Stockholm School of Economics
Master Thesis in Finance

The Effect of Functional Diversification on Financial Conglomerates:

Evidence from European Countries

Oskars Cimermanis[a] Janis Pastars[b]

02.06.2011

Abstract

The purpose of this paper is to re-examine the diversification effect within banking industry and to check how it has been affected after the late-2000s financial crisis. The paper focuses exclusively on activity or function based diversification and evaluates how it affects market valuations of banks. The analysis is based on new dataset that includes only European banks covering the period from 2006 to 2010 and resulting in 750 observations. The results suggest that income diversification discount still persists as banks with diversified income sources have significantly lower market values. However, we do not find significant discount for banks that have diversified asset structure. Additionally, by performing various econometric tests and using control variables, we confirm that diversity per se causes the discount and not the underlying firm or country characteristics. Our findings correspond to the theories stressing that intensified agency problems in financial conglomerates outweigh economies of scope.

JEL Classification: G2, G3, L2
Keywords: Financial Conglomerates, Functional Diversity, Bank Valuation, Economies of Scope, Diversification Discount

Authors: Oskars Cimermanis and Janis Pastars
Supervisor: Peter Englund
Discussants: Andrejs Delmans and Johannes Haedicke
Date and Location: 16 June 2011, Stockholm

Acknowledgements: The authors thank Professor Peter Englund for his valuable input and support during the process of writing the thesis.

[a] 40030@student.hhs.se [b] 40031@student.hhs.se

Table of Contents

1. Introduction

The effect of corporate diversification been extensively researched in academic literature; however, no general consensus have been reached so far. The problem is so complex, that researchers often focus on specific industry and specific dimension of diversification in their studies. One of the most researched sub-industries has been the banking industry. However, the infamous financial crisis of 2007 has caused significant changes in banking industry, and as a result we believe that it is important to re-examine the diversification effect on financial conglomerates using new data and comprehensible methodology.

The aim of this paper is to empirically re-examine whether corporate diversification is creating or destroying the value of financial firms. The focus in this paper is only on the diversification across activities, or so called functional diversification that is based on either income or asset composition of banks. In many ways, our methodology relies on the work by Laeven and Levine (2007); nevertheless, we include additional diversification measures and construct a new dataset containing 150 largest banks from 26 European countries within period from 2006 to 2010.

In our paper, the level of diversification is measured using Leaven-Leven and Herfindahl-Hirschman indexes that are often used in comparable studies. Due to limited availability of financial data, the diversification measures are based only on two types of activities: interest-generating and non-interest-generating activities. As a result, a bank is classified as pure-activity bank if it is involved only in lending activities (commercial bank), or only in fee-generation activities (investment bank), while a bank that is involved in both types of activities is classified as diversified bank.

To compare bank valuations we use Tobin's q ratio. In simple words, Tobin's q is the ratio between the market value and replacement value of the bank's assets. It is preferred measure since it allows comparing bank valuations with different leverage levels. Afterwards, we examine whether Tobin's q of a diversified bank is higher or lower than the q the bank would have if it was broken into a portfolio of banks that

each specializes in the individual activities of the diversified bank. A negative difference between those two variables would indicate diversification discount, whereas a positive would indicate premium.

Next, we run numerous regression specifications that test relationship between diversification measures, excess values, and Tobin's q. In order to analyse the effect of diversity per se, we also perform numerous econometric procedures to control for simultaneity bias, endogeneity and take into account various other factors that might influence the results.

Our econometric analysis yields evidence that is favourable to the view that activity diversification within banking industry leads to lower bank valuations. We find strong evidence that diversity based on income composition leads to lower bank valuations; however, we don't find statistically significant evidence that diversification based on asset composition leads to market discount. The results do not change when we control for bank specific characteristics, country level traits, time effects, M&A activity, or expansion opportunities. Also, endogeneity tests with instrumental variables, sub-sample testing, and application of alternative measures of bank valuation do not influence the results. Even after employing multiple economic procedures we still find that banks benefit from specializing either in commercial banking (interest income), or investment banking (non-interest income).

In general, our results are line with comparable papers available; however, it adds value by using new dataset, focusing on European countries, using enhanced methodology and broad set of diversity measures. As a result, our paper gives new and fresh evidence in favour to the existence of diversification discount in banking industry, and it shows that it has not disappeared also after the financial crisis of 2007.

The rest of the paper is structured as follows. Chapter two consists of a detailed review of literature regarding the effects of diversification. Chapter three describes the data used for this study. Chapter four discusses the methodology adopted for this study by describing the activity measures, variables, and the statistical implements used for data analysis. Chapter five covers the main empirical findings. Finally, the

main conclusions, limitations and implications for further research are presented in chapter six.

2. Review of Literature

This part describes different views about the effect of diversification on firm performance. Although there is a large amount of literature related to diversification discounts or premiums for non-financial firms, the literature on the costs or gains associated with financial conglomerates is relatively limited. Thus, we start by describing the general effects of diversification, and then discuss the impact of activity diversification on financial conglomerates.

Many benefits of diversification have been researched in the literature in the past decades. Among numerous literature sources, an improved resource allocation through internal capital markets (Williamson, 1975; Stein, 1997), a potentially lower tax burden due to higher financial leverage (Lewellen, 1971), the ability to use firm-specific resources to extend a competitive advantage from one market to another (Wernerfelt and Montgomery, 1988), and economies of scope (Williamson, 1970; Teece, 1980) are mentioned as the main positive effects of diversification.

It is also argued that the reason for diversification for banks is the underlying synergy of gathering detailed customer information and reusing the information to benefit in their affiliated businesses. As suggested by the study of Diamond (1991), Rajan (1992), and Stein (2002), banks acquire client information during the process of loan making that may facilitate the efficient provision of other financial services, including underwriting of securities. It is also true in the opposite direction, since securities underwriting, brokerage, and other activities may produce information that improves loan making (Laeven and Levine, 2007).

In contrast to the previous authors, other researchers describe the costs of diversification that can influence the activities of firms. Some of the main concerns related to diversification are the agency problems affecting diversifying investments (Jensen, 1986; Meyer et al., 1992), inefficient internal resource allocation due to malfunctioning of internal capital markets (Lamont, 1997), and informational asymmetries between head office and divisional managers (Harris et al., 1992). In addition, diversification can also affect the volume of activities (Scharfstein and Stein,

2000) and result in bargaining problems (Rajan et al., 2000) or bureaucratic rigidity (Shin and Stulz, 1998).

The following part illustrates the main empirical findings about the advantages and disadvantages associated with diversification of financial institutions. Given the various dimensions of diversification, we will focus on the diversification across activities.

2.1. Advantages of Diversification in Financial Conglomerates

There are various sources in the financial literature describing the benefits of diversification for financial conglomerates, and in this section we have looked at the activity diversification effect from various perspectives.

In order to test whether activity diversification could reduce risk and promote financial stability, Santomero and Chung (1992) have created hypothetical bank holding companies composed of various combinations of banking, insurance, and securities firms. Using the data from 1985 to 1989, the authors find that bank holding companies could have reduced their probability of failure if they had been permitted to diversify into insurance and securities. Similarly, Holzhäuser (2005) finds that bank holding companies with a strong increase in corporate diversification, measured using a Herfinedahl index, show significant improvements in the market valuation and operating performance over a three year period after the event.

Similarly, Saunders and Walter (1994) perform a series of simulated mergers between U.S. banks, securities firms, and insurance companies in order to test the stability of earnings in merged institutions compared to separated institutions. They find potential risk-reduction gains from diversification in multi-activity financial conglomerates. According to the authors, the main risk-reduction gains can be achieved from combining commercial banking with insurance activities, rather than combining commercial banking with securities activities.

A significant benefit associated to activity diversification is the potential for more efficient internal capital markets, since diversified banks have better ability to transfer internal cash flows from less efficient operations to most beneficial areas

within the organization. As described by Stulz and Shin (1998), internal funds are less costly than external capital, and well-diversified banks possess an advantage over those without such an opportunity.

Elsas et al. (2005) finds that diversification enhances bank profitability via higher margins from non-interest businesses and lower cost income ratios. Their empirical results show that positive diversification effects have outweighed diversification cost in banking. Moreover, the paper provides evidence that diversification benefits are embedded in the production function of most banking firms, and suggests that economies of scope are stronger in banking industry than in many other industries.

Drucker and Puri (2005) empirically examine whether bank can offer underwriting services at a lower cost if the information needed has already been collected when evaluating the loan application, and find support for the existence of economies of scope. They find that banks, which provide both lending and underwriting services, are able to offer lower underwriting spreads and smaller yield spreads to their clients, who need both of these services, compared to clients without coexisting lending relationships.

Overall, these findings emphasize the different benefits of diversification that can increase the value of financial institutions. Nevertheless, the next section describes some disadvantages of activity diversification, which can destroy the value of financial conglomerates.

2.2. Disadvantages of Diversification in Financial Conglomerates

In contrast to the previous findings about the diversification benefits, there are various sources in literature showing that diversification reduces the value of financial conglomerates.

In their paper, Saunders and Walter (1994) find negative cost economies of scope among the 200 largest banks in the world, showing that the cost per unit rises

as the range of activities broadens. Similarly, Mitchell and Onvural (1995) examine the cost structure of more than 300 banks with assets between USD 500 million and USD 100 billion during 1986 to 1991, and find extremely weak evidence for the existence of economies of scope.

Various researches have shown that there are costs associated with increased bank complexity. Adding new activities makes it more difficult for bank management to monitor the behaviour of its other divisions. Gertner, Scharfstein and Stein (1994) suggest that internal capital markets increase the incentive to monitor. Despite the fact that monitoring of diversified firms can improve operating performance, it can increase the costs significantly.

Laeven and Levine (2005) find strong evidence of a conglomerate discount by benchmarking Tobin's q of financial conglomerates against the q that the same banks would have had based on the adjusted q values of specialized financial firms. Using data comprising of 836 banks from 43 different countries, they conclude that diversification of financial conglomerates reduces their value, which can be explained by the agency problems associated with financial conglomerate structures.

Using the dataset over the period of 1997 to 2002, Stiroh and Rumble (2006) find that diversification of U.S. financial holding companies that are diversifying from lending to non-interest activities lower their risk-adjusted performance. Robust statistical results show that any scope-related gains are more than offset by the higher volatility of these activities.

Nevertheless, some researchers doubt whether corporate diversification is the main cause for the valuation discount. Alternatively, they consider that already discounted firms might diversify away from industries experiencing difficulties into more promising industries. For example, Campa and Kedia (2002) use fixed effects regressions and Heckman's self-selection model to control for the endogeneity of the diversification decision. Their results indicate that the diversification discount declines substantially and sometimes turns into a premium when the endogeneity of the diversification decision is accounted for.

As we can see from the literature, previous studies have found mixed result about the impact of diversification to financial conglomerates. Given these findings, we employ an empirical investigation to assess whether diversification is creating or decreasing the value of European financial conglomerates.

3. Data

The main data source for this paper is taken from Bureau van Dijk Orbis database which contains comprehensive information on companies worldwide, and includes broad range of data about financial institutions. Banks in this sample are selected due to availability of detailed information from financial statements, as well as their stock market valuation.

The sample of banks is developed based on the available information in the Orbis database. When sorting by the type of entity, Orbis database provide information about 58,272 banks, which include commercial banks, savings banks, cooperative banks, real estate & mortgage banks, investment banks, Islamic banks, other non-banking credit institutions, specialized governmental credit institutions, bank holding & holding companies, central banks, multi-lateral government banks, micro-financing institutions, securities firms, private banking / asset management companies, investment & trust corporations, finance companies (credit card, factoring & leasing), clearing institutions / custodies, and group finance companies. To ensure that no duplicated bank data are included in the sample, only the banks, who are global ultimate owners with the path of minimum 50.01% of control, are considered. After this specification the sample size consists of 3,889 banks.

Next, banks that are neither engaged in investment banking, nor in deposit-taking and loan-making are excluded from the sample. Thus, only commercial banks, savings banks, cooperative banks, investment banks, securities firms, and bank holding & holding companies are retained. After completing this adjustment, the sample size is reduced to 2,913 banks. In order to enhance comparability across countries, banks classified as small companies are eliminated from the sample retaining banks classifies as very large companies, large companies, and medium companies, which reduces the sample size to 2,447 banks.

Afterwards, the sample is adjusted to include banks only from the European Union countries, along with Iceland, Norway, and Switzerland. Consequently, the data are gathered form the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary,

Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Iceland, Norway, and Switzerland. After adding this specification the number of banks in the sample is reduced to 941.

Finally, the sample include only those banks for whom the annual market capitalisation is known in the given time range. The banks with missing market valuation are excluded from the sample, and the final dataset includes information about 150 banks from 26 countries.

In addition to the information taken from Orbis database, we include national macroeconomic variables such as real GDP growth and inflation. This statistical information is taken from Eurostat database. The data about bare gathered for 5 consecutive years from 2006 to 2010, and the final dataset includes 750 bank-year observations.

4. Methodology

In this part we first explain how to measure different banking activities in financial conglomerates. Banks can be involved in various different activities: loan making, securities underwriting, asset securitization, brokerage services provision, and many other activities. However, data availability constraint limits the ability to measure the diversity of bank activities. Consequently, we focus on the distinction between interest generating activities and fee generating activities.

Then, we present and discuss the measurement of diversification, which is divided into income diversification and asset diversification. We use asset-based and income-based measures to determine the degree to which banks engage in loan making activities or fee and trading-based activities. Due to financial data limitations, we focus on the distinction between pure commercial banks that are involved in interest generating (lending) activities, pure investment banks that are involved in fee generating (non-lending) activities, and diversified banks that are involved in both types of activities. Furthermore, we use Herfindahl-Hirschman Index as an alternative measure of the degree of diversification.

In the last part of this section, we discuss the measures of market valuation for financial conglomerates. We use Tobin's q and activity-adjusted q to evaluate the present value of future cash flows against the book value of total assets, and calculate the excess values as an alternative market valuation of a bank.

4.1. Measurement of Activities in Financial Conglomerates

We differentiate between interest generating activities and fee generating activities, and measure where each bank is situated in the range from pure commercial banking to specialized investment banking. We use two separate indicators, which are asset-based and income-based, to measure the extent to which each bank has engaged in lending or fee-generating activities.

First, wet construct an income-based indicator that equals the ratio of net interest income- to-total operating income:

$$Income\ based\ activity\ indicator = \frac{Net\ interest\ income}{Total\ operating\ income}$$

Net interest income is the amount that a bank receives from interest on assets (loans) less the amount of money the bank pays out for interest on liabilities. Total operating income includes net interest income, net fee income, net trading income, and net commission income. When analysing the income based activity indicator, a specialized loan-making bank is expected to have a larger share of net interest income of its total operating income, while a specialized investment bank is expected to have a larger share of share of other operating income (fees, commissions, and trading income). Thus, for specialized loan-making banks the ratio is expected to be high, while for specialized investment banks it is expected to be low.

Second, we construct an asset-based measure that equals loans relative to total earning assets:

$$Asset\ based\ activity\ indicator = \frac{Net\ loans}{Total\ earning\ assets}$$

Total-earning assets include loans, securities, and investments. When evaluating the asset-based activity indicator, a specialized commercial bank is expected to have a larger share of loans of its total earning assets, while a specialized investment bank is expected to have a larger share of non-loan making activities. Hence, for specialized loan-making banks the ratio is expected to be high, while for specialized investment banks it is expected to be low.

4.2. Measurement of Diversification in Financial Conglomerates

When analysing the impact of diversification on financial conglomerates it is important to use a proper measure for diversification. In this paper we use two methods to identify the degree of diversification in with respect to income and assets.

4.2.1. Income Diversification

Following Laeven and Levine (2007), a measure of diversification across different sources of income and is calculated as:

$$Income\ diversity = 1 - \left| \frac{Net\ interest\ income - Other\ operating\ income}{Total\ operating\ income} \right|$$

Regarding the variables, net interest income is equal to interest income less interest expense. Other operating income includes net fee income, net commission income, and net trading income. Total operating income is equal to the sum of net interest income and other operating income. Thus, income diversity is the absolute value indicator, and takes values between 0 and 1 with higher values indicating greater diversification.

In addition, Herfindahl-Hirschman Index (HHI), which was described by Lang and Stulz, (1994), Comment and Jarrell (1995), and Denis, Denis and Sarin (1997), is used to measure the degree of diversification of the income structure in financial conglomerates. The HHI index includes net interest income ratio and net non-interest income ratio. Net operating income equals to net interest income (NII) plus net non-interest income (NNI). Next, taking their respective shares in net operating income we can calculate the HHI income diversity index:

$$Net\ interest\ income\ ratio = \frac{Net\ interest\ income\ (NII)}{Net\ interest\ income(NII) + Net\ non\ interest\ income(NNI)}$$

$$Net\ non\ interest\ income\ ratio = \frac{Net\ non\ interest\ income\ (NNI)}{Net\ interest\ income\ (NII) + Net\ non\ interest\ income(NNI)}$$

$$Income\ HHI = 1 - (Net\ interest\ income\ ratio^2 + Net\ non\ interest\ income\ ratio^2)$$

The value of the HHI income diversity index varies from 0.0 to 0.5. The index is equal to 0.0 when the bank is specializing only in one activity and equal to 0.5 when the bank is equally diversified between interest-generating and fee-generating activities.

4.2.2. Asset Diversification

As suggested by Laeven and Levine (2007), another way to calculate the degree of diversification is by using asset diversity measure, which is calculated in the following way:

$$Asset\ diversity = 1 - \left|\frac{Net\ loans - Other\ earning\ assets}{Total\ earning\ assets}\right|$$

When describing the variables, net loans contain all the loans issued by the financial conglomerate, while other earning assets include securities and investments. Total earning assets is the sum of net loans and other earning assets. Thus, asset diversity takes values between 0 and 1 with larger values indicating higher degree of diversification.

Similarly, Herfindahl-Hirschman Index is also applied to compute the degree of diversification of bank assets, including net loans (NLS) and other earning assets (OEA). Total earning assets equal to net loans plus other earning assets. Next, taking their respective shares in total earning assets:

$$Net\ loans\ ratio = \frac{Net\ loans\ (NLS)}{Net\ loans\ (NLS) + Other\ earning\ assets (OEA)}$$

$$Other\ earning\ assets\ ratio = \frac{Other\ earning\ assets\ (OEA)}{Net\ loans\ (NLS) + Other\ earning\ assets\ (OEA)}$$

$$Asset\ HHI = 1 - (Net\ loans\ ratio^2 + Other\ earning\ assets\ ratio^2)$$

The value of this Asset HHI varies from 0.0 to 0.5. The index is equal to zero when diversification reaches its minimum, equal to 0.5 when the bank is equally diversified between loan-making and fee and trading-based activities, and it increases as the degree of diversification increases.

Overall, using both the asset diversity and income diversity increases the scope of the analysis since income diversity is based on flow variables, while asset diversity is based on stock variables.

4.3. Measurement of Market Value in Financial Conglomerates

4.3.1. Tobin's q

Following the methodology of Berger and Ofek (1995), Tobin's q is used as a measure of bank valuation. Tobin's q is defined as:

$$q = \frac{Market\ value\ of\ total\ assets}{Book\ value\ of\ total\ assets}$$

where market value of assets is calculated as the sum of the market value of common equity plus the book value of preferred shares plus the book value of total debt.

Lang and Stulz (1994) explain that q is designed to measure the present value of future cash flows divided by the replacement cost of tangible assets. According to the authors, an advantage of using q is that there is no theoretical reason to adjust for risk or leverage when comparing firms. Nevertheless, the disadvantages of using Tobin's q include the fact that banks are extremely highly leveraged and their tangible assets are mainly financial assets, so market values and replacement costs can be identical for many assets (Brook et al. 1998). As part of the analysis, we also reassess the results using the ratio of operating income to total assets to measure the bank performance.

4.3.2. Adjusted Tobin's q

As introduced by LeBaron and Speidell (1987), Lang and Stulz (1994),and defined by Laeven and Levine (2007), activity-adjusted Tobin's q is used to estimate the q that would prevail if bank j were divided into activity-specific financial institutions and then priced according to the q's associated with each of those specific activities. It is calculated as

$$Activity\ adjusted\ q_j = \sum_{i=1}^{n} a_{ji} q^i$$

where q^i is the estimated Tobin's q of financial institutions that specialize in activity i and α_{ij} is the weight of the i^{th} activity in the total activity of bank j.

In the model with two activities, the definition of activity-adjusted q for bank j can be characterized by the following equation:

$$Activitiy\ adjusted\ q_j = \left(\alpha_{j1} q^1 + \alpha_{j2} q^2\right) = (\alpha_{j1} q^1 + (1 - \alpha_{j1}) q^2)$$

Activity-adjusted q can be interpreted as the weighted average of the pure activity q's (q^1 and q^2), where α_{j1} and α_{j2} are the weights that show the division between pure commercial and investment banking activity within each bank. Furthermore, q^1 and q^2 are the estimated as average Tobin's q's for pure commercial banks and pure investment banks.

We can calculate the activity-adjusted q based on both the income and asset bank activity measures. When using income based measures, the activity-adjusted q can be calculated in the following way:

$$Activitiy\ adjusted\ q_j = \frac{Net\ interest\ income}{Total\ operating\ income} \times\ q^1 + \left(1 - \frac{Net\ interest\ income}{Total\ operating\ income}\right) \times\ q^2$$

$$q^1 = Average\ q, \qquad of\ banks\ for\ whom\ \frac{Net\ interest\ income}{Total\ operating\ income} \geq 0.9$$

$$q^2 = Average\ q, \qquad of\ banks\ for\ whom\ \frac{Net\ interest\ income}{Total\ operating\ income} \leq 0.1$$

$$Total\ operating\ income = \ Net\ interest\ income + Other\ operating\ income$$

In the equation above, q^1 is the estimated average Tobin's q of an activity-specific bank focused on pure commercial banking using income-based measure. It is calculated as the average q of banks that receives more than 90% of their operating income from net interest income (income-based activity indicator is larger than 0.9). In comparison, q^2 is the average Tobin's q of an activity-specific bank focused on pure investment banking. It is calculated as the average q of banks that receives more than 90% of their operating income from other operating income (income-based activity indicator is smaller than 0.1).

Similarly, activity-adjusted q can also be calculated using asset based measures:

$$Activitiy\ adjusted\ q_j = \frac{Net\ loans}{Total\ earning\ assets} \times\ q^1 + \left(1 - \frac{Net\ loans}{Total\ earning\ assets}\right) \times\ q^2$$

$$q^1 = Average\ q, \qquad of\ banks\ for\ whom\ \frac{Net\ loans}{Total\ earning\ assets} \geq 0.9$$

$$q^2 = Average\ q, \qquad of\ banks\ for\ whom\ \frac{Net\ loans}{Total\ earning\ assets} \leq 0.1$$

$$Total\ earning\ assets = \ Net\ loans + Other\ earning\ assets$$

In the equation, q^1 is the estimated average Tobin's q of an activity-specific bank focused on pure commercial banking using asset-based measure. It is calculated as the average q of banks, for whom net loans form more than 90% of their total earning assets (asset-based activity indicator is larger than 0.9). In contrast, q^2 is the average Tobin's q of an activity-specific bank focused on pure investment banking. It is calculated as the average q of banks, for whom other earning assets form more than 90% of their total earning assets (asset-based activity indicator is smaller than 0.1).

4.3.3. Excess Value

To examine whether diversification increases or decreases the value of a bank, we use the excess value measure that compares bank's value to its assigned value if its segments were operated as stand-alone entities (Berger and Ofek, 1995). Each segment of a diversified firm is valued based on the average income or asset-based measures for single-activity banks in that industry.

Following the procedure used by Laeven and Levine (2007), we use Tobin's q and activity adjusted q to calculate excess value. Excess value is the difference between Tobin's q and activity-adjusted q:

$$Excess\ value = Tobin's\ q\ -\ Activity\ adjusted\ q$$

Since we have two measures of activity-adjusted q (income-based and asset-based), we also calculate two measures of excess value. One is determined by asset composition and the other by income composition of each bank.

In general, positive excess value indicates that diversification enhances the value of segments beyond that of their stand-alone counterparts. Negative excess value indicates that diversification reduces value.

5. Empirical Results

In this part we present and discuss our empirical findings that form new evidence on the question of how activity diversification in banking industry affects bank valuations. We start by analysing key variables and then proceed to econometric analysis.

We do econometric analysis by running various regression specifications that test for relationship between bank valuation measures (such as Tobin's q or excess values) and diversity measures (such as asset or income diversity). Afterwards, we perform numerous additional tests to control for other factors that might influence results. More specifically, we test for various bank characteristics, country level traits, and time effects. We also use several instrumental variables and perform endogeneity tests. Next, we test for other contradicting theories by controlling for expansion opportunities and M&A activity. Last, we perform sub-sample testing and use alternative measures of bank valuation to cross check our results.

5.1. Summary Statistics of Main Variables

Table 1 provides summary statistics for all the main variables – measures of bank diversification, activities, and Tobin's q. Those variables were calculated by averaging all bank year observations (150 banks with data from year 2006 to year 2010 resulting in 750 observations).

The variables indicate strong volatility in bank diversification: the mean for net interest income to total operating income ratio is 0.57 with standard deviation of 21%, while the average loans to total earning assets ratio is 0.65 with 23% standard deviation. The average income diversity is 0.63, and the average asset diversity is 0.50, with substantial standard deviations of 25% and 24 %, respectively. HHI based diversity measures give very similar statistics.

The results point out that there is a strong variation in the degree to which banks are diversified – some are specialized, while some are engaged in multiple activities.

Furthermore, the results are identical if we consider only separate years from our sample.

We have also looked at the correlations between all of the main variables. The correlation between net interest income to total operating income ratio and the loans to total earnings asset ratio is 67%. This imperfect correlation indicates that those two indicators measure different aspects of bank diversification. Correlation between income and asset diversities is much smaller, only 23%, giving even more evidence that they are two distinct kinds of diversification. Besides that, Tobin's q show very strong negative correlation with all diversity measures, in range of -49% to -35%. Only asset based diversity measures have relatively lower correlation, around -10%, but it still is negative and significant. These numbers already give some evidence that diversification is associated with lower bank valuations.

In Table 2, Panel A we show breakdown of sample banks by type. We see that approximately 10% of the banks are classified as pure-commercial or pure-investment banks, while all other are classified as diversified. To remind, a bank is classified as diversified if the ratio of interest income to total operating income is between 0.1 and 0.9 (based on income diversity) or if the ratio of loans to total earning assets is between 0.1 and 0.9 (based on asset diversity).

In Table 2, Panel B, we calculate means and medians of excess values of only diversified banks. It also includes results from mean-comparison tests that check if mean excess values are statistically different from zero.

We find that diversified banks have significantly negative excess values, or, in other words, large diversification discounts using both income and asset diversity measures. The diversification discount is about 10% of average q or about 50% of the standard deviation of q. Additionally, mean-comparison tests give very high t-values that further reinforce evidence of diversification discounts.

The last row in Table 2, Panel B shows coefficients and t-statistics of a following regression:

$$Q = \beta_0 + \beta_1 DivD + \beta_2 CountryD + \beta_3 YearD + \varepsilon$$

Here Tobin's q (*Q*) is regressed on diversification dummy variable (*DivD*) and control variables for countries (*CountryD*) and time (*YearD*). The regression gives statistically significant and negative coefficients indicating that diversified banks on average have lower valuations than specialized banks.

Table 2, Panel C shows both average Tobin's q and excess values of pure commercial and pure investment banks. Data shows that specialized banks have excess values that are close to zero, while diversified banks have negative excess values.

The initial results give evidence that there is a strong relationship between diversification and valuation discounts. Now we proceed to more thorough econometric analysis that control for various other factors that might influence the results.

5.2. Excess Values of Diversified Banks: Regressions

In order to assess the relationship between diversity per se and bank valuation we have to control for the possibility that market values different financial activities differently. Since banks have distinct mixes of financial activities, this characteristic might influence bank valuations, Tobin's q, and eventually interfere with our regression results. For example, if investment banking is valued higher than loan making, then a bank that does both might be valued higher than bank that does only loan making. A standard way to take into account these activity-effects is to use method developed by Lang and Stulz (1994) and LeBaron and Speidell's (1987) and to calculate excess values. Another way to control for this is to include a measure of the mixture of each bank's activities (activity indicator) as a regressor into regression specification. We use both methods by running the following regressions:

$$EV = \beta_0 + \beta_1 DivM + \beta_2 CountryD + \beta_3 YearD + \varepsilon$$

$$Q = \beta_0 + \beta_1 DivM + \beta_2 ActivityM + \beta_3 CountryD + \beta_4 YearD + \varepsilon$$

Here Excess Value (*EV*) is regressed on bank diversification measure (*DivM*), and control variables for countries (*CountryD*) and time (*YearD*). In different regression specifications bank diversification measure (*Div*) is represented by the following variables: income diversity, asset diversity, income HHI, and asset HHI. In regression specification, where the Tobin's q (*Q*) is the dependent variable, we also include bank activity indicator (ActivityM) as one of the regressors. (ActivityM) can be either the net interest income to total operating income ratio as an income-based activity indicator, or the loans to total earning assets ratio as an asset-based activity indicator.

The results of the regressions are summarized in Table 3. Table 3 have two panels – Panel A uses income-based diversity measures, while Panel B shows results using asset-based diversity measures. Columns (1) and (2) show the results from the regressions where the dependent variable is the excess value while columns (3) and (4) summarize the results from regressions were the dependent variable is Tobin's q. The main regressors in all specifications are listed and explained in the paragraph above. In all regressions standard errors are adjusted for clustering at the bank-level to account for possibility that bank observations over time might not be independent and adjusted for heteroskedasticity.

All regression specifications give us results that indicate presence of diversification discount. Using both the diversification measure used by Laeven and Levine (2007) (further abbreviated as Laeven-Levine diversity) and HHI diversity measure, for either asset-based or income-based diversity measures, we find large negative coefficients that are statistically significant. For HHI diversity the coefficients are in range from 25% to 35 %, while for Laeven-Levine diversity the coefficients are in range from 11% to 14%. All of the coefficients are statistically significant at 1% or 5% significance level. This relationship is economically significant, since one standard deviation increase in income diversity would increase the diversification discount by 3.5%.

The results correspond to earlier evidence and show that there is a strong negative relationship between q of a bank and diversity of a bank. In other words,

diversified banks have lower valuations that support the hypothesis that there is diversification discount in banking industry.

Interestingly, the results also show that banks, which are engaged in less traditional activities (have more non-interest income or assets other than loans), are valued higher on average. This statement is backed by the fact that both, the ratio of net interest income to total operating income and the ratio of net loans to earnings asset enter the regressions with large, negative, and significant coefficients.

5.3. Controlling for Bank-Level and Country-Level Characteristics

Bank valuations can be easily affected by factors that are specific to a bank or a country where it is located; therefore, in this section we discuss robustness of the previous regressions by controlling for bank-level and country-level characteristics. We do this by adding new control variables in our regression specifications following Laeven and Levine (2007).

The results of the analysis are summarized in Table 4. Table 4 have four panels from A to D and 8 regression specifications in each panel. Panels A and B use income diversity measures, while Panels C and D use asset diversity measures. Panels A and C show regressions where dependent variable is excess value, while for Panels B and D the dependent variable is Tobin's q.

Regressions from (1) to (4) in Table 4 test for bank specific traits and their specifications are presented below:

$$EV = \beta_0 + \beta_1 DivM + \beta_2 SizeM + +\beta_3 DL + \beta_4 EA + \beta_5 IncomeG + \beta_6 AssetsG + +\beta_7 MSdeposits + \beta_8 CountryD + \beta_9 YearD + \varepsilon$$

$$Q = \beta_0 + \beta_1 DivM + \beta_2 ActivityM + \beta_3 SizeM + +\beta_4 DL + \beta_5 EA + \beta_6 IncomeG + \beta_7 AssetsG + \beta_8 MSdeposits + \beta_9 CountryD + \beta_{10} YearD + \varepsilon$$

Here Excess Value (*EV*) and Tobin's q (*Q*) are regressed on bank diversification measure (*DivM*), bank activity indicator (*ActivityM*), bank size measure (*SizeM*), the

ratio of total deposits to total liabilities (*DL*), the ratio of book value of equity to total assets (*EA*), the growth rate in operating income (*IncomeG*), the growth rate in total assets (*AssetsG*), each bank's market share of deposits (*MSdeposits*), and control variables for countries (*CountryD*) and time (*YearD*). Bank diversification measure (*Div*) is represented by income diversity, asset diversity, income HHI, and asset HHI. Bank size measure (*SizeM*) is represented by logarithm of total assets or logarithm of total operating income.

Regressions from (5) to (8) additionally test for country specific traits and their specifications are as follows:

$$EV = \beta_0 + \beta_1 DivM + \beta_2 SizeM + \beta_3 DL + \beta_4 EA + \beta_5 IncomeG + \beta_6 AssetsG + +\beta_7 MSdeposits + \beta_8 GDPgrowth + \beta_9 Inflation + \beta_{10} CountryD + \beta_{11} YearD + \varepsilon$$

$$Q = \beta_0 + \beta_1 DivM + \beta_2 ActivityM + \beta_3 SizeM + \beta_4 DL + \beta_5 EA + \beta_6 IncomeG + \beta_7 AssetsG + \beta_8 MSdeposits + \beta_9 GDPgrowth + \beta_{10} Inflation + \beta_{11} CountryD + \beta_{12} YearD + \varepsilon$$

These regressions, as compared to the previous ones mentioned above, also include country-level controls that vary over time. Specifically, we include the annual growth rate in the real Gross Domestic Product (*GDPgrowht*) and the annual inflation rate (*Inflation*).

The reasons for inclusion of the new bank-level and country-level control variables are explained next. The natural logarithm of total assets and total operating income are included to control for different bank size. The past growth rate of assets and income are used to control for growth opportunities. The equity to assets ratio is included to control for the book value capitalization. The deposits to liabilities ratio is used to control for the bank's liabilities structure. The market share of deposits is included as an indicator of the degree of competition facing the bank. Lastly, the annual growth ratio in real Gross Domestic Product (GDP) and annual inflation rate are included to control for different country-level traits and economic environment. All of these variables can affect bank performance, influence bank decisions, and can be potential cause for differences in bank valuations.

The regression analysis gives us disputing results. The regressions that use income diversity measures in Panels A and B support evidence of diversification discount – while the regressions that use asset diversity in Panels C and D provide very weak or insignificant evidence.

With respect to income diversity, all regressions show strong and significant relationship between diversity measures and bank valuations (bank valuations are proxied by excess values or Tobin's q). Even after controlling for country and bank-level effects, in all eight regressions, both in Panel A and B, income diversity measures have high coefficients in range of 10% to 20% that are significant at 1% significance level.

However, the regressions that use asset diversity show that, after controlling for bank specific and country specific traits, there is not statistically significant relationship between bank valuations and asset diversity measures. The coefficients are still negative and in some specifications they are significant at 10% significance level, but in most cases the coefficients are not statistically significant.

Additionally, we find that deposit/liability ratio enters regressions with significant and positive coefficients. This indicates that bank with relatively more deposits than liabilities tend to have higher market valuations. Besides that, only GDP growth and equity/assets ratios significantly explain differences in valuation, as they both have positive coefficients. Positive coefficients for equity/assets ratio corresponds to the view that well capitalized firms tend to take less risks resulting in higher valuations, whereas positive relationship with GDP growth indicates that favourable economic environment boosts valuations. Additionally, in Panel D, loans to total earning assets ratio significantly enters regressions indicating that valuations are affected by the mix of assets.

To sum up, after controlling for bank-level and country-level characteristics, we find that diversification based on income measures results in lower valuations; however, we don't find statistically significant evidence that diversification based on assets leads to lower valuations.

5.4. Further Robustness Checks - Endogeneity

Diversification or specialization is a result of a choice made by financial institutions. Campa and Kedia (2002) argue that bank-level characteristics that drive the diversification decision might also affect the market's valuation of the banks. They warn that there is possibility that diversification discount is a result of bank level traits and not the diversification per se. We already have tested how bank-specific traits affect outcome and the results were summarized in Table 4 and discussed above. Now we use a couple of instrumental variable specifications to eliminate endogeneity concerns and to get even more robust results.

In our first instrumental variable specification, we use the average income or asset diversity of other financial institutions in the economy (country) as an instrumental variable for each bank's degree of income or asset diversity. According to Laeven and Levine (2007), this is an alternative way of abstracting from country factors that induce diversification.

In our second instrumental variable specification, we employ multiple instruments suggested by Campa and Kedia (2002). Instruments include: logarithm of total assets return on assets (to control for size and performance of financial institutions that might influence diversification decisions); share of diversified banks in the country (to control for country-specific factors that influence the attractiveness of diversification); dummy variable indicating whether the bank belongs to the Dow Jones Euro Stoxx, Global Titans 50, or Stoxx 50 Europe indices (listing on a major exchange may give the financial institution greater visibility, reduce information costs, lower the cost of capital and trigger higher relative valuations and thereby make it easier to diversify). All these instrumental variables extract the exogenous component of diversity. The specification also includes year and dummy variables and the standard errors are adjusted for clustering at the bank-level.

The results of the regressions with instrumental variables are summarized in Table 5 in Panels A and B. Panel A shows results with income diversity measures,

whereas Panel B shows regression outcomes with asset diversity measures. In Panel A, all income diversity measures enter both instrumental variable regressions specifications with high, negative, and significant coefficients. Coefficients range from 22% up to 67% when using HHI diversity measure. All coefficients are statistically significant at 1% significance level. In Panel B, asset diversity enters regressions significantly only in the case of the 'multiple' instrumental variable specification. This weaker result corresponds to the regression outcomes in Table 4, where we found very weak relationship between asset diversity measures and bank valuations after controlling for bank specific traits.

In general, the results from the analysis using instrumental variables lead to further evidence that income diversification in financial conglomerates leads to lower valuations. In other words, with the only exception of asset diversity measures, we continue to find that diversity per se lowers market valuations.

5.5. Controlling for Expansion Opportunities

According to Maksimovic and Phillips (2002) companies diversify when they don't have expansion opportunities and opportunity costs to diversification are low. Following their logic, it must be true that specialized banks have larger operations in activity A than conglomerate firm's operations in activity A, because the former have had good expansion opportunities and they have kept investing in activity A, while the latter (the conglomerate firm) diversified into other operations because it did not have good expansion opportunities within the business activity A. This theory implies that diversified firms have discount, not because of diversification per se, but because of the fact that the firms have low expansion opportunities, i.e. firm specific characteristics.

To see how this contradicting theory works in financial services industry we use the testing methodology suggested by Laeven and Levine (2007). We run regressions of bank characteristics on dummy variables that indicate whether the bank is a specialized commercial bank or a specialized investment bank while the default

category is a diversified bank. We test the following bank characteristics: logarithm of total assets, net loans, other earning assets, operating income, net interest income, and non-interest income.

The Maksimovic and Phillips (2002) predict that all of the above mentioned variables should be on average higher for specialized banks compared to diversified banks. However, our regression results summarized in Table 6 indicate the opposite; dummy variables on specialized banks enter regressions with negative and statistically significant coefficients; therefore, our findings don't support the view that banks, which lack expansion opportunities in one activity, diversify into other activities. We find that diversified banks tend to be larger than specialized banks even within the specialized activity, such as lending or investment banking. These findings give a further support for the view that diversification per se causes lower bank valuations.

5.6. Controlling for Mergers

Graham, Lemmon, and Wolf (2002) do not agree that diversification discount destroys value; rather, they argue that diversification discount arises because the conglomerates purchase target firms that are already discounted. To control for this possible impact of M&A activity, we again follow methodology developed by Laeven and Levine (2007).

First, we start by tracing the history of every bank in our sample to check whether it has recently undergone an important merger or acquisition. Then we create a dummy variable for each bank-year observation that indicates if there has been a major merger or acquisition for a bank in a particular year. Afterwards, we run several regression specifications that exclude all the banks that have undergone a merger, or include the merger dummy variable in regressions.

Second, we identify all banks that experienced change in assets of more than 50% from year t-1 to year t. Then we run regressions excluding those observations that had this change in year t and all later years. This change may reflect an

acquisition or a similar phenomenon, and therefore, it represents an additional way of controlling for possible impact of mergers and acquisitions.

As it can be seen in Table 7, we use several regression specifications: In Panels A and B we exclude banks that had M&A activity. In regression specifications (1) and (2) we exclude all banks that have undergone M&A event within year t, in regressions (3) and (4) we exclude banks that had M&A event in last three years, and in regressions (5) and (6) we exclude banks that had M&A event in last five years.

In Panels C and D, instead of excluding observations, we control for M&A effect by including dummy variables into regression specifications that indicate M&A activity in similar way as described above: M&A activity during year t, during last 3 years, and during last 5 years. Lastly, in Panels E and F we exclude banks that have undergone at least 50% change in assets.

The regressions show that controlling for major mergers and acquisitions does not affect our previous results; income diversity continue to enter the regressions negatively and significantly, whereas asset diversity still shows weak relationship with bank valuations. This again reinforces the evidence that income diversification per se causes discounts in banking industry.

5.7. Sub-samples and Alternative Valuations

As a next step, we investigate how our results change by examining sub-samples from our main sample of banks. In our case, sub-sample testing is very limited, since our dataset by itself is a large subset: it consists of only European banks. However, we test separately only diversified banks and only commercial banks. Additionally, we use weighted least squares, where weights are calculated as the inverse of the number of banks within each country. This method tests weather our results are not driven by differences in the number of banks across countries.

As can be seen in Table 8, our previous results do not change neither when testing only diversified banks and commercial banks, nor when using weighted least

squares. Income diversity measures still are negative and significant at 1% significance level. In this case, asset diversity measures also have negative coefficients, but they are significant only at 10% significance level or are insignificant. In general, the results still indicate a diversification discount in financial conglomerates.

As a final test, we consider alternative measures of bank valuations and performance. Firstly, when we constructed activity-adjusted q's and calculated excess values, we used the average q of single-activity banks. Now we calculate new excess values by using the median value of q of single-activity banks instead. Secondly, we use a measure of excess performance (excess value equivalent) based on the firm's operating income rather than Tobin's q. This variable is constructed in similar way as the excess values, but it uses data on operating income rather than Tobin's q.

Just as previously, regression results in Table 9 show that regardless of what kind of measure of firm valuations we use, the results do not change. Regressions with income diversity continue to indicate strong evidence of diversification discount, while asset diversity indicates insignificant or very weak evidence.

5.8. Result Comparison with Similar Researches

There are three comparable papers available, which use similar methodology and test existence of activity diversification within banking industry. These papers are written by Laeven and Levine (2007), Choi and Kotrozo (2006), and Schmid and Walter (2006). In this section we want shortly comment on differences in inputs and outputs among these papers, as well as to compare them with our work. The summary of all the main information from these papers are presented in Table 10.

The initial step is to discuss the datasets of the given papers. Firstly, none of the above mentioned papers focuses on European banks only; two of them include banks from all over the world, while one paper by Schmid and Walter (2006) considers only US banks. Secondly, those papers, which include banks from all over the world, do

not include all European countries. In contrast, our dataset include more European countries, and, as result, our sample is more complete.

Probably the most important difference is the time period used in the papers. The ranges are different both in length and period. Length ranges from 5 up to 20 years, but all of the papers use relatively old data. The newest and longest dataset is used by Schmid and Walter (2006), since they include period starting from 1985 up till 2004. In contrast, our work includes dataset that ranges from 2006 till 2010; therefore, our sample size does not overlap in terms of time period. Another important aspect is that our dataset includes period after financial crisis of 2007. Since we know that the crisis have significantly affected banking industry, our papers allows investigating if that has also impacted the diversification and bank valuation relationship.

All of the works use quite similar methodology, but there are some differences. For valuation/performance measures, all papers use either Tobin's q or excess values. However, only our paper and paper by Laeven and Levine (2007) use both valuation measures. Regarding diversification measures, Laeven and Levine (2007) uses its own measure, while other papers use Herfindahl index that in one case is based only on income diversity and in other case on both income and asset diversity. Our paper is the only one that uses both Laeven-Levine and Herfindahl indexes based on both asset and income diversity resulting in four different diversification measures. It also uses both Tobin's q and excess values. All of the papers use various kinds of control variables to take into account bank-level and country-level factors that might influence the results. We use the same control variables or introduce close proxies to them.

The last and the final thing is the discussion of results. Paper by Schmid and Walter (2006) finds strong evidence of activity based diversification discount both before and after using control variables, and for both income and asset based measures. Significance level of the coefficients of the diversification variables is at 1% level in all regression specifications. Laeven and Levine (2007) achieve very similar results; they find that both asset and income diversification yields lover market valuations, and this relationship is statistically significant even after including

numerous control variables and performing various tests. The results by Choi and Kotrozo (2006) are slightly weaker in terms of significance levels, but they still find that income diversification leads to lower bank valuations. However, we remind that Choi and Kotrozo (2006) tests only income based diversification.

In general, all of the papers find some form of diversification discount, but since there are differences in methodology, it is hard to compare the results directly. Our results differ in a way that we find only income diversification leading to lower bank values, whereas using asset diversification we get mostly insignificant results.

6. Conclusions

This paper re-examines the question of activity diversification discount within financial services industry. Even though this question has been researched in several papers, they use different methodologies and provide vague results. While the paper primarily is based on methodology proposed by Leaven and Levine (2007), it additionally uses Herfindahl-Hirschman Index to construct supplementary diversification measures, and modifies a number of the tests and variables.

According to the methodology used, the term diversification in this paper is reduced to mix of only two activities: commercial banking and non-commercial banking that to a large extent is a proxy for investment banking. As a result, our evidence can be used to decide whether it pays off to merge investment banking activities with commercial banking activities.

After performing thorough econometric analysis, we find evidence that is favourable to the view that activity diversification within banking industry leads to lower bank valuations. We find strong evidence that diversity based on income composition leads to lower bank valuations; however, the result is much weaker or insignificant when we use diversity measures based on asset composition.

The results do not change when we control for bank specific characteristics, country level traits, time effects, M&A activity, or expansion opportunities. Also endogeneity tests with instrumental variables, sub-sample testing, and application of alternative measures of bank valuation do not influence the results. Even after employing multiple economic procedures, we still find that financial firms benefit from specializing on a particular business activity/ income source and are valued higher than firms that have diversified income sources. Thus, our paper gives new and fresh evidence in favour to the existence of diversification discount in banking industry and shows that the discount has not disappeared also after the infamous financial crisis of 2007.

In general, our results are quite similar to the results of comparable papers that use similar methodology. However, our paper differs from other papers through using different methodologies and focusing on different dimensions of diversification.

This paper adds value with respect to other papers in several ways. Firstly, besides primarily following methodology proposed by Leaven and Levine (2007), it additionally introduces Herfindahl-Hirschman Index as a diversity measure that provides an opportunity to cross check the results and makes them more robust. Secondly, it focuses on thorough research of European banks, and includes more countries from Europe than other comparable papers. Thirdly, instead of using BankScope data source, we have constructed our own dataset using Orbis database to ensure independent results. Fourthly, our dataset includes years from 2006 to 2010 that does not overlap with the data from other papers, makes our evidence up-to-date, and incorporates data from the period of financial crisis.

References

Berger, P., Ofek, E., 1995. Diversification's effect on firm value. Journal of Financial Economics 37, 39-65.

Brook, Y., Hendershott, R., Lee, D., 1998. The gains from takeover deregulation: Evidence from the end of interstate banking restrictions. Journal of Finance 53, 2185–2204.

Campa, J., Kedia, S., 2002. Explaining the diversification discount. Journal of Finance 57, 1731-1762.

Chen, S. H., Lin, Y. Y., 2009. Diversification Discount or Premium? New International Evidence from Financial Conglomerates. Working Paper.

Chiorazzo, V., Milani, C., Salvini, F., 2008. Income diversification and bank performance: Evidence from Italian banks. Journal of Financial Services Research 33, 181-203.

Choi, S., Kotrozo, J., 2006. Diversification, bank risk and performance: A cross-country comparison. Working paper.

Comment, R., Jarrell, G. A. 1995. Corporate focus and stock returns. Journal of Financial Economics 37, 67-87.

Denis, D.J., Denis, D.K., Sarin, A. 1997. Agency problems, equity ownership, and corporate diversification. Journal of Finance 52, 135-160.

Diamond, D., 1991. Monitoring and reputation: The choice between bank loans and directly placed debt. Journal of Political Economy 99, 689-721.

Drucker, S., Puri, M., 2005. On the Benefits of Concurrent Lending and Underwriting. Journal of Finance, Forthcoming.

Elsas, R., Hackethal, A., Holzhäuser, M., 2006. The anatomy of bank diversification. Working paper.

Gertner, R. H., Scharfstein, D. S., Stein, J. C., 1994. Internal Versus External Capital Markets. Quarterly Journal of Economics, 109, 1211-1230.

Graham, J. R., Lemmon, M. L., Wolf, J. G., 2002. Does corporate diversification destroy firm value? Journal of Finance 57 (2), 695-720.

Harris, M., Kriebel, C., Raviv, A., 1992. Asymmetric information, incentives, and intrafirm resource allocation. Management Science 28, 604-620.

Holzhäuser, M., 2005. Long-term performance effects of bank diversification. Working Paper.

Jensen, M. C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-329.

Laeven, L., Levine, R., 2007. Is there a diversification discount in financial conglomerates? Journal of financial economics 85, 331-367.

Lamont, O., 1997. Cashflow and investment: Evidence from internal capital markets. The Journal of Finance 52, 83-109.

Lang, L., Stulz, R., 1994. Tobin's Q, corporate diversification, and firm performance. Journal of Political Economy 102, 1248-1280.

LeBaron, D., Speidell, L., 1987. Why are the parts worth more than the sum? 'Chop shop', a corporate valuation model. The Merger Boom, Conference Series no. 31. Boston. Federal Reserve Bank.

Lewellen, W. G., 1971. A pure financial rationale for the conglomerate merger. The Journal of Finance 26, 521–537.

Maksimovic, V., Phillips, G.M., 2002. Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence. Journal of Finance 57, 721-767.

Meyer, M., Milgrom, P., Roberts, J., 1992. Organizational prospects, influence costs, and ownership changes. Journal of Economics and Management Strategy 1, 9–35.

Mitchell, K., Onvural, N., 1996. Economies of scale and scope at large commercial banks: Evidence from the Fourier Flexible Functional Form. Journal of Money, Credit and Banking, 28, 178-199.

Rajan, R., 1992. Insiders and outsiders: The choice between informed and arm's-length debt. Journal of Finance 47, 1367-1400.

Rajan, R., Servaes, H., Zingales, L., 2000. The cost of diversity: The diversification discount and inefficient investment. The Journal of Finance 55, 35-80.

Santomero, A., Chung, E. J., 1992. Evidence in support of broader bank powers. Financial Markets, Institutions, and Instruments, 1, 1-69.

Saunders, A., Walter, I., 1994. Universal banking in the United States. New York: Oxford University Press.

Scharfstein, D. S., Stein, J., 2000. The Dark Side of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment. Journal of Finance 55.

Schmid, M., Walter, I., 2006. Do financial conglomerates create or destroy economic value?. Working Paper, University of St. Gallen and New York University.

Shin, H., Stulz, R. M., 1998. Are Internal Capital Markets Efficient?. The Quarterly Journal of Economics, MIT Press, vol. 113(2), 531-552.

Stein, J., 2002. Information production and capital allocation: Decentralized versus hierarchical firms. Journal of Finance 57, 1891-1921.

Stein, J. C., 1997. Internal capital markets and the competition for corporate resources. The Journal of Finance 52, 111-134.

Stiroh, K.J., Rumble, A., 2006. The dark side of diversification: The case of US financial holding companies. Journal of Banking and Finance 30, 2131－2161.

Stultz, R., Shin, H., 1998. Are Internal Capital Markets Efficient?. Quarterly Journal of Economics, 113, 531-552.

Teece, D. J., 1980. Economies of scope and the scope of the enterprise. Journal of Economic Behavior and Organization, 1, 223-247.

Wernerfelt, B., Montgomery, C. A., 1988. Tobin's q and the importance of focus in firm performance. American Economic Review 78, 246-250.

Williamson, O. E., 1970. Corporate control and business behavior: an inquiry into the effects of organizational form on enterprise behavior. EnglewoodCliffs, NJ: Prentice-Hall.

Williamson, O. E., 1975. Markets and hierarchies: Analysis and antitrust implications. Free Press, New York.

Appendix

Table 1: Summary Statistics and Correlations of Tobin's q and Diversity Measures

Panel A describes the variables, gives their definitions, and provides summary statistics. For the definition of Tobin's q MV stands for market value and BV for book value. In the net interest income to total operating income formula other operating income includes net fee income, net commission income, and net trading income. For the asset diversity definition other earning assets include securities and investments. In the income HHI formula net interest income ratio is calculated as the share of net interest income to the sum of net interest income and net non-interest income. Alternatively, net non-interest income ratio is the share of net non-interest income to the sum of net interest income and net non-interest income. In the asset HHI formula net loans ratio is calculated as the share of net loans to the sum of net loans and other earning assets. In contrast, other earning assets ratio is the share of other earning assets to the sum of net loans and other earning assets. Income diversity and income HHI indices are measures of diversification across different types of income, whereas asset diversity and asset HHI indices are measures of diversification across different types of assets. Income and asset HHI indices takes values between 0 and 0.5, while income and asset diversity indices takes values between 0 and 1 and are increasing in the degree of diversification. Data contain information about150 banks from 26 countries, and ranges from 2006 to 2010. Panel B and C describes the correlations of Tobin's q, activity indicators, and diversity measures.

Panel A: Summary Statistics of Tobin's q and Diversity Measures

Variable	Definition	Sample size	Mean	Median	Standard deviation
Tobin's q	$\text{Tobin's q} = \frac{\text{MV of common equity} + \text{BV of preferred shares} + \text{BV of total debts}}{\text{BV of total assets}}$	660	1.04	1.00	0.19
Net interest income to total operating income	$\text{Income based activity indicator} = \frac{\text{Interest income} - \text{Interest expense}}{\text{Net interest income} + \text{Other operating income}}$	634	0.57	0.62	0.21
Loans to total earning assets	$\text{Asset based activity indicator} = \frac{\text{Net loans}}{\text{Total earning assets}}$	647	0.65	0.72	0.23
Income diversity	$\text{Income diversity} = 1 - \left\lvert \frac{\text{Net interest income} - \text{Other operating income}}{\text{Total operating income}} \right\rvert$	632	0.63	0.66	0.25
Income HHI	$\text{Income HHI} = 1 - (\text{Net interest income ratio}^2 + \text{Net non interest income ratio}^2)$	634	0.40	0.44	0.11
Asset diversity	$\text{Asset diversity} = 1 - \left\lvert \frac{\text{Net loans} - \text{Other earning assets}}{\text{Total earning assets}} \right\rvert$	647	0.50	0.49	0.24
Asset HHI	$\text{Asset HHI} = 1 - (\text{Net loans ratio}^2 + \text{Other earning assets ratio}^2)$	647	0.35	0.37	0.12

Panel B: Correlations of Tobin's q, Activity Indicators, and Diversity Measures

	Correlation (p-value)					
Variable	Interest income to total operating income	Loans to total earning assets	Income diversity	Income HHI	Asset diversity	Asset HHI
Tobin's q	-0.49	-0.35	-0.35	-0.41	-0.10	-0.15
	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)
Net interest income to total operating income		0.67	0.16	0.27	0.04	0.10
		(0.00)	(0.00)	(0.00)	(0.30)	(0.01)
Loans to total earning assets			0.28	0.29	-0.18	-0.09
			(0.00)	(0.00)	(0.00)	(0.03)

Panel C: Correlations between Diversity Measures

	Correlation (p-value)	
Variable	Asset diversity	Asset HHI
Income diversity	0.23	0.26
	(0.00)	(0.00)
Income HHI	0.27	0.32
	(0.00)	(0.00)

Table 2: Division by Type of Bank and Excess Value of Diversified Banks

Panel A shows the division of banks according to their type: diversified, pure commercial or pure investment bank. Panel B describes the average statistics for excess values. The excess value for a bank is the difference between its actual q and its activity-adjusted q. The activity-adjusted q of a bank is the weighted average of pure commercial banking q's and pure investment banking q's, where the weights are based on the relative importance of income and asset-based activity measures. The pure commercial banking q is estimated by the average of the q's of banks with a ratio of interest income to total operating income of 0.9 or higher for income diversity measure or a ratio of loans to total earning assets of 0.9 or higher for asset diversity measure. The pure investment banking q is estimated by the average of the q's of banks with a ratio of interest income to total operating income of 0.1 or lower for income diversity measure or a ratio of loans to total earning assets of 0.1 or lower for asset diversity measure. A financial conglomerate is defined to be diversified if the ratio of interest income to total operating income is between 0.1 and 0.9 for income diversity measure or if the ratio of loans to total earning assets is between 0.1 and 0.9 for asset diversity measure. In case of estimating unadjusted excess value, the coefficients of diversification dummy variables are measured. Data are for the years 2006-2010. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Division of Sample Banks by Type

Variable	Income diversity	Asset diversity
Observations of diversified banks	585	582
Observations of pure commercial banks	12	34
Observations of pure investment banks	37	31
Total observations	634	647

Panel B: Excess Value of Diversified Banks

Variable	Income diversity	Asset diversity
Mean excess value (t-statistic)	-0.092***	-0.101***
	(22.09)	(23.47)
Median excess value (p-value for non-parametric sign test)	-0.089***	-0.114***
	(0.000)	(0.000)
Unadjusted excess value (t-statistic)	-0212***	-0.101***
	(5.24)	(2.58)
Observations	622	635
R-squared	0.43	0.24

Panel C: Average Measures of Tobin's q and Excess Value

	Income		Asset	
	Mean	Median	Mean	Median
Tobin's q	1.039	0.998	1.039	0.998
Tobin's q (pure commercial banks)	0.970	0.969	1.021	0.960
Tobin's q (pure investment banks)	1.292	1.249	1.292	1.132
Excess value	-0.084	-0.065	-0.091	0.006
Excess value (pure commercial banks)	-0.017	-0.037	-0.110	0.049
Excess value (pure investment banks)	0.015	-0.030	0.037	0.168

Table 3: Excess Value of Diversified Banks

Panel A considers income diversity measures, and panel B uses asset diversity measures. The dependent variable in columns (1) and (2) is the difference between actual q and activity-adjusted q (excess value), whereas the dependent variable in columns (3) and (4) is Tobin's q. The regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Sample includes all diversified and pure-activity banks. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity

	(1)	(2)	(3)	(4)
	Excess value		Tobin's Q	
Income diversity	-0.137***		-0.141***	
	(4.95)		(6.45)	
Income HHI		-0.319***		-0.353***
		(4.57)		(6.34)
Net interest income to total operating income			-0.301***	-0.261***
			(6.59)	(6.26)
Observations	620	622	620	622
R-squared	0.34	0.34	0.50	0.51

Panel B: Asset Diversity

	(1)	(2)	(3)	(4)
	Excess value		Tobin's Q	
Asset diversity	-0.113***		-0.110**	
	(2.82)		(2.49)	
Asset HHI		-0.253***		-0.249
		(2.58)		(2.42)
Loans to total earning assets			-0.242***	-0.236
			(4.55)	(4.59)
Observations	635	635	635	635
R-squared	0.20	0.20	0.29	0.30

Table 4: Diversity and Excess Value: Controlling for Bank-Level and Country-Level Characteristics

The dependent variable in panel A is excess value and in panel B it is unadjusted Tobin's q based on income diversity. The dependent variable in panel C is excess value and in panel D it is unadjusted Tobin's q based on asset diversity. Log(total assets) is the logarithm of the bank's total assets. Equity/Assets is the ratio of book value of equity to total assets. Growth in assets is the annual growth rate in total assets. Growth in income is the annual growth rate in operating income. Market share of deposits is the bank's share in total bank deposits in the country. GDP per capita growth is the annual real growth in GDP, and Inflation is the annual change in the CPI index in the respective country. The regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity (excess value)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Excess value							
Income diversity	-0.100***		-0.102***		-0.103***		-0.106***	
	(5.20)		(5.06)		(5.34)		(5.21)	
Income HHI		-0.266***		-0.267***		-0.272***		-0.274***
		(4.16)		(4.23)		(4.21)		(4.29)
Log (total assets)	0.002	0.001			0.001	0.001		
	(0.45)	(0.38)			(0.37)	(0.29)		
Log(total operating income)			0.006	0.006			0.006	0.006
			(1.53)	(1.41)			(1.43)	(1.31)
Deposits/Liabilities	0.097***	0.116***	0.113***	0.131***	0.097***	0.116***	0.113***	0.131***
	(2.58)	(3.08)	(3.11)	(3.58)	(2.58)	(3.07)	(3.10)	(3.56)
Equity/Assets	0.232	0.120	0.255	0.145	0.224	0.112	0.247	0.138
	(1.23)	(0.67)	(1.41)	(0.84)	(1.20)	(0.63)	(1.38)	(0.81)
Growth in assets	0.015	0.016	0.016	0.017	0.014	0.014	0.014	0.015
	(0.93)	(1.01)	(0.95)	(1.04)	(0.81)	(0.89)	(0.84)	(0.92)
Growth in income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.20)	(0.34)	(0.11)	(0.25)	(0.23)	(0.12)	(0.31)	(0.18)
Market share of deposits	-0.008	-0.013	-0.058	-0.061	0.000	-0.004	-0.049	-0.052
	(0.20)	(0.31)	(1.33)	(1.33)	(0.00)	(0.10)	(1.11)	(1.12)
GDP growth					0.004**	0.004**	0.004**	0.004**
					(2.09)	(2.18)	(2.05)	(2.13)
Inflation					0.005	0.005	0.004	0.004
					(1.44)	(1.41)	(1.35)	(1.33)
Observations	593	595	593	595	593	595	593	595
R-squared	0.44	0.43	0.44	0.43	0.44	0.43	0.45	0.44

Panel B: Income Diversity (Tobin's q)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobin's Q							
Income diversity	-0.101***		-0.104***		-0.104***		-0.107***	
	(5.53)		(5.45)		(5.73)		(5.65)	
Income HHI		-0.285***		-0.289***		-0.293***		-0.296***
		(4.69)		(4.81)		(4.77)		(4.89)
Log (total assets)	0.002	0.002			0.002	0.002		
	(0.55)	(0.53)			(0.46)	(0.43)		
Log(total operating income)			0.009**	0.008**			0.008**	0.008**
			(2.18)	(2.08)			(2.09)	(1.98)
Net interest income to total operating income	-0.222***	-0.212***	-0.211***	-0.202***	-0.220***	-0.209***	-0.210***	-0.199***
	(5.21)	(5.23)	(5.22)	(5.22)	(5.11)	(5.13)	(5.13)	(5.13)
Deposits/Liabilities	0.085**	0.106***	0.107***	0.126***	0.085**	0.105***	0.106***	0.126***
	(2.27)	(2.80)	(2.89)	(3.42)	(2.26)	(2.79)	(2.87)	(3.39)
Equity/Assets	0.329*	0.217	0.372**	0.261	0.323*	0.211	0.366**	0.256
	(1.71)	(1.18)	(2.03)	(1.48)	(1.69)	(1.16)	(2.00)	(1.46)
Growth in assets	0.022	0.023	0.023	0.025	0.020	0.021	0.021	0.023
	(1.27)	(1.42)	(1.32)	(1.47)	(1.17)	(1.31)	(1.22)	(1.36)
Growth in income	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
	(0.52)	(0.72)	(0.48)	(0.70)	(0.11)	(0.28)	(0.07)	(0.26)
Market share of deposits	-0.007	-0.013	-0.075*	-0.080*	0.001	-0.005	-0.066	-0.071*
	(0.18)	(0.33)	(1.85)	(1.87)	(0.04)	(0.11)	(1.62)	(1.65)
GDP growth					0.004**	0.005**	0.004**	0.005**
					(2.23)	(2.38)	(2.18)	(2.32)
Inflation					0.005	0.005	0.004	0.004
					(1.42)	(1.41)	(1.29)	(1.27)
Observations	593	595	593	595	593	595	593	595
R-squared	0.54	0.53	0.55	0.53	0.54	0.53	0.55	0.54

Panel C: Asset Diversity (excess value)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Excess value							
Asset diversity	-0.036		-0.047		-0.035		-0.047*	
	(1.46)		(1.87)		(1.44)		(1.85)	
Asset HHI		-0.068		-0.096		-0.065		-0.094
		(1.18)		(1.62)		(1.14)		(1.58)
Log (total assets)	-0.005	-0.005		0.006	-0.005	-0.005		
	(1.31)	(1.34)		(1.21)	(1.48)	(1.52)		
Log(total operating income)			0.006				0.005	0.005
			(1.18)				(1.08)	(1.11)
Deposits/Liabilities	0.111***	0.111***	0.149***	0.149***	0.110***	0.110***	0.148***	0.149***
	(2.62)	(2.62)	(3.81)	(3.82)	(2.61)	(2.61)	(3.79)	(3.80)
Equity/Assets	0.355	0.351	0.450**	0.444**	0.349	0.345	0.446**	0.440**
	(1.60)	(1.58)	(2.07)	(2.04)	(1.58)	(1.56)	(2.06)	(2.03)
Growth in assets	0.024*	0.024*	0.024*	0.024*	0.022	0.022*	0.022	0.022
	(1.80)	(1.83)	(1.73)	(1.77)	(1.63)	(1.66)	(1.57)	(1.62)
Growth in income	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
	(0.38)	(0.41)	(0.35)	(0.41)	(0.02)	(0.02)	(0.05)	(0.01)
Market share of deposits	0.046	0.044	-0.057	-0.060	0.057	0.054	-0.048	-0.050
	(1.08)	(1.02)	(1.27)	(1.31)	(1.30)	(1.25)	(1.05)	(1.09)
GDP growth					0.005***	0.005**	0.005**	0.004**
					(2.12)	(2.07)	(2.03)	(1.96)
Inflation					0.005	0.005	0.005	0.005
					(1.38)	(1.40)	(1.20)	(1.23)
Observations	610	610	610	610	610	610	610	610
R-squared	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41

Panel D: Asset Diversity (Tobin's q)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobin's Q							
Asset diversity	-0.025		-0.034		-0.024		-0.034	
	(1.06)		(1.44)		(1.04)		(1.43)	
Asset HHI		-0.056		-0.081		-0.054		-0.079
		(1.05)		(1.47)		(1.00)		(1.44)
Log (total assets)	-0.003	-0.002			-0.003	-0.003		
	(0.69)	(0.62)			(0.83)	(0.78)		
Log(total operating income)			0.009*	0.009*			0.008*	0.009*
			(1.75)	(1.80)			(1.65)	(1.71)
Loans to total earning assets	-0.138I***	-0.137***	-0.126***	-0.124***	-0.140***	-0.138***	-0.128***	-0.126***
	(3.83)	(3.83)	(3.34)	(3.32)	(3.92)	(3.92)	(3.41)	(3.39)
Deposits/Liabilities	0.088*	0.089**	0.125***	0.125***	0.088*	0.089**	0.125***	0.125***
	(1.94)	(1.97)	(2.91)	(2.94)	(1.94)	(1.97)	(2.90)	(2.93)
Equity/Assets	0.436*	0.437*	0.531**	0.529**	0.429*	0.430*	0.526**	0.525**
	(1.91)	(1.91)	(2.40)	(2.39)	(1.89)	(1.89)	(2.39)	(2.38)
Growth in assets	0.0302*	0.031*	0.031*	0.032*	0.028*	0.028*	0.029*	0.030*
	(1.90)	(1.92)	(1.84)	(1.88)	(1.77)	(1.80)	(1.73)	(1.76)
Growth in income	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000
	(0.56)	(0.60)	(0.54)	(0.61)	(0.21)	(0.25)	(0.18)	(0.25)
Market share of deposits	0.035	0.033	-0.077*	-0.077*	0.044	0.043	-0.068	-0.068
	(0.84)	(0.82)	(1.72)	(1.70)	(1.06)	(1.04)	(1.50)	(1.49)
GDP growth					0.005**	0.004**	0.004*	0.004*
					(2.08)	(2.04)	(1.95)	(1.89)
Inflation					0.005	0.005	0.004	0.004
					(1.32)	(1.33)	(1.09)	(1.12)
Observations	610	610	610	610	610	610	610	610
R-squared	0.45	0.45	0.46	0.46	0.46	0.46	0.46	0.46

Table 5: Diversity and Excess Value: Controlling for Endogeneity

The dependent variable in panel A is excess value based on income diversity. The dependent variable in panel B is excess value based on asset diversity. The regression in column (1) and (2) is estimated using instrumental variables (IV). It uses the average income or (asset) diversity of other banks in the country as instrument for income (asset) diversity. The IV regression in column (3) and (4) uses the following variables as instruments for the income (asset) diversity measure: the log of total assets, return on assets, the fraction of diversified banks, and Dow Jones index. Return on assets is pre-tax income over average total assets. Fraction of diversified firms is the fraction of diversified banks in the country, calculated as the fraction of banks for which Diversified bank takes value of one. Dow Jones index is a dummy variable that takes value one if the company is included in Dow Jones Euro Stoxx, Global Titans 50, or Stoxx 50 Europe indices. The F-test of instruments reports the p-value of the F-test of joint significance of identifying instruments. The p-value of Hausman specification error test is reported to compares the difference between the IV and OLS estimators. All regressions include year dummies, the regressions in columns (3) to (4) also include country dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity

	(1)	(2)	(3)	(4)
	Diversity others		Multiple	
Income diversity	-0.223***		-0.390***	
	(3.47)		(5.31)	
Income HHI		-0.419**		-0.673***
		(2.50)		(4.50)
Country fixed effects	No	No	Yes	Yes
F-test of instruments (p-value)	0.00	0.00	0.00	0.00
Hausman test (p-value)	0.15	0.50	0.00	0.00
Observations	594	596	612	614

Panel B: Asset Diversity

	(1)	(2)	(3)	(4)
	Diversity others		Multiple	
Asset diversity	-0.131		-0.378***	
	(0.98)		(5.29)	
		-0.176		-0.653***
		(0.93)		(5.39)
Country fixed effects	No	No	Yes	Yes
F-test of instruments (p-value)	0.00	0.00	0.00	0.00
Hausman test (p-value)	0.85	0.73	0.00	0.00
Observations	610	610	625	625

Table 6: Scale and Scope of Activities of Specialized and Diversified Banks

Panel A considers income diversity measures, and panel B uses asset diversity measures. The dependent variable in column (1) is the logarithm of total assets. The dependent variable in column (2) is the logarithm of net loans. The dependent variable in column (3) is the logarithm of total other earning assets. The dependent variable in column (4) is the logarithm of total operating income. The dependent variable in column (5) is the logarithm of total net interest income. The dependent variable in column (6) is the logarithm of total non-interest income. Specialized commercial bank is a dummy variable that takes value of one if the ratio of net interest income to total operating income is more than 0.9 in case of income diversity (panel A) or if net loans to total earning assets is more than 0.9 in case of asset diversity (panel B), and zero otherwise. Specialized investment bank is a dummy variable that takes value of one if the ratio of net interest income to total operating income is less than 0.1 in case of income diversity (panel A) or if net loans to total earning assets is less than 0.1 in case of asset diversity (panel B), and zero otherwise. Diversified bank is a dummy variable that takes value of one if the ratio of net interest income to total operating income is between 0.1and 0.9 in case of income diversity (panel A) or if net loans to total earning assets is between 0.1 and 0.9 in case of asset diversity, and zero otherwise. All regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity

	(1)	(2)	(3)	(4)	(5)	(6)
	Total assets	Net loans	Other earning assets	Operating income	Net interest income	Non-interest income
Specialized commercial bank	-0.323	-0.161	-0.371	-0.613	-0.286	-2.251***
	(0.78)	(0.45)	(0.69)	(1.26)	(0.66)	(3.80)
Specialized investment bank	-3.347***	-4.785***	-3.57***	-1.674***	-4.246***	-0.905***
	(9.68)	(9.42)	(7.83)	(5.44)	(12.12)	(2.73)
Observations	634	625	634	634	634	633
R-squared	0.456	0.486	0.438	0.428	0.496	0.441

Panel B: Asset Diversity

	(1)	(2)	(3)	(4)	(5)	(6)
	Total assets	Net loans	Other earning assets	Operating income	Net interest income	Non-interest income
Specialized commercial bank	-1.241***	-0.839***	-2.44***	-1.154***	-0.963***	-1.468***
	(4.41)	(3.13)	(6.54)	(4.65)	(4.34)	(4.64)
Specialized investment bank	-2.864***	-5.778***	-2.165***	-1.784***	-2.945***	-1.248**
	(6.61)	(13.08)	(4.60)	(4.28)	(6.68)	(2.39)
Observations	647	647	647	646	642	624
R-squared	0.434	0.479	0.431	0.449	0.437	0.457

Table 7: Scale and Scope of Activities of Specialized and Diversified Banks

The dependent variable in panels A and C is excess value based on income diversity. The dependent variable in panels B and D is excess value based on asset diversity. In panels A and B, we exclude banks that have merged with at least one other financial institution during the current year (columns 1-2), the past 3 years (columns 3-4), or the past 5 years (columns 5-6). In panels C and D, we include merger dummy variables to control for banks that merged with another financial institution during the current year (columns 1-2), the past 3 years (columns 3-4), or the past 5 years (columns 5-6). Merger [t] is a dummy variable that takes value of one if the bank that merged with at least one other financial institution during year t. Merger [t-2, t] is a dummy variable that takes value of one if the bank that merged with at least one other financial institution during the years t-2 to t. Merger [t-4, t] is a dummy variable that takes value of one if the bank that merged with at least one other financial institution during the years t-4 to t. In panel D (based on income diversity) and panel E (based on income diversity), bank observations with a significant annual change in total assets (more than 50% in a given year) are excluded for the following years in the sample period. The merger variables are constructed using mergers and acquisitions data from the Orbis database. The regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity (excess value, exclude banks that merged with another financial institution)

	(1)	(2)	(3)	(4)	(5)	(6)
	Merger [t]		Merger [t-2, t]		Merger [t-4, t]	
Log (total assets)	-0.007**	-0.005	-0.007	-0.006	-0.016*	-0.014*
	(2.38)	(1.62)	(1.55)	(1.28)	(1.89)	(1.73)
Income diversity	-0.109***		-0.163***		-0.195***	
	(3.52)		(3.39)		(3.23)	
Income HHI		-0.271***		-0.345**		-0.464***
		(3.24)		(2.49)		(2.96)
Observations	449	450	262	262	209	209
R-squared	0.37	0.37	0.46	0.47	0.66	0.67

Panel B: Asset Diversity (excess value, exclude banks that merged with another financial institution)

	(1)	(2)	(3)	(4)	(5)	(6)
	Merger [t]		Merger [t-2, t]		Merger [t-4, t]	
Log (total assets)	-0.014***	-0.013***	-0.021***	-0.021***	-0.019	-0.020
	(3.19)	(3.05)	(3.27)	(3.23)	(1.43)	(1.47)
Asset diversity	-0.107*		-0.053		-0.060	
	(1.75)		(1.19)		(0.98)	
Asset HHI		-0.245		-0.126		-0.166
		(1.60)		(1.15)		(1.11)
Observations	458	458	264	264	215	215
R-squared	0.22	0.23	0.28	0.28	0.26	0.26

Panel C: Income Diversity (excess value, control for banks that merged with another financial institution)

	(1)	(2)	(3)	(4)	(5)	(6)
	Merger [t]		Merger [t-2, t]		Merger [t-4, t]	
Log (total assets)	-0.010***	-0.009***	-0.008**	-0.006*	-0.006*	-0.005
	(3.94)	(3.21)	(2.37)	(1.69)	(1.92)	(1.31)
Income diversity	-0.113***		-0.110***		-0.113***	
	(4.44)		(4.27)		(4.36)	
Income HHI		-0.274***		-0.270***		-0.280***
		(3.95)		(3.86)		(3.96)
Merger [t]	0.025**	0.024**				
	(2.46)	(2.38)				
Merger [t, t-2]			-0.005	-0.008		
			(0.35)	(0.59)		
Merger [t, t-4]					-0.017	-0.021
					(0.98)	(1.22)
Observations	620	622	620	622	620	622
R-squared	0.36	0.36	0.35	0.35	0.36	0.36

Panel D: Asset Diversity (excess value, control for banks that merged with another financial institution)

	(1)	(2)	(3)	(4)	(5)	(6)
	Merger [t]		Merger [t-2, t]		Merger [t-4, t]	
Log (total assets)	-0.018***	-0.018***	-0.020***	-0.019***	-0.019***	-0.018***
	(5.22)	(4.97)	(4.38)	(4.37)	(4.28)	(4.23)
Asset diversity	-0.056		-0.060		-0.059	
	(1.33)		(1.46)		(1.45)	
Asset HHI		-0.129		-0.138		-0.135
		(1.24)		(1.35)		(1.33)
Merger [t]	0.012	0.012				
	(1.11)	1.10				
Merger [t, t-2]			0.025	0.025		
			(1.23)	(1.24)		
Merger [t, t-4]					0.017	0.016
					(0.75)	(0.74)
Observations	635	635	635	635	635	635
R-squared	0.23	0.24	0.24	0.24	0.24	0.24

Panel E: Income Diversity (excess value, exclude banks with a significant annual change in total assets)

	(1)	(2)
	Significant change in total assets	Significant change in total assets
Log (total assets)	-0.007***	-0.006**
	(3.01)	(2.23)
Income diversity	-0.116***	
	(4.96)	
Income HHI		-0.289***
		(4.76)
Observations	554	556
R-squared	0.42	0.41

Panel F: Asset Diversity (excess value, exclude banks with a significant annual change in total assets)

	(1)	(2)
	Significant change in total assets	Significant change in total assets
Log (total assets)	-0.014***	-0.013***
	(4.34)	(4.16)
Asset diversity	-0.095**	
	(2.02)	
Asset HHI		-0.233*
		(1.92)
Observations	567	567
R-squared	0.23	0.24

Table 8: Diversity and Excess Value: Sub-Samples

The dependent variable in panel A is excess value based on income diversity. The dependent variable in panel B is excess value based on asset diversity. In columns (1) and (2), we restrict the sample to diversified firms only, for which the income diversity dummy takes a value of one (panel A) or the asset diversity dummy takes a value of one (panel B). In columns (3) and (4), we restrict the sample to commercial banks only, as defined by Orbis database classification. In columns (5) and (6) we use Weighted Least Squares estimations taking the inverse of the number of country observations as the weight. The regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity (excess value)

	(1)	(2)	(3)	(4)	(5)	(6)
	Diversified banks		Commercial banks		WLS	
Log (total assets)	-0.005**	-0.005*	-0.005*	-0.005*	-0.006**	-0.004
	(2.20)	(1.85)	(1.65)	(1.74)	(2.52)	(1.62)
Income diversity	-0.070***		-0.103***		-0.142***	
	(3.37)		(3.29)		(4.38)	
Income HHI		-0.185***		-0.251***		-0.371***
		(2.96)		(3.14)		(4.47)
Observations	574	575	310	310	620	622
R-squared	0.39	0.38	0.47	0.47	0.40	0.42

Panel B: Asset Diversity (excess value)

	(1)	(2)	(3)	(4)	(5)	(6)
	Diversified banks		Commercial banks		WLS	
Log (total assets)	-0.015***	-0.015***	-0.012***	-0.012***	-0.015***	-0.014***
	(4.59)	(4.50)	(4.37)	(4.33)	(4.01)	(3.73)
Asset diversity	-0.026		-0.052*		-0.064*	
	(0.95)		(1.70)		(1.69)	
Asset HHI		-0.041		-0.093		-0.157*
		(0.61)		(1.25)		(1.66)
Observations	571	571	315	315	635	635
R-squared	0.33	0.33	0.58	0.58	0.23	0.23

Table 9: Diversity and Excess Value: Alternative Performance Measures

Panel A considers income diversity measures, and panel B uses asset diversity measures. The dependent variable in columns (1) and (2) is excess value, calculated using the median q of single-activity banks rather than the average q of single-activity banks. The dependent variable in columns (3) and (4) is the difference between actual operating income-to-total assets and activity-adjusted operating income-to-total assets (excess income), calculated using the average operating income-to-total assets ratio of single-activity banks. The regressions include country and year dummies, and standard errors are adjusted for clustering at the bank-level. Data are for the years 2006-2010. T-statistic is presented below coefficients in parenthesis. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Income Diversity (excess value)

	(1)	(2)	(3)	(4)
	Excess value (median)		Excess income	
Log (total assets)	-0.009***	-0.007***	-0.007***	-0.006***
	(3.87)	(3.02)	(5.76)	(5.64)
Income diversity	-0.116***		-0.084***	
	(4.45)		(5.34)	
Income HHI		-0.291***		-0.210***
		(4.10)		(5.02)
Observations	620	622	632	634
R-squared	0.36	0.36	0.45	0.48

Panel B: Asset Diversity (excess value)

	(1)	(2)	(3)	(4)
	Excess value (median)		Excess income	
Log (total assets)	-0.017***	-0.016***	-0.012***	-0.012***
	(4.96)	(4.73)	(6.46)	(6.12)
Asset diversity	-0.050		-0.004	
	(1.23)		(0.33)	
Asset HHI		-0.126		-0.009
		(1.24)		(0.32)
Observations	635	635	646	646
R-squared	0.24	0.24	0.23	0.23

Table 10: Comparison of Papers about Bank Diversification by Activities

Panel A summarizes the paper "Diversification, Bank Risk and Performance: A Cross-Country Comparison" by Choi, Kotrozo (2006). Panel B summarizes the paper "Is There a Diversification Discount in Financial Conglomerates?" by Laeven and Levine (2007). Panel C summarizes the paper "Do Financial Conglomerates Create or Destroy Economic Value?" by Schmid and Walter (2006). Panel D reviews the paper "The Effect of Functional Diversification on Financial Conglomerates: Evidence from European Countries" by Cimermanis and Pastars (2011).

Panel A: "Diversification, Bank Risk and Performance: A Cross-Country Comparison" by Choi, Kotrozo (2006)

	Findings
Methods	• Performance measure: Tobin's q (also annualized stock returns) • Diversification measure: Herfindahl index – calculated based only on income diversity • Control variables: various bank-level and country-level control variables
Data	• Data taken from BankScope and include all world banks • Data for years 1995-2002, total of 675 banks from 42 countries • Maximum of 5,400 bank year observations
Results for relationship between performance/valuation and diversification	• For simple regressions: negative relationship; coefficient on diversity measure is 13%, significant at 5% level • For regressions with control variables: negative relationship; coefficient on diversity measure is 12%, significant at 10% level
Conclusion	• Finds some evidence of activity based diversification discount; significance levels are not very high

Panel B: "Is There a Diversification Discount in Financial Conglomerates?" by Laeven and Levine (2007)

	Findings
Methods	• Performance measures: Tobin's q and excess values (Tobin's q – Activity-adjusted Tobin's q), both asset and income based • Diversification measure: develop a new measure (we call it Laeven-Levine index) that is based on both asset and income diversity • Control variables: various bank-level and country-level control variables
Data	• Data taken from BankScope database and include all world banks • Data for years 1998-2002, total of 683 banks from 43 countries • Maximum of 3,415 bank year observations
Results for relationship between performance/valuation and diversification	• For simple regressions: negative relationship; coefficients on both asset and income diversity measures range from 10% to 13%; coefficients significant at 1% or 5% significance level • For regressions with control variables: negative relationship; coefficients on diversity measures are in range from 7% to 14%; coefficients are significant at 1%, 5% or 10% level
Conclusion	• Finds strong evidence of activity based diversification discount (both asset and income activity); significance levels are strong

Panel C: "Do Financial Conglomerates Create or Destroy Economic Value?" by Schmid and Walter (2006)

	Findings
Methods	• Performance measures: excess values (Tobin's q – Activity-adjusted Tobin's q) both asset and income based • Diversification measure: Herfindahl index that is based on both asset and income diversity, and a dummy variable that equals one when firm operates in several segments • Control variables: various bank level and country level control variables
Data	• Data taken from Compustat database and include only US financial institutions • Data for years 1985-2004, total of 664 financial institutions • Maximum of 4,060 bank year observations
Results for relationship between performance/valuation and diversification	• For simple regressions: negative relationship; coefficients on both asset and income diversity measures range from 29% to 35%; coefficients are significant at 1% significance level. • Regressions with control variables are done only for income based diversity and excess values, they find: negative relationship; coefficient on income diversity measure is 39%; coefficient is significant at 1% level
Conclusion	• Finds strong evidence of activity based diversification discount, but thorough analysis is done only using income based measures; significance levels are strong

Panel D: "The Effect of Functional Diversification on Financial Conglomerates: Evidence from European Countries" by Cimermanis and Pastars (2011)

	Findings
Methods	• Performance measures: Tobin's q and excess values (Tobin's q – Activity-adjusted Tobin's q), both asset and income based • Diversification measure: Laeven-Levine index and Herfindahl index that both are based on either asset or income diversity • Control variables: various bank level and country level control variables
Data	• Data taken from Orbis database; includes only European banks • Data from years 2006-2010; total of 150 banks from 26 European countries • Maximum of 750 bank year observations
Results for relationship between performance/valuation and diversification	• For simple regressions: negative relationship; coefficients on diversity measures are from 14% to 30% depending on measure • All coefficients significant at 1% level • For regressions with control variables: still negative relationship; coefficients on diversity measures in range of 10% to 30% depending on measure • Coefficients on income based diversity measures are significant at 1% level, while coefficients on asset based diversity measures are insignificant or sometimes significant at 10% level
Conclusion	• Finds some evidence of activity based diversification discount; results are highly significant using income based diversification measures, but very weak for asset based diversification measures