. As in Panel (a), we can see that the average level of total geographic diversification ('TOTAL') of DC banks is higher than that of EC banks, and this seems to be driven by higher levels of diversification both within regions ('INTRA') and across regions ('INTER'). Furthermore, all three baseline measures show an overall declining trend during the global financial crisis period (for both bank groups), with the most prominent downturn being observed in inter-regional diversification, starting in 2008 and ending in 2011. In the last couple of years, the two bank groups seem to pursue different strategies: while EC banks become intra-regionally and inter-regionally more diversified, DC banks engage in slightly lower levels of diversification. Finally, comparing the two

[16] All extracted financial variables are winsorized at the 1st and 99th percentiles.

[17] To calculate these shares, we use consolidated financial statements for parent banks and unconsolidated financial statements for subsidiaries.

[18] For each 'completed' acquisition deal, we extract information about the acquiror, target and vendor, as well as the initial, acquired and final stakes. We code as ownership change any deal where the acquiror ends up with 50% or more of the shares of the target (the acquiror's stake increases from less than 50% to 50% or more), as the acquiror has now control of the target.

[19] The number of parent banks included in our regressions is 150 since for 10 banks there are either missing values on the model variables or less than two observations on the dependent variable.

[20] Although our sampling procedure identifies over 200 banks with headquarters in 56 countries, the US banks account for 33 percent of the original bank sample. To ensure that our results are not driven by a single country and that DC banks are not over-represented in our sample, we consider the 12 largest US banks for our analysis. Additionally, the US banking system is quite special in the sense that it is dominated by non-diversified domestic banks (see also Laeven and Levine, 2007), and, as pointed out by Fang and van Lelyveld (2014), a growing US bank is much less likely to become an international bank (compared, for example, to a European bank) due to the large size of the economy. It must be stressed that our baseline results hold when we exclude all US banks or when we exclude all banks with no foreign subsidiaries in all years (see Section 4.4).

Table 2
Classifying bank-year observations using Aggarwal et al. (2011)' system.

Symbol	All countries			Developed countries			Emerging countries		
	Count	Perc	Cum Perc	Count	Perc	Cum Perc	Count	Perc	Cum Perc
D	254	24.4	24.4	171	26.9	26.9	83	20.4	20.4
R1	283	27.2	51.5	151	23.8	50.7	132	32.4	52.8
R2	6	0.6	52.1	0	0.0	50.7	6	1.5	54.3
T2	357	34.3	86.4	183	28.8	79.5	174	42.8	97.1
T3	92	8.8	95.2	80	12.6	92.1	12	3.0	100.0
T4	31	3.0	98.2	31	4.9	97.0	0	0.0	100.0
T5	19	1.8	100.0	19	3.0	100.0	0	0.0	100.0
Total	1042	100.0	100.0	635	100.0	100.0	407	100.0	100.0

The table shows the number of bank-year observations if there are no missing values on Tobin's Q. **D**: Banks with subsidiary presence only within their home country in year *t*; **R1**: Banks with subsidiary presence only in the region in which they are headquartered in year *t*, and in less than one-third of the countries in that region; **R2**: Banks with subsidiary presence only in the region in which they are headquartered in year *t*, and in one-third to two-thirds of the countries in that region; **T2**, **T3**, **T4**, and **T5**: Banks with subsidiary presence in two regions, three regions, four regions, and five regions in year *t*, respectively.

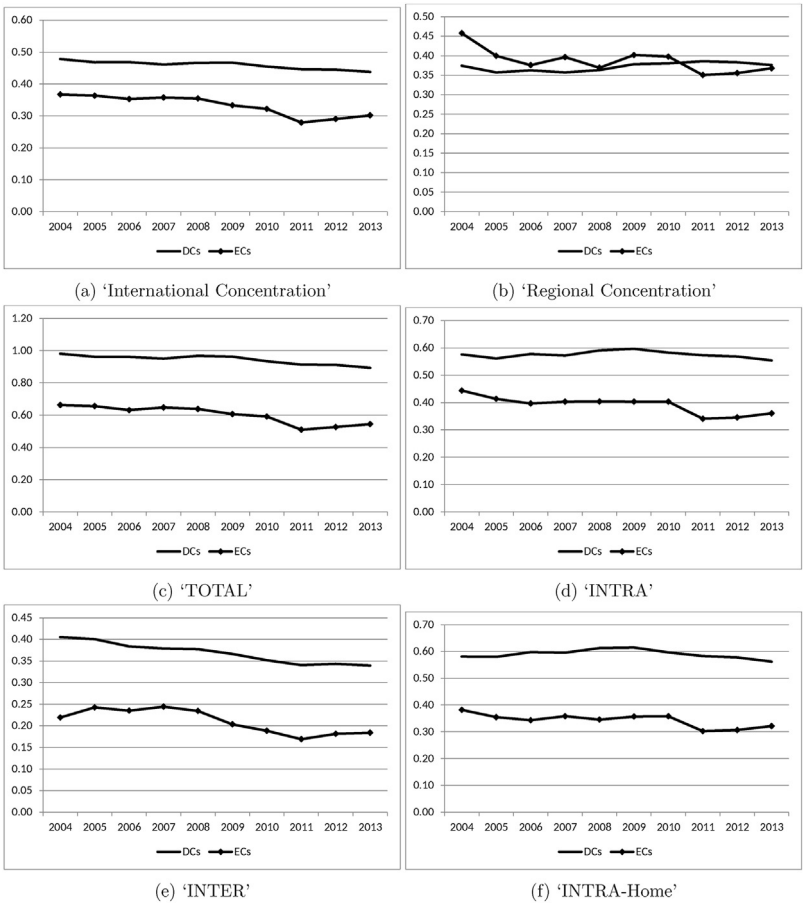

Fig. 1. The graphs show the evolution of 'International Concentration', 'Regional Concentration', 'TOTAL', 'INTRA', 'INTER' and 'INTRA-Home' for developed countries (solid lines) and emerging countries (marked lines) over the sample period 2004–2013.

intra-regional diversification measures, 'INTRA' and 'INTRA-Home', we can see that geographic diversification within the home-region accounts for almost all of the intra-regional diversification.[21]

It is worth noting that DC banks and EC banks exhibit similar within-bank variation in the diversification measures; for instance, the within-bank standard deviation of 'TOTAL' takes an average value of 0.06 for both bank groups. To provide an example of such within-bank variation, we consider the evolution of the three baseline diversification measures for one of the parent banks in our sample: Société Générale, a European multinational banking and financial services company headquartered in France. During the second half of the 2000s, Société Générale grew its subsidiary presence in several European countries (Germany and Poland in 2006, Czech Republic and Croatia in 2007, and Russia in 2009), while, in 2012, following the Greek debt crisis, it sold its only subsidiary in Greece. As shown in Fig. 2, these activities are reflected in changes in the value of 'INTRA' in the corresponding years. On the other hand, Société Générale's diversification does not change much over the sample period in terms of inter-regional expansion: the bank's 'INTER' falls in 2005 due to the sale of its Argentinean

[21] Formal *t*-tests confirm that the average values of the four diversification measures ('TOTAL', 'INTRA' and 'INTER' and 'INTRA-Home') are statistically different between DC banks and EC banks, and this applies for both the full sample period (2004–2013) and the crisis and post-crisis years (2007–2013).

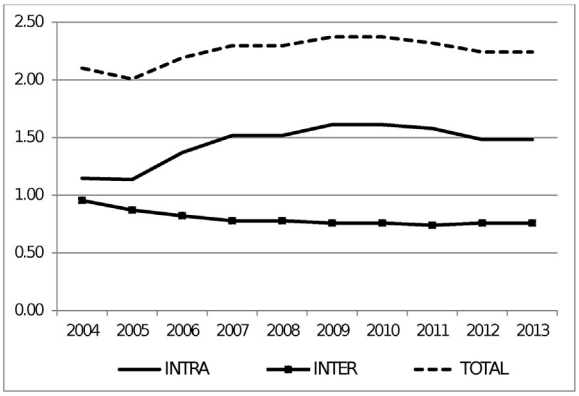

Fig. 2. The graph shows the evolution of 'TOTAL', 'INTRA' and 'INTER' for Société Générale over the sample period 2004–2013.

subsidiary, and follows a slightly declining trend up until 2009 due to enhanced regional focus (and thus lower diversification across different regions). Since 'INTRA' exhibits a larger variation compared to 'INTER' over the sample period, the evolution of 'TOTAL' for Société Générale reflects mostly the changes in the bank's intra-regional activities.

4. Empirical analysis

4.1. Basic findings

We start our empirical analysis by estimating model (M.1) for the full sample period 2004–2013 (see columns (1) to (6) of Table 3). As a first point, we can see that the coefficient on the previous year's Tobin's Q is positive and statistically significant, indicating the persistence in bank value over time and justifying the use of a dynamic model. Furthermore, we can see that Tobin's Q improves during an economic upturn, as captured by the positive and statistically significant coefficient on 'Growth'. Turning now to our variables of interest, we find evidence that higher levels of total geographic diversification are associated with changes in valuations for EC banks, but not for DC banks: while the coefficient on 'TOTAL * EC' in column (2) is positive and statistically significant, the coefficient on 'TOTAL * DC' fails to reach statistical significance. The latter can explain the absence of diversification-induced value changes in col-

Table 3
Diversification and value: basic results.

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments												
	Estimation period: 2004–2013 (baseline specification)						Estimation period: 2007–2013					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lagged Dependent	0.31***	0.34***	0.31***	0.32***	0.28***	0.28***	0.21*	0.24**	0.19	0.26**	0.19	0.21
	(3.32)	(4.02)	(3.06)	(3.38)	(2.96)	(2.87)	(1.74)	(2.33)	(1.47)	(2.33)	(1.37)	(1.57)
TOTAL	0.13						0.06					
	(0.81)						(0.29)					
INTRA			0.17							0.17		
			(1.04)						(0.85)			
INTER					0.00						−0.35	
					(0.01)						(1.32)	
ID * EC[a]		0.48**		0.54**		−0.20		0.48**		0.54***		−0.55
		(2.49)		(2.22)		(0.53)		(2.23)		(3.22)		(1.62)
ID * DC[a]		−0.02		0.04		0.12		−0.04		−0.05		−0.42
		(0.12)		(0.28)		(0.41)		(0.14)		(0.29)		(0.88)
Income Diversity	0.01	0.05	−0.00	0.02	0.07	0.12	−0.02	−0.05	−0.02	−0.05	−0.06	−0.08
	(0.09)	(0.40)	(0.01)	(0.19)	(0.50)	(0.65)	(0.18)	(0.40)	(0.22)	(0.49)	(0.43)	(0.48)
Capitalization	−0.25	−0.24	−0.34*	−0.31	−0.31	−0.25	0.02	−0.03	−0.12	−0.08	−0.07	−0.03
	(1.36)	(1.11)	(1.94)	(1.52)	(1.49)	(1.17)	(0.10)	(0.14)	(0.52)	(0.34)	(0.32)	(0.11)
Operational Inefficiency	−0.06	−0.08	−0.04	−0.05	−0.03	−0.08	−0.01	−0.01	0.01	−0.01	0.03	−0.03
	(0.78)	(0.87)	(0.40)	(0.53)	(0.26)	(0.98)	(0.09)	(0.14)	(0.07)	(0.07)	(0.28)	(0.44)
NPL	−0.10	−0.13*	−0.11	−0.17**	−0.12	−0.11	−0.15*	−0.19**	−0.17**	−0.21**	−0.14*	−0.14*
	(1.35)	(1.95)	(1.38)	(2.17)	(1.61)	(1.57)	(1.79)	(2.09)	(2.05)	(2.46)	(1.89)	(1.85)
GDP Growth	0.21***	0.15*	0.24***	0.20***	0.22***	0.24***	0.16**	0.11	0.19**	0.12	0.12	0.11
	(3.01)	(1.93)	(3.10)	(2.71)	(3.89)	(3.50)	(2.03)	(1.28)	(2.41)	(1.53)	(1.48)	(1.23)
Inflation	0.08	0.03	0.13**	0.08	0.11	0.10*	0.07	0.03	0.13*	0.06	0.12	0.12
	(1.32)	(0.41)	(2.03)	(1.36)	(1.62)	(1.71)	(1.00)	(0.52)	(1.84)	(1.23)	(1.46)	(1.59)
Long-run effect (ID)	0.19		0.25		0.00		0.07		0.22		−0.43	
Long-run effect (ID * EC)		0.72**		0.80**		−0.28		0.64**		0.72***		−0.69*
Long-run effect (ID * DC)		−0.04		0.06		0.16		−0.05		−0.07		−0.53
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	900	900	900	900	900	900	771	771	771	771	771	771
Number of banks	150	150	150	150	150	150	149	149	149	149	149	149
Number of instruments	110	124	110	124	110	124	107	121	107	121	107	121
AR(2) *p*-value[b]	0.86	0.90	0.92	0.99	0.84	0.85	0.96	0.99	0.97	0.89	1.00	0.95
Hansen *p*-value[c]	0.35	0.44	0.53	0.45	0.29	0.47	0.26	0.46	0.16	0.25	0.13	0.27

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1). The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] In columns with even numbers, the international diversification variable 'ID' of the previous column is replaced by the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'}.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

Table 4
Diversification, profitability and risk.

Method: System Generalized Method of Moments. Estimation period: 2004–2013												
	Dependent variable: ROA						Dependent variable: Z-score					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lagged Dependent	0.22**	0.21*	0.25**	0.23**	0.19**	0.23**	0.89***	0.89***	0.89***	0.90***	0.90***	0.84***
	(2.03)	(1.74)	(2.36)	(2.25)	(2.14)	(2.47)	(20.93)	(23.53)	(21.67)	(21.91)	(18.65)	(14.82)
TOTAL	0.20						−0.10					
	(1.05)						(1.64)					
INTRA			0.07						−0.07			
			(0.37)						(1.42)			
INTER					0.30						−0.12	
					(1.53)						(1.22)	
ID * EC[a]		0.45**		0.27*		0.50*		−0.19***		−0.10**		−0.29**
		(2.03)		(1.70)		(1.87)		(2.66)		(1.96)		(2.39)
ID * DC[a]		0.08		0.07		0.08		−0.07		−0.07		−0.02
		(0.40)		(0.43)		(0.23)		(0.68)		(0.89)		(0.15)
Income Diversity	−0.04	−0.00	−0.05	−0.06	0.01	0.01	−0.01	−0.00	−0.03	−0.01	−0.02	−0.04
	(0.37)	(0.00)	(0.41)	(0.42)	(0.12)	(0.06)	(0.12)	(0.03)	(0.44)	(0.08)	(0.28)	(0.61)
Capitalization	0.36**	0.28*	0.31*	0.29*	0.38***	0.32**	0.10*	0.13***	0.10	0.10**	0.10*	0.16**
	(2.46)	(1.78)	(1.91)	(1.72)	(2.96)	(2.26)	(1.87)	(2.69)	(1.51)	(1.98)	(1.91)	(2.42)
Operational Inefficiency	−0.50***	−0.40***	−0.47***	−0.44***	−0.48***	−0.44***	−0.13***	−0.12***	−0.12***	−0.14***	−0.10***	−0.09**
	(5.18)	(4.34)	(4.20)	(4.94)	(5.85)	(6.39)	(3.32)	(3.63)	(2.66)	(3.39)	(2.75)	(2.41)
NPL	−0.22***	−0.24***	−0.20***	−0.23***	−0.22***	−0.20***	−0.04	−0.02	−0.03	−0.02	−0.03	−0.05
	(2.80)	(3.61)	(3.28)	(3.89)	(3.66)	(3.41)	(1.22)	(0.67)	(1.13)	(0.70)	(1.26)	(1.58)
GDP Growth	0.02	0.02	0.01	0.01	−0.00	−0.02	−0.08***	−0.07**	−0.07**	−0.07**	−0.06**	−0.04
	(0.28)	(0.23)	(0.14)	(0.12)	(0.01)	(0.29)	(3.14)	(2.57)	(2.05)	(2.36)	(2.50)	(1.58)
Inflation	0.09*	0.07	0.09*	0.09**	0.05*	0.03	−0.01	−0.01	−0.01	−0.01	0.00	0.02
	(1.77)	(1.39)	(1.81)	(2.04)	(1.65)	(0.67)	(0.39)	(0.38)	(0.44)	(0.78)	(0.29)	(1.35)
Long-run effect (ID)	0.25		0.09		0.37		−0.96*		−0.68		−1.28*	
Long-run effect (ID * EC)		0.57**		0.35*		0.65*		−1.66**		−1.02		−1.82***
Long-run effect (ID * DC)		0.10		0.09		0.10		−0.59		−0.71		−0.10
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	902	902	902	902	902	902	896	896	896	896	896	896
Number of banks	150	150	150	150	150	150	149	149	149	149	149	149
Number of instruments	112	126	112	126	112	126	112	126	112	126	112	126
AR(2) *p*-value[b]	0.89	0.89	0.99	0.81	0.89	0.66	0.34	0.34	0.37	0.29	0.38	0.55
Hansen *p*-value[c]	0.45	0.21	0.24	0.33	0.58	0.42	0.18	0.27	0.15	0.21	0.26	0.19

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1) with the dependent variable 'Tobin's Q' replaced by 'ROA' or 'Z-score'. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] In columns with even numbers, the international diversification variable 'ID' of the previous column is replaced by the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'}.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

umn (1), where we consider the average diversification effect for all sampled banks. Finally, our results indicate that the observed relationship between total diversification and bank value for EC banks is driven by geographic expansion within regions, rather than across regions: the coefficient on 'INTRA * EC' in column (4) is positive, statistically significant, and larger in size than that of 'TOTAL * EC' in column (2), whereas the coefficient on 'INTER * EC' in column (6) has the opposite sign and fails to reach statistical significance. Qualitatively, the results suggest that the long-run (or steady-state) value of Tobin's Q increases by 0.72 standard deviations when 'TOTAL' increases by 1 standard deviation, and by 0.80 standard deviations when 'INTRA' increases by 1 standard deviation.

Do the reported relationships persist when we focus on the crisis and post-crisis years, which are associated with heightened risk in international financial markets and costly regulatory reforms? To answer this question, we exclude the period 2004–2006 (15% of our bank-year observations) and re-estimate the same regression set-up as in columns (1) to (6). The corresponding estimates, reported in columns (7) to (12) of Table 3, support the main findings of the previous paragraphs. However, the negative effect of 'INTER' is now relatively stronger, suggesting that a wider multi-regional spread during crisis and post-crisis years is value-destroying for EC banks. More precisely, the long-run effect in column (12) implies that a one-standard deviation increase in 'INTER' reduces the value of Tobin's Q by 0.69 standard deviations.[22] Concerning the control variables, we can notice that, when we focus on the shorter period, the coefficient on 'NPL' is statistically significant at conventional levels of significance – with the negative sign indicating that, during periods of financial turmoil, poor asset quality becomes critically important and leads to lower values of Tobin's Q.

Overall, our findings broadly support the hypotheses developed in Section 2.2. In line with Hypothesis 1, the bank diversification–valuation relationship is conditioned by the locus of destination of the diversification efforts: intra-regional diversification has a positive effect and inter-regional diversification a negative (but statistically less robust) effect on Tobin's Q. In addition, in line with Hypothesis 2, these effects are significant for banks

[22] Note that this result is mainly driven by the two years of the global financial crisis, 2007 and 2008: when we restrict the sample to include only the post-crisis years 2009–2013, the estimated coefficient on 'INTER * EC' becomes much weaker, both economically and statistically.

Table 5
Diversification and value: control for different types of bilateral distance.

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013												
	TOTAL (1)	INTRA (2)	INTER (3)	TOTAL (4)	INTRA (5)	INTER (6)	TOTAL (7)	INTRA (8)	INTER (9)	TOTAL (10)	INTRA (11)	INTER (12)
Lagged Dependent	0.38***	0.37***	0.34***	0.36***	0.36***	0.32***	0.38***	0.40***	0.32***	0.38***	0.36***	0.33***
	(4.77)	(3.96)	(3.30)	(4.10)	(3.86)	(3.08)	(4.59)	(4.09)	(3.40)	(4.40)	(3.80)	(3.58)
ID * EC[a]	0.40**	0.43*	−0.16	0.38*	0.39**	−0.08	0.32	0.43*	−0.11	0.53*	0.51**	0.14
	(2.01)	(1.94)	(0.47)	(1.92)	(2.43)	(0.30)	(1.40)	(1.87)	(0.34)	(1.87)	(1.99)	(0.40)
ID * DC[a]	−0.09	−0.02	0.12	−0.08	−0.04	0.12	−0.05	0.02	0.07	−0.10	−0.03	0.10
	(0.43)	(0.15)	(0.50)	(0.36)	(0.29)	(0.44)	(0.29)	(0.17)	(0.25)	(0.50)	(0.18)	(0.39)
Geographic Distance	0.08	0.03	0.16									
	(0.46)	(0.14)	(0.86)									
Language Distance				0.14	0.09	0.04						
				(0.58)	(0.44)	(0.21)						
Institutional Distance							0.08	−0.07	0.05			
							(0.29)	(0.25)	(0.22)			
Regulatory Distance										−0.14	−0.11	−0.12
										(0.48)	(0.41)	(0.39)
Long-run effect (ID * EC)	0.65**	0.68**	−0.25	0.58*	0.61***	−0.12	0.52	0.72**	−0.16	0.85**	0.81**	0.20
Long-run effect (ID * DC)	−0.15	−0.03	0.19	−0.12	−0.06	0.17	−0.08	0.04	0.10	−0.16	−0.04	0.15
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	900	900	900	900	900	900	900	900	900	900	900	900
Number of banks	150	150	150	150	150	150	150	150	150	150	150	150
Number of instruments	137	137	137	137	137	137	137	137	137	137	137	137
AR(2) *p*-value[b]	0.86	0.95	0.85	0.86	0.94	0.82	0.86	0.99	0.84	0.87	0.99	0.78
Hansen *p*-value[c]	0.31	0.46	0.30	0.20	0.33	0.41	0.24	0.27	0.48	0.21	0.28	0.37

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1). The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] For brevity and comparability, the columns show the results with the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'} (as given at the top of each column).

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

originating from ECs and insignificant for banks originating from DCs.

To gain a more thorough understanding of the performance implications of geographic diversification, we further explore its impact on bank profitability and bank risk. Following Berger et al. (2010)'s arguments, if higher values of geographic diversification lead to an increase in bank profitability and a decrease in bank risk, then we can conclude that greater levels of diversification improve the overall bank performance. If, on the other hand, geographic diversification is found to be positively related to both bank profitability and bank risk, then the overall performance effects are ambiguous and would depend on what shareholders might perceive as efficient risk-return trade-off. To explore these arguments, we estimate the same regression set-up as in Table 3, but we now use proxies for bank profitability and bank risk as the dependent variable; namely, 'ROA' (return on assets) and 'Z-score' (calculated as the sum of return on assets and equity to assets ratio, scaled by the standard deviation of return on assets over the sample period).[23]

The results, presented in Table 4, indicate that higher values of total diversification boost EC banks' profitability, but, at the same time, translate into higher risk. Qualitatively, the long-run coefficients suggest that a one-standard deviation increase in 'TOTAL' increases the value of 'ROA' by 0.57 standard deviations and reduces the value of 'Z-score' by 1.66 standard deviations. These highly pronounced effects seem to be primarily driven by inter-regional expansion: when EC banks diversify across different regions, they enjoy much higher 'ROA' but are also exposed to much lower values of 'Z-score' (see long-run effects in columns (6) and (12)), leading to ambiguous effects on performance. On the other hand, intra-regional expansion seems to have an overall positive effect on performance: when EC banks follow a more regionally concentrated strategy, they achieve a moderate increase in profitability without being penalized as much in terms of risk (see long-run effects in columns (4) and (10)). These findings can explain, to some extent, the bank value effects of EC banks' diversification activities found in Table 3 and discussed in the previous paragraphs. Notably, when we employ accounting measures of performance, the explanatory power of our bank-level control variables improves. More precisely, as shown in Table 4, higher levels of 'Capitalization' and lower values of 'Operational Inefficiency' and 'NPL' are generally associated with higher profitability and lower risk.

4.2. Direct metrics of distance and institutional dispersion

As argued by Rugman et al. (2011) and noted in Section 3.1, regional boundaries represent a useful cut at separating lower-distance intra-regional environments from higher-distance inter-regional ones. Hence, although our diversification measures do not explicitly utilize a direct metric of bilateral distance (economic, cultural, institutional, or merely geographic), they do take into account that inter-regional settings involve markets 'far away' from banks' home regions. One concern that may arise here is that the different bank value effects of 'INTRA' and 'INTER' are not driven by changes in the breath and depth of geographic diver-

[23] Higher 'Z-score' indicates lower probability of default (lower risk). Since the distribution of 'Z-score' is highly skewed, we use its logarithm in our regressions.

sification within regions and across regions, but are rather the outcome of bilateral distance changes between the source and the host countries; that is, regional boundaries do not actually matter. To address this concern, we examine whether our results hold when we augment the baseline specification of Table 3 with direct metrics of distance; namely, 'Geographic Distance', 'Language Distance', 'Institutional Distance' and 'Regulatory Distance'. Each indicator is calculated as a weighted average of the distance between the home country of the parent bank and the countries of residence of its subsidiaries, where the weight is the parent bank's share of subsidiaries in each country. For 'Geographic Distance' we use the logarithm of bilateral (capital to capital city) distances in kilometers, for 'Institutional Distance' we use the bilateral differences in institutional development, while for 'Regulatory Distance' we use the bilateral differences in regulatory quality.[24] 'Language Distance' is based on the CEPII's Common Language Index, re-scaled to reflect distance instead of proximity between countries. Table 5 displays the corresponding results, where, for brevity and comparability, we focus on the interaction terms 'ID * EC' and 'ID * DC'. The added distance variables turn out to have little economic influence on the dependent variable and fail to reach statistical significance. More importantly, the inferences on our diversification measures do not change: once again we find that the value of EC banks responds positively to increasing levels of intra-regional diversification, which, in turn, produces an overall positive impact of 'TOTAL' on Tobin's Q.

The failure to uncover strong relationships between bank value and direct metrics of distance is consistent with the arguments of Shenkar (2001) and Gupta et al. (2002). According to these studies, using continuous distance measures raises questions of linearity and functional form by implicitly assuming away discontinuities and threshold effects. Country clusters, on the other hand, can be a more useful way to summarize cultural and institutional similarities, as well trade and customer links, across countries. Following these arguments, we employ an alternative definition of regions – based on institutions – as a post hoc test. Since there is no consensus about how to classify countries into institutional clusters, we follow the approach of Asmussen and Goerzen (2013). More precisely, we first divide all the countries of the world into two groups: those with an average institutional development score above the median and those with an average institutional development score below the median. We then utilize these groups to construct two new diversification measures based on Eqs. (3) and (4); namely, 'Intra-institutional Dispersion' (dispersion within a group of institutionally similar countries) and 'Inter-institutional Dispersion' (dispersion across groups of institutionally different countries). Table 6 shows the results with 'INTRA' and 'INTER' replaced by these new diversification measures. Overall, we find evidence that, for EC banks, higher levels of intra-institutional dispersion lead to value enhancement, while higher levels of inter-institutional dispersion have no effect on value. This is not so surprising if we take into account that the two alternative definitions of regions are highly correlated; that is, countries within a geographic region are far more likely to be institutionally similar to one another than those in different geographic regions.[25] At the same time, the estimated coefficients in Table 6 are economically less significant than those in Table 3, indicating that the institutional definition of regions does not provide as good of a test of the research question as does the geographic definition of regions used in our baseline model.

Table 6
Diversification and value: institutional dispersion.

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013				
	(1)	(2)	(3)	(4)
Lagged Dependent	0.29***	0.29***	0.29***	0.28***
	(3.01)	(3.72)	(3.05)	(2.99)
Intra-institutional Dispersion	0.20			
	(1.17)			
Inter-institutional Dispersion			−0.04	
			(0.24)	
Ω* EC[a]		0.38**		0.01
		(2.12)		(0.04)
Ω* DC[a]		0.04		−0.07
		(0.17)		(0.38)
Long-run effect (Ω)	0.28		−0.06	
Long-run effect (Ω* EC)		0.53**		0.01
Long-run effect (Ω* DC)		0.05		−0.10
Year, country, size dummies	Yes	Yes	Yes	Yes
Number of observations	900	900	900	900
Number of banks	150	150	150	150
Number of instruments	110	124	109	122
AR(2) *p*-value[b]	0.88	0.90	0.83	0.78
Hansen *p*-value[c]	0.43	0.49	0.20	0.33

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1), with 'INTRA' and 'INTER' replaced by 'Intra-institutional Dispersion' and 'Inter-institutional Dispersion'. To calculate these measures, we divide all the countries of the world into two groups: those with an average institutional development score above the median, and those with an average institutional development score below the median. The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. Equations estimated using Windmeijer WC-robust standard errors.

[a] In columns with even numbers, the institutional dispersion measure 'Ω' of the previous column is replaced by the interaction terms 'Ω*EC' and 'Ω*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'Ω' ∈ {'Intra-institutional Dispersion','Inter-institutional Dispersion'}.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

In sum, the results of Tables 5 and 6 point to two conclusions. First, institutional similarity within regions is indeed an important channel through which EC banks can benefit from intra-regional diversification. Second, using the geographic region as a unit of analysis can sufficiently capture the multiplicative performance effects stemming from different types of distance (and country links), which are not independent of each other.

4.3. Variation across bank and country characteristics

As discussed in Section 2.2, EC banks may not have the firm- and country-specific advantages associated with internationalization that DC banks do. To take a closer look at this issue, we compare the two bank groups in our sample across four bank- and country-level variables: 'Age'$_m$ (number of years since establishment), 'Size'$_m$ (total assets in billions of US dollars), 'Financial Development'$_m$ (domestic credit to private sector as % of GDP), and 'Institutional

[24] Data for institutional development and regulatory quality are obtained from the World Bank's World Governance Indicators (WGI) database, which has been used widely in related studies (see, for example, Claessens and van Horen, 2012a; Asmussen and Goerzen, 2013). The institutional development score is calculated as the average standardized score (percentile rank) of the six WGI items: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. The regulatory quality score is simply the standardized score of the fourth item.

[25] Specifically, source and host countries within the same geographic region belong to the same institutional group in 73% of the cases in our sample, while the corresponding percentage for those in different geographic regions is 40%. Similar correlations can be observed when we create groups based on language similarities and regulatory quality closeness.

Table 7
Developed country vs emerging country banks.

Variable	DC banks			EC banks			*t*-test
	Obs	Mean	Std dev	Obs	Mean	Std dev	Mean Diff[a]
Age_m	83	81.00	81.37	77	43.48	38.82	37.52***
$Size_m$	83	548.80	644.02	77	37.88	61.82	510.92***
Financial $Development_m$	83	139.36	41.17	77	65.37	41.82	73.99***
Institutional $Development_m$	83	86.60	8.05	77	41.39	16.23	45.21***

W_m is the median value of yearly observations of W over the sample period 2004–2013, where $W \in$ {'Age','Size','Financial Development','Institutional Development'}. See Table 1 for further information on these variables. The values displayed in this table are not in logs.

[a] Reports the difference in the mean values between DC and EC banks.

*** Statistically significant at the 1% confidence level.

Table 8
Diversification and value: variation across bank and country characteristics.

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013			
	TOTAL (1)	INTRA (2)	INTER (3)
Specification I			
ID * EC	0.46	0.76**	−0.41
	(1.21)	(2.14)	(1.31)
ID * DC	−0.01	−0.02	−0.14
	(0.01)	(0.13)	(0.46)
Specification II			
ID	1.45	1.13	1.25
	(1.10)	(1.21)	(0.78)
ID * Age_m	−0.33	−0.18	−0.38
	(0.98)	(1.01)	(0.95)
Specification III			
ID	0.97	6.68**	−1.77
	(0.27)	(2.20)	(1.34)
ID * $Size_m$	−0.08	−0.73**	0.17
	(0.20)	(2.22)	(1.07)
Specification IV			
ID	5.17	5.49*	1.10
	(1.47)	(1.96)	(0.40)
ID * Financial $Development_m$	−0.83	−0.89*	−0.24
	(1.43)	(1.94)	(0.53)
Specification V			
ID	2.48	6.40**	−1.61
	(0.73)	(2.12)	(0.86)
ID * Institutional $Development_m$	−0.28	−0.71**	0.17
	(0.72)	(2.06)	(0.71)

Columns report long-run effects (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the steady-state value of the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.2). Specification I shows the results with the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'} (as given at the top of each column). Specifications II-V show the results with the variable 'ID' and the interaction term 'ID* W_m', where $W_m \in$ {'Age'_m, '$Size'_m$, 'Financial $Development'_m$, 'Institutional $Development'_m$}. See Table 1 for further information on these variables.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

Development'$_m$ (the WGI institutional development score). We can discern that, on average, EC banks are younger, smaller, and originate from countries with lower levels of financial and institutional development, and that the mean differences in these variables between the two bank groups are very large and statistically significant at the 1% confidence level (see Table 7). Do the results reported in Table 3 change when we allow for variation in bank value with respect to bank and country characteristics? To answer this question, we augment the baseline specification (M.1) with the aforementioned variables (in logarithms) and omit the size- and country-specific effects. The long-run estimates, presented in Specification I of Table 8, lead to the same overall conclusion: greater intra-regional diversification is value-creating for EC banks.

The significant differences in bank- and country-specific characteristics between DC banks and EC banks raise also another important question. Which of these characteristics are driving the observed relationships between bank value and geographic diversification for the two bank groups? We thus take our analysis one step further and re-estimate the same regression set-up with 'ID * EC' and 'ID * DC' replaced by the interaction between 'ID' and $W_m \in$ {'Age'_m, '$Size'_m$, 'Financial $Development'_m$, 'Institutional $Development'_m$}; that is, we estimate model (M.2) separately for each W_m.[26] The results, displayed in Specifications II–V of Table 8, are in line with our previous findings. Specifically, we find that Tobin's Q responds more positively to increased intra-regional diversification when banks are smaller and originate from countries with lower values of financial and institutional development, with all being characteristics of EC banks. We infer this from the positive estimated long-run coefficients of 'ID' in column (2) of specifications III, IV and V, together with the negative and significant estimated long-run coefficients of 'ID * $Size'_m$', 'ID * Financial $Development'_m$ and 'ID * Institutional $Development'_m$. It must be stressed that, due to high correlations between the four variables under consideration, one has to be very cautious in prioritizing and uncovering links among the different sources of variation in the diversification effects. Nevertheless, the analysis in this section clearly indicates that a binary distinction between EC banks and DC banks can serve as a crude measure that may capture a number of these sources simultaneously.

4.4. Robustness tests

We perform various tests to assess the robustness of the key findings, as discussed in Section 4.1. First, we check whether our results hold when we use, as dependent variable, alternative proxies of bank value; that is, the ratio of the market value of equity to the book value of equity, 'MV-to-BV' (columns (1)–(3) of Table 9), and the ratio of the market value of equity to total assets, 'MV-to-Assets' (columns (4)–(6) of Table 9).[27] Second, we test whether our results become less pronounced when we replace 'INTRA' with 'INTRA-Home' (columns (7)–(9) of Table 9). Third, we examine the sensitivity of our results when we adopt subsidiary asset-based (instead of presence-based) measures of total, intra-regional, and inter-regional geographic diversification (columns (10)–(12) of Table 9).[28] Fourth, we include the growth rate of total assets, 'Assets

[26] Including all the interaction terms in the same specification generates a great many instruments in the GMM estimation and weakens the Hansen test of the instruments' joint validity. In addition, it leads to collinearity and identification problems, which affects the interpretability of the estimated coefficients.

[27] The first measure has been employed in other studies (see, for example, Caprio et al., 2007), whereas the second measure is based on BankScope's definition for Tobin's Q.

[28] The asset-based measures are also constructed using Eqs. (3) and (4), but, in this case, incorporate information about the proportion of subsidiary assets instead of the proportion of subsidiaries. Since for a large number of subsidiaries in our

Table 9
Diversification and value: robustness tests.

Dependent variable: MV-to-BV (columns (1)–(3)), MV-to-Assets (columns (4)–(6)), Tobin's Q (columns (7)–(12)). Method: System Generalized Method of Moments. Estimation period: 2004–2013

	Dependent: 'MV-to-BV'			Dependent: 'MV-to-Assets'			Use 'INTRA-Home'			Use asset-based 'ID'		
	TOTAL (1)	INTRA (2)	INTER (3)	TOTAL (4)	INTRA (5)	INTER (6)	TOTAL (7)	INTRA (8)	INTER (9)	TOTAL (10)	INTRA (11)	INTER (12)
Lagged Dependent	0.28***	0.28***	0.29***	0.29***	0.29***	0.29***	0.32***	0.32***	0.28***	0.33***	0.32***	0.28***
	(3.41)	(3.45)	(3.56)	(2.79)	(2.79)	(3.17)	(3.81)	(3.63)	(2.87)	(3.49)	(3.60)	(2.80)
ID * EC[a]	0.31*	0.42**	−0.48	0.38**	0.38*	0.13	0.47***	0.56**	−0.20	0.42***	0.33**	−0.12
	(1.91)	(2.04)	(0.99)	(2.47)	(1.91)	(0.47)	(2.58)	(2.42)	(0.53)	(2.67)	(2.20)	(0.27)
ID * DC[a]	−0.23	−0.19	0.09	0.04	0.05	0.06	0.05	0.04	0.12	0.05	0.10	0.13
	(1.02)	(1.24)	(0.23)	(0.29)	(0.58)	(0.26)	(0.19)	(0.20)	(0.41)	(0.36)	(0.65)	(0.52)
Income Diversity	0.05	0.07	0.06	0.03	0.02	0.08	0.01	0.00	0.12	0.01	−0.03	0.06
	(0.45)	(0.58)	(0.43)	(0.34)	(0.19)	(0.61)	(0.11)	(0.02)	(0.65)	(0.12)	(0.26)	(0.41)
Capitalization	−0.24	−0.28	−0.19	0.18	0.09	0.27*	−0.24	−0.32	−0.25	−0.30	−0.30*	−0.30
	(1.15)	(1.38)	(1.09)	(1.05)	(0.49)	(1.66)	(1.09)	(1.40)	(1.17)	(1.64)	(1.67)	(1.19)
Operational Inefficiency	−0.06	−0.07	−0.09	−0.01	0.03	−0.06	−0.09	−0.03	−0.08	−0.06	−0.04	−0.08
	(0.75)	(0.81)	(0.74)	(0.08)	(0.38)	(0.89)	(1.10)	(0.34)	(0.98)	(0.74)	(0.47)	(0.81)
NPL	−0.15***	−0.19***	−0.15**	−0.12**	−0.13**	−0.08	−0.13*	−0.16**	−0.11	−0.16*	−0.17**	−0.14*
	(2.72)	(2.83)	(2.10)	(2.07)	(1.96)	(1.51)	(1.76)	(2.07)	(1.57)	(1.93)	(2.38)	(1.88)
GDP Growth	0.11	0.13*	0.19***	0.11	0.15**	0.10*	0.18**	0.20**	0.24***	0.18***	0.20***	0.23***
	(1.38)	(1.85)	(3.13)	(1.61)	(1.98)	(1.80)	(1.98)	(2.58)	(3.50)	(2.74)	(2.88)	(3.72)
Inflation	0.02	0.04	0.12**	0.01	0.05	−0.00	0.04	0.08	0.10*	0.11*	0.12*	0.09
	(0.52)	(0.72)	(2.02)	(0.23)	(0.93)	(0.01)	(0.53)	(1.22)	(1.71)	(1.81)	(1.86)	(1.42)
Long-run effect (ID * EC)	0.43**	0.59**	−0.68	0.54***	0.54**	0.18	0.69***	0.82**	−0.28	0.63***	0.48**	−0.16
Long-run effect (ID * DC)	−0.33	−0.27	0.12	0.06	0.08	0.09	0.08	0.06	0.16	0.08	0.14	0.18
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	900	900	900	865	865	865	900	900	900	900	900	900
Number of banks	150	150	150	147	147	147	150	150	150	150	150	150
Number of instruments	124	124	124	122	122	122	124	124	124	124	124	124
AR(2) *p*-value[b]	0.80	0.91	0.89	0.69	0.83	0.54	0.88	0.96	0.85	1.00	0.99	0.83
Hansen *p*-value[c]	0.26	0.24	0.19	0.13	0.27	0.20	0.34	0.22	0.47	0.50	0.32	0.46

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1). The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] For brevity and comparability, the columns show the results with the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'} (as given at the top of each column). Equations in columns (1)–(3) have, as dependent variable, the ratio of the market value of equity to the book value of equity ('MV-to-BV'). Equations in columns (4)–(6) have, as dependent variable, the ratio of the market value of equity to total assets ('MV-to-Assets'). Equations in columns (7)–(9) replace 'INTRA' with 'INTRA-Home'. Equations in columns (10)–(12) employ subsidiary asset-based (instead of presence-based) 'ID' measures.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

Growth', and age dummies (binary variables that group banks into age quartiles) as additional control variables, and omit 'Income Diversity' which is another form of diversification (columns (1)–(9) of Table 10). Fifth, we experiment by re-defining 'TOTAL', 'INTRA' and 'INTER' to capture geographic diversification within and across five regions, instead of six (columns (10)–(12) of Table 10).[29] Finally, we exclude the US banks, the Japanese banks and the Chinese banks, which have the highest number of bank-year observations in our sample (columns (1)–(9) of Table 11). Overall, the estimates obtained are broadly consistent with those reported in the baseline specification: intra-regional diversification, and particularly diversification across the home-region countries, is value-creating for EC banks, which leads to an overall positive impact of 'TOTAL' on Tobin's Q.

As noted in Section 3.3, a number of bank-year observations in our sample are classified as domestic. To check robustness to sample selection, in that pure domestic banks are perhaps different entities altogether, we exclude all banks with no foreign subsidiaries in all years and focus on the diversification effects of international banks. As shown in columns (10)–(12) of Table 11, the estimated coefficients are marginally smaller in absolute value, but they retain their sign and level of statistical significance, leading to the same inferences.

We also test whether our results persist when we consider a bank fixed effects framework. In the context of a dynamic panel data model as in (M.1), the fixed effects estimator is known to be severely biased and inconsistent unless the time dimension is large (Nickel, 1981). The time dimension in our data set is relatively small (at most 10 years) and, hence, the bias that results from using a fixed effects estimator is non-negligible. To address this issue, we transform our model into first differences (without the inclusion of the lagged dependent variable), which allows us to obtain estimates of the immediate (within the year) effects. Taking first differences eliminates endogeneity from time-invariant unobserved bank characteristics, but it does not control for unobserved bank-specific time trends in levels, which are likely to be present in EC banks. It is thus sensible to estimate the first-differencing model with bank fixed effects. Table 12 shows the results of this

sample, the value of assets is available for a limited number of years, we calculate these measures using the median of each subsidiary's assets over the sample period. Therefore, while the asset-based measures take into account the relative size of each subsidiary, they do not vary when a subsidiary becomes larger or smaller over time.

[29] To do that, we merge 'Asia' and 'Oceania' into one region.

Table 10
Diversification and value: robustness tests (continued).

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013												
	Add 'Assets Growth'			Add age dummies			Omit 'Income Diversity'			Use five regions		
	TOTAL (1)	INTRA (2)	INTER (3)	TOTAL (4)	INTRA (5)	INTER (6)	TOTAL (7)	INTRA (8)	INTER (9)	TOTAL (10)	INTRA (11)	INTER (12)
Lagged Dependent	0.33***	0.33***	0.29***	0.34***	0.32***	0.28***	0.37***	0.36***	0.32***	0.34***	0.33***	0.28***
	(4.56)	(3.90)	(3.26)	(4.17)	(3.36)	(2.76)	(3.89)	(3.48)	(2.90)	(4.18)	(3.38)	(2.93)
ID * EC[a]	0.50**	0.55**	−0.13	0.47**	0.53**	−0.33	0.48**	0.53**	−0.14	0.50**	0.56**	−0.15
	(2.54)	(2.52)	(0.53)	(2.40)	(2.29)	(0.73)	(2.52)	(2.18)	(0.47)	(2.47)	(2.16)	(0.43)
ID * DC[a]	−0.09	0.00	0.01	−0.04	0.04	0.16	0.03	0.05	0.06	−0.00	0.07	0.13
	(0.47)	(0.03)	(0.04)	(0.24)	(0.30)	(0.59)	(0.13)	(0.29)	(0.21)	(0.01)	(0.49)	(0.51)
Income Diversity	0.06	0.03	0.05	0.04	0.00	0.08				0.06	0.04	0.10
	(0.58)	(0.36)	(0.40)	(0.29)	(0.01)	(0.43)				(0.46)	(0.35)	(0.56)
Capitalization	−0.29	−0.31	−0.24	−0.22	−0.29	−0.24	−0.23	−0.30	−0.22	−0.21	−0.27	−0.23
	(1.33)	(1.60)	(1.05)	(1.04)	(1.46)	(1.03)	(0.98)	(1.42)	(1.06)	(1.05)	(1.45)	(1.06)
Operational Inefficiency	−0.00	0.02	−0.05	−0.08	−0.06	−0.10	−0.10	−0.05	−0.10	−0.08	−0.06	−0.08
	(0.00)	(0.22)	(0.59)	(0.88)	(0.64)	(1.16)	(1.15)	(0.43)	(1.10)	(0.84)	(0.63)	(1.03)
NPL	−0.15**	−0.17**	−0.14**	−0.12*	−0.16**	−0.12*	−0.15*	−0.17*	−0.14*	−0.13*	−0.17**	−0.11
	(1.98)	(2.37)	(1.96)	(1.90)	(1.97)	(1.72)	(1.91)	(1.95)	(1.78)	(1.95)	(2.15)	(1.58)
Assets Growth	0.01	0.02	−0.02									
	(0.25)	(0.43)	(0.43)									
GDP Growth	0.14*	0.18**	0.20***	0.15**	0.20***	0.24***	0.12*	0.17**	0.18***	0.15*	0.20***	0.23***
	(1.89)	(2.54)	(3.56)	(2.00)	(2.78)	(3.48)	(1.77)	(2.37)	(3.29)	(1.90)	(2.73)	(3.46)
Inflation	0.04	0.08	0.09*	0.03	0.08	0.12*	0.05	0.09	0.09*	0.03	0.08	0.09
	(0.51)	(1.46)	(1.71)	(0.31)	(1.30)	(1.84)	(0.58)	(1.35)	(1.70)	(0.33)	(1.32)	(1.53)
Long-run effect (ID * EC)	0.74**	0.82**	−0.19	0.70**	0.77**	−0.45	0.76**	0.83**	−0.21	0.77**	0.83**	−0.21
Long-run effect (ID * DC)	−0.14	0.01	0.02	−0.06	0.06	0.22	0.05	0.07	0.09	−0.00	0.11	0.19
Age dummies	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	900	900	900	900	900	900	900	900	900	900	900	900
Number of banks	150	150	150	150	150	150	150	150	150	150	150	150
Number of instruments	137	137	137	126	126	126	110	110	110	124	124	124
AR(2) *p*-value[b]	0.91	0.99	0.88	0.88	0.97	0.86	0.96	0.94	0.89	0.91	0.99	0.83
Hansen *p*-value[c]	0.34	0.33	0.36	0.42	0.42	0.44	0.32	0.25	0.15	0.43	0.45	0.50

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1). The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] For brevity and comparability, the columns show the results with the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'} (as given at the top of each column). Equations in columns (1)–(3) include 'Assets Growth' in the list of bank-level control variables. Equations in columns (4)–(6) include age dummies in the list of bank-level control variables. Equations in columns (7)–(9) exclude 'Income Diversity' from the list of bank-level control variables. Equations in columns (10)–(12) employ re-defined 'ID' measures, capturing geographic diversification within and across five regions, instead of six.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

estimation, where the diversification measures and the bank-level control variables are lagged by one year to mitigate the possibility of simultaneity or reverse causality bias. Overall, the results are in line with those reported in Table 3 and the main conclusions remain valid.[30]

To further explore the sensitivity of our results, we replace our baseline diversification measures with the two Herfindahl-type indices discussed in Section 3.1. The corresponding results, displayed in Table 13, confirm that our findings are indeed due to the distinction between global and regional dispersion. Specifically, while the coefficient on 'Θ * EC' is positive and statistically significant at the 10% confidence level in the regression with 'International Concentration', it becomes larger in magnitude and highly statistically significant in the regression with 'Regional Concentration'.

Additional checks are conducted, such as using different classifications of DCs and ECs,[31] employing different instrument structures, and using alternative measures of institutional development and regulatory efficiency (for the tests in Sections 4.2 and 4.3) based on the Heritage Foundation's Index of Economic Freedom. These additional tests yield similar results and do not change the inferences drawn (available upon request).

5. Conclusions

The global banking system has now become more heterogeneous than ever before due to the increasingly important role of banks from emerging markets and the rising trend towards greater regional activity. The existing literature on the internationalization–bank performance debate ignores the locus of geographic

[30] As noted in Section 3.2, using the system-GMM mitigates most of the endogeneity issues since this methodology is suitable for independent variables that are not strictly exogenous. We acknowledge that the identification can be further strengthened by using instrumental variable analysis based on external instruments. However, finding a valid instrument for internationalization becomes very challenging when one considers different types of geographic diversification (within and across regions) and employs data from very different countries, as in our case.

[31] For instance, treating South Korea as an EC based on the MSCI Market Classification Framework does not alter our findings.

Table 11
Diversification and value: robustness tests (continued).

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013												
	Exclude US banks			Exclude Japanese banks			Exclude Chinese banks			Exclude non-diversified banks		
	TOTAL (1)	INTRA (2)	INTER (3)	TOTAL (4)	INTRA (5)	INTER (6)	TOTAL (7)	INTRA (8)	INTER (9)	TOTAL (10)	INTRA (11)	INTER (12)
Lagged Dependent	0.30***	0.31***	0.25**	0.34***	0.32***	0.28***	0.34***	0.32***	0.28**	0.28***	0.29***	0.20*
	(3.34)	(3.52)	(2.11)	(4.03)	(3.36)	(2.79)	(3.74)	(3.15)	(2.54)	(3.01)	(3.28)	(1.72)
ID * EC[a]	0.45**	0.46**	−0.02	0.50**	0.62**	−0.23	0.57**	0.55**	−0.31	0.43**	0.44**	−0.13
	(2.43)	(2.07)	(0.08)	(2.31)	(2.32)	(0.69)	(2.58)	(2.15)	(0.62)	(2.49)	(2.24)	(0.37)
ID * DC[a]	−0.23	−0.06	−0.23	−0.02	0.10	0.10	0.07	0.08	0.04	0.01	−0.08	0.07
	(1.18)	(0.38)	(0.67)	(0.07)	(0.52)	(0.30)	(0.33)	(0.60)	(0.16)	(0.05)	(0.43)	(0.33)
Income Diversity	0.02	0.01	0.03	0.09	0.10	0.12	0.11	0.07	0.16	0.09	0.08	0.07
	(0.25)	(0.06)	(0.25)	(0.65)	(0.71)	(0.67)	(0.94)	(0.57)	(0.91)	(0.96)	(0.69)	(0.44)
Capitalization	−0.38	−0.35	−0.44*	−0.19	−0.24	−0.18	−0.15	−0.23	−0.20	−0.00	−0.09	0.05
	(1.57)	(1.54)	(1.67)	(0.82)	(1.03)	(0.84)	(0.65)	(1.06)	(0.85)	(0.02)	(0.43)	(0.27)
Operational Inefficiency	−0.12	−0.13	−0.14	−0.06	0.00	−0.08	−0.10	−0.08	−0.07	−0.11	−0.06	−0.13
	(1.20)	(1.15)	(1.27)	(0.56)	(0.01)	(0.83)	(1.06)	(0.89)	(0.80)	(1.18)	(0.62)	(1.47)
NPL	−0.15*	−0.19**	−0.14	−0.14*	−0.17**	−0.11*	−0.13*	−0.16**	−0.13**	−0.18*	−0.23**	−0.14
	(1.95)	(2.15)	(1.61)	(1.90)	(2.07)	(1.79)	(1.84)	(2.13)	(1.98)	(1.72)	(2.02)	(1.59)
Growth	0.14	0.18*	0.18***	0.13*	0.19**	0.21***	0.13*	0.17**	0.19***	0.11	0.14**	0.16**
	(1.57)	(1.96)	(2.76)	(1.86)	(2.49)	(3.27)	(1.69)	(2.47)	(2.98)	(1.57)	(2.14)	(2.52)
Inflation	0.02	0.07	0.10	0.01	0.06	0.09	0.01	0.07	0.11*	−0.05	−0.02	0.01
	(0.28)	(1.24)	(1.37)	(0.17)	(0.91)	(1.47)	(0.09)	(1.12)	(1.65)	(0.56)	(0.19)	(0.06)
Long-run effect (ID * EC)	0.64**	0.67**	−0.03	0.76**	0.91**	−0.32	0.88***	0.80**	−0.43	0.60**	0.63**	−0.16
Long-run effect (ID * DC)	−0.32	−0.09	−0.30	−0.03	0.15	0.14	0.11	0.12	0.06	0.01	−0.12	0.09
Year, country, size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	794	794	794	823	823	823	852	852	852	741	741	741
Number of banks	138	138	138	138	138	138	134	134	134	112	112	112
Number of instruments	123	123	123	123	123	123	123	123	123	100	100	100
AR(2) *p*-value[b]	0.82	0.94	0.74	0.99	0.89	0.98	0.96	0.97	0.92	0.96	0.94	0.84
Hansen *p*-value[c]	0.53	0.40	0.23	0.15	0.19	0.28	0.46	0.52	0.48	0.67	0.59	0.38

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1). The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] For brevity and comparability, the columns show the results with the interaction terms 'ID*EC' and 'ID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ID' ∈ {'TOTAL','INTRA','INTER'} (as given at the top of each column). Equations in columns (1)–(3) exclude the US banks. Equations in columns (4)–(6) exclude the Japanese banks. Equations in columns (7)–(9) exclude the Chinese banks. Equations in columns (10)–(12) exclude banks with no foreign subsidiaries in all years.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

Table 12
Diversification and value: bank fixed effects.

Dependent variable: ΔTobin's Q. Method: Bank Fixed Effects. Estimation period: 2004–2013												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔTOTAL	0.54**						0.47*					
	(2.02)						(1.68)					
ΔINTRA		0.59***							0.52**			
			(2.74)						(2.28)			
ΔINTER					−0.05						−0.04	
					(0.69)						(0.54)	
Δ ID *EC[a]		0.82**		0.93***		−0.12		0.68*		0.82***		−0.17*
		(2.43)		(3.48)		(0.82)		(1.81)		(2.85)		(1.83)
Δ ID *DC[a]		−0.07		−0.11		0.01		0.01		−0.10		0.08
		(0.43)		(0.98)		(0.10)		(0.03)		(1.07)		(0.79)
Year dummies	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	784	784	784	784	784	784	784	784	784	784	784	784
R-squared (within)	0.04	0.04	0.04	0.05	0.03	0.03	0.23	0.24	0.24	0.24	0.23	0.23

Columns report estimated coefficients (|*z*|-statistics). All variables are standardised and expressed in first differences (Δ). 'ΔTOTAL', 'ΔINTRA', 'ΔINTER', 'Δ ID *EC', 'Δ ID *DC', and all bank-level control variables are lagged by one year to mitigate the possibility of simultaneity or reverse causality bias. The bank- and country-level control variables (in first differences) are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using robust standard errors.

[a] In columns with even numbers, the international diversification variable 'ΔID' of the previous column is replaced by the interaction terms 'ΔID*EC' and 'ΔID*DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'ΔID' ∈ {'ΔTOTAL','ΔINTRA','ΔINTER'}. Equations in columns (1)–(6) exclude year specific effects, while equations in columns (7)–(12) include year specific effects.

* Statistically significant at the 10% confidence level.

** Statistically significant at the 5% confidence level.

*** Statistically significant at the 1% confidence level.

Table 13
Diversification and value: Herfindahl-type diversification measures.

Dependent variable: Tobin's Q. Method: System Generalized Method of Moments. Estimation period: 2004–2013				
	(1)	(2)	(3)	(4)
Lagged Dependent	0.32***	0.35***	0.31***	0.32***
	(3.45)	(4.38)	(3.10)	(2.86)
International Concentration	0.11			
	(0.72)			
Regional Concentration			0.39	
			(1.20)	
Θ* EC[a]		0.39*		0.98***
		(1.94)		(2.85)
Θ* DC[a]		−0.02		0.40
		(0.12)		(1.03)
Long-run effect (Θ)	0.16		0.56	
Long-run effect (Θ* EC)		0.60*		1.44***
Long-run effect (Θ* DC)		−0.04		0.58
Year, country, size dummies	Yes	Yes	Yes	Yes
Number of observations	900	900	900	900
Number of banks	150	150	150	150
Number of instruments	110	124	110	124
AR(2) *p*-value[b]	0.87	0.91	0.98	0.85
Hansen *p*-value[c]	0.30	0.34	0.18	0.10

Columns report estimated coefficients (|*z*|-statistics). All coefficients are standardised and display how many standard deviations the dependent variable changes for a one-standard deviation change in the independent variable. The regression model is given in (M.1), with 'TOTAL' and 'INTRA' replaced by 'International Concentration' and 'Regional Concentration'. The bank- and country-level variables of vectors **X** and **Y** are included in the regressions but are not displayed in this table. The description of the regression variables is given in Table 1. Equations estimated using Windmeijer WC-robust standard errors.

[a] In columns with even numbers, the concentration-based diversification measure 'Θ' of the previous column is replaced by the interaction terms 'Θ* EC' and 'Θ* DC', where 'EC' and 'DC' are binary variables coding banks headquartered in ECs and DCs, and 'Θ' ∈ {'International Concentration','Regional Concentration'}.

[b] Reports the Arellano-Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0: no autocorrelation.

[c] Reports the Hansen test *p*-value for over-identifying restrictions, where H_0: over-identifying restrictions are valid.

* Statistically significant at the 10% confidence level.

*** Statistically significant at the 1% confidence level.

diversification and fails to appreciate the conditionality of effects upon home country attributes. Our study fills this gap by exploring the valuation impacts of both intra-regional and inter-regional diversification, and by examining whether the resulting effects vary between banks headquartered in ECs and those headquartered in DCs. To this end, we consider data from the largest banks across the world over the period 2004–2013, and employ the system-GMM estimation technique. Two key results emerge. First, higher levels of geographic diversification are associated with changes in valuations for EC banks, but not for DC banks. Second, while higher levels of intra-regional diversification lead to value enhancement, higher levels of inter-regional diversification seem to induce a negative (but statistically unstable) effect on the valuation of EC banks.

Further analysis sheds light on potential explanations for the aforementioned findings. When EC banks diversify across different regions, they enjoy high profitability gains as they can capitalize on strategic assets, capabilities and markets outside their home region, but, at the same time, they are exposed to much higher levels of risk, leading to ambiguous effects on performance. On the other hand, when they engage in a more regionally-concentrated strategy, they can achieve a moderate increase in profitability without being penalized as much in terms of risk. Through intra-regional diversification, it is indeed possible to access different markets and resources embedded in different countries in the region, while, due to geographic proximities and institutional and cultural similarities, adaptation costs and risks remain relatively low. As suggested by Arregle et al. (2009), although countries continue to matter, national markets in the same region share similarities that decrease the newness of the problems and the liability of foreignness. Given that a regional focus is becoming increasingly important in global banking, the absence of value gains for DC banks (as observed in this paper) can be attributed, to some extent, to dismal growth prospects and costly regulations in the banking markets of these countries, especially since the onset of the global financial crisis. Furthermore, as showcased here, DC banks do not only operate in more financially and institutionally developed countries, but are also larger, more mature and earlier-comers to the internationalization stage compared to EC banks. Consequently, the marginal benefits and costs of pursuing further geographic diversification (either regionally or globally) are much weaker for these banks.

The expansion of international financial institutions has been particularly strong since the mid-1990s, reflecting the sharp increase in financial globalization. Given the concerns about global banks serving as a risk transmission channel, the extent of international diversification gains in banking is critically important for investors, bankers and policy-makers. The design of regulatory policies and geographic expansion strategies should take into account that aggregate or total international diversification is not a sufficient indicator of bank multinationality, and that the value gains from international expansion depend on the banks' home country set-ups and the locus of international diversification, as indicated by the results of this paper. In particular, our finding that EC banks' valuations are highly responsive to their internationalization strategies may be of help to policy-makers in ECs, with regards to implementing policies aiming at encouraging the diversification of banking, especially within the same region.

As outlined above, our paper offers important contributions to the existing literature, especially with respect to the role of regional boundaries. However, this is only one study on this topic, and, as such, it can be used as the starting point for future research. Due to the scope of the current study, we focus on large banks which can exhibit significant within-bank intertemporal variation in geographic diversification within and across regions. Hence, our results do not capture all the aspects of the relationship between geographic diversification and performance. Extending the sample to include a much larger number of banks across the world and a longer time period could enable scholars to examine the bank- and country-level characteristics that determine the propensity to change geographic scope from domestic to international. Similarly, by considering a wider sample of banks from ECs, one could explore the existence of geographic limits in diversification gains within intra-regional settings, and the role specific bank attributes play in that respect.

Appendix A. Appendix

See Tables A.1–A.3.

Table A.1
Descriptive statistics for the main regression variables.

Variable	Obs	Mean	Std dev	Min	Max
Tobin's Q (Q)	1042	1.03	0.08	0.86	1.47
ROA	1018	1.03	1.03	−1.84	5.59
Z-score (log)	1012	2.09	1.02	−0.26	5.56
Income Diversity	1018	0.42	0.19	−0.06	0.98
Capitalization	1042	0.08	0.05	0.01	0.28
Operational Inefficiency	1018	0.58	0.14	0.22	1.09
NPL	1004	0.02	0.02	0.00	0.11
GDP Growth	1042	0.03	0.04	−0.15	0.18
Inflation	1042	0.04	0.09	−0.28	1.04
TOTAL	1042	0.80	0.83	0.00	3.18
INTRA	1042	0.50	0.66	0.00	3.18
INTER	1042	0.30	0.42	0.00	1.43
INTRA-Home	1042	0.49	0.71	0.00	3.18
International Concentration	1042	0.40	0.36	0.00	0.96
Regional Concentration	1042	0.39	0.40	0.00	1.00
Geographic Distance (log)	1042	5.79	3.40	0.00	9.37
Language Distance	1042	0.44	0.32	0.00	1.00
Institutional Distance	1042	16.59	15.76	0.00	73.76
Regulatory Distance	1042	15.44	15.43	0.00	77.45

Table A.2
Cross correlation matrix for the main regression variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Tobin's Q	1																	
2 ROA	0.58*	1																
3 Z-score	0.03	0.15*	1															
4 Income Diversity	0.17*	0.11	−0.16*	1														
5 Capitalization	0.29*	0.69*	0.18*	0.06	1													
6 Operational Inefficiency	−0.23*	−0.41*	−0.34*	0.31*	−0.27*	1												
7 NPL	−0.08	−0.03	−0.18*	−0.17*	0.22*	−0.07	1											
8 GDP Growth	0.19*	0.34*	0.28*	−0.06	0.29*	−0.23*	−0.06	1										
9 Inflation	0.11	0.31*	0.01	−0.01	0.30*	−0.10	0.13*	0.23*	1									
10 TOTAL	−0.09	−0.20*	−0.05	0.06	−0.32*	0.04	−0.10	−0.15*	−0.04	1								
11 INTRA	−0.08	−0.16*	−0.07	0.02	−0.27*	0.02	−0.02	−0.16*	−0.03	0.87*	1							
12 INTER	−0.05	−0.13*	0.01	0.09	−0.21*	0.05	−0.17*	−0.04	−0.03	0.60*	0.13*	1						
13 International Concentration	−0.05	−0.17*	−0.05	0.03	−0.31*	0.01	−0.10	−0.11	−0.02	0.95*	0.79*	0.63*	1					
14 Regional Concentration	−0.01	−0.13*	−0.06	0.01	−0.17*	−0.04	0.05	−0.05	−0.02	0.48*	0.59*	0.00	0.46*	1				
15 Geographic Distance	0.10	0.01	−0.03	−0.05	−0.06	−0.15*	0.07	0.07	0.08	0.54*	0.36*	0.51*	0.62*	0.54*	1			
16 Language Distance	0.12	0.08	0.06	−0.11	0.03	−0.18*	0.12	0.13*	0.12*	0.44*	0.39*	0.26*	0.47*	0.58*	0.80	1		
17 Institutional Distance	0.02	0.03	0.16*	−0.16*	0.02	−0.25*	0.06	0.13*	0.14*	0.23*	0.14*	0.23*	0.26*	0.46*	0.66*	0.64*	1	
18 Regulatory Distance	0.06	0.07	0.17*	−0.16*	0.05	−0.29*	0.07	0.14*	0.14*	0.24*	0.15*	0.25*	0.27*	0.42*	0.63*	0.61*	0.96*	1

* Statistically significant at the 1% level.

Table A.3
Overview of top 30 most diversified parent banks.

Bank Name	Home Country	DC vs EC	Total Assets[a]	Number of Subsidiaries	Host Countries
Ecobank Transnational Incorporated	TG	EC	8	24	BF, BI, BJ, CD, CF, CG, CI, CM, GA, GN, GW, KE, LR, ML, NE, NG, RW, SL, SN, TD, TG, TZ, UG, ZW
Standard Bank Group Limited	ZA	EC	162	18	AO, BW, CD, GB, GH, KE, LS, LU, MU, MW, MZ, NA, RU, SZ, ZA, ZM
Banco Santander SA	ES	DC	1461	19	BE, BO, BR, CH, CL, CO, ES, GB, IT, MX, PL, PT, RU, US, UY, VE
Standard Chartered Plc	GB	DC	437	17	AU, BW, CN, GB, GH, KE, KR, MU, MY, NG, TH, TZ, UG, VN, ZM
BNP Paribas	FR	DC	2516	15	BE, BR, CN, DZ, ES, FR, IT, LU, MG, PL, RU, TR, UA, US
Société Générale	FR	DC	1528	26	AR, BR, CI, CN, CZ, DE, DZ, FR, GR, HR, MA, PL, RO, RS, RU, SI, TN
Bank of Nova Scotia (The) – SCOTIABANK	CA	DC	668	13	AR, CA, CL, CO, CR, GB, JM, MX, PE, SV, TT, US
UniCredit SpA	IT	DC	1223	17	AT, BG, CZ, DE, HR, IT, LU, PL, RO, RS, RU, SI
HSBC Holdings Plc	GB	DC	2410	14	AR, BR, CN, EG, FR, GB, MT, MX, MY, TR, VN
Deutsche Bank AG	DE	DC	2668	16	BR, CN, DE, ES, GB, IT, LU, MY, NL, RU, US
Banco Bilbao Vizcaya Argentaria SA	ES	DC	745	11	AR, BR, CL, CO, ES, MX, PT, PY, US, UY, VE
Citigroup Inc	US	DC	1857	10	BE, CN, IE, JP, KZ, MX, MY, PE, US
Commerzbank AG	DE	DC	758	11	AT, BR, DE, GB, HU, ID, LU, PL, RU
Intesa Sanpaolo	IT	DC	864	11	AL, AR, BR, CL, DE, EG, FR, IE, IT, SI, UY
DnB ASA	NO	DC	315	7	DK, LT, LU, LV, NO, PL, RU
Sumitomo Mitsui Financial Group, Inc	JP	DC	1569	9	BR, CA, CN, GB, ID, JP, US
Credit Suisse Group AG	CH	DC	1014	9	CH, DE, FR, GB, IT, LU, MX

Table A.3 (*Continued*)

Bank Name	Home Country	DC vs EC	Total Assets[a]	Number of Subsidiaries	Host Countries
KBC Groep NV/ KBC Groupe SA-KBC Group	BE	DC	429	11	BE, CZ, DE, HU, LU, RS, SK
OTP Bank Plc	HU	EC	46	6	HR, HU, ME, RO, RS, SK
Attijariwafa Bank	MA	EC	37	6	CG, CI, FR, GA, ML, SN
Access Bank Plc	NG	EC	9	6	CD, GB, GH, RW, SL, ZM
Shinhan Financial Group	KR	DC	250	7	CN, DE, JP, KR, US, VN
FirstRand Limited	ZA	EC	101	7	LS, MZ, NA, SZ, ZA, ZM
Mitsubishi UFJ Financial Group Inc-Kabushiki Kaisha Mitsubishi UFJ Financial Group	JP	DC	1824	7	CA, CN, JP, MY, NL, US
Barclays Plc	GB	DC	2283	8	EG, ES, GB, KE, US, ZA
Nordea Bank AB (publ)	SE	DC	731	8	DK, FI, LU, NO, RU, SE
Erste Group Bank AG	AT	DC	272	11	AT, CZ, HR, RO, RS, UA
Byblos Bank S.A.L.	LB	EC	10	5	AM, BE, CD, SD, SY
United Bank for Africa Plc	NG	EC	13	5	BF, CM, GH, TZ, UG
CTBC Financial Holding Co Ltd	CN	EC	73	5	CA, CN, ID, PH, US

[a] Median of total assets over the sample period (in billions of US dollars). Country names are according to ISO 3166-2 classification.

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