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ARTICLE INFO	Johann Burgstaller and Teodoro D. Cocca (2010). Profitability, efficiency and growth in the private banking industry: evidence from Switzerland and Liechtenstein. *Banks and Bank Systems*, *5*(4)
RELEASED ON	Monday, 20 December 2010
JOURNAL	"Banks and Bank Systems"
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
0	0	0

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Profitability, efficiency and growth in the private banking industry: evidence from Switzerland and Liechtenstein

Abstract

This paper examines the overall performance of banks from Switzerland and Liechtenstein that are specialized in wealth management. More profitable and cost-efficient institutions feature comparatively low levels of assets managed per employee and high salaries paid. The ability to attract new money seems to be fostered by signalling competence via high margins rather than through the importance of bank-own funds or management mandates. Superior investment performance is associated with a higher share in mandated assets, higher salaries and less assets managed per employee. There is, however, no persistence found for the investment performance of wealth managers. No effects emerge from bank size and only little heterogeneity in overall performance can be traced back to the structure of assets, the size and location of the bank's network, and differences in ownership.

Keywords: private banking, profitability, efficiency, growth.
JEL classification: G21, L11.

Introduction

Economic performance in the private banking and wealth management industry is rarely analyzed due to a general lack of data (Cocca, 2008b). The studies at hand, including their analysis of the available data, are mainly descriptive in nature. In this paper we, therefore, seek to provide a thorough examination of key operating figures and their determinants. Measures of the profitability, efficiency and growth of private banks[1] in Switzerland and Liechtenstein shall be applied in this respect.

Most banks operating in Switzerland offer financial services to wealthy private and to institutional investors (Swiss Bankers Association, 2009). Swiss banks are estimated to administer about one tenth of the global assets under management (Swiss Bankers Association, 2009). Switzerland's market share in the private assets that are managed off-shore is about 30%, and approximately 60% of the assets managed by Swiss banks are of foreign origin (Geiger and Hürzeler, 2003; Swiss Bankers Association, 2009). The importance of wealth management for the Swiss economy is stressed by Geiger and Hürzeler (2003), who argue that private banking activities account for about half of the banking sector's total contribution. Switzerland and Liechtenstein are strongly interlinked financial centers and institutions can be considered as homogeneous in terms of the market and the regulatory environment. Private banks in Switzerland and Liechtenstein have rather homogeneous salary policies, business and pricing models, as well as a similar product offering.

The structure of this study is as follows. Section 1 describes the data gathered from financial reports to analyze bank performance. The key figures to be explained are the margin with fee-based activity, the cost-income ratio, and the growth in managed assets due to both the inflow of new money and investment performance. The hypotheses to be tested can be found in Section 2, which establishes relationships to the previous literature as well. As research specific to institutions specialized in private banking and wealth management is thin, we revert to studies on banking in general. The literature survey, therefore, is fairly restricted with a focus on relatively recent work related to European banks (see Goddard et al., 2007, for a survey). Section 3 illustrates the methods used, while the results are presented in Section 4. The last Section summarizes and concludes.

1. Data

Basically, the data set used is made up by the figures gathered for and processed in "The international private banking study 2007" (Cocca and Geiger, 2007). In principle, this edition of the study features banks from 15 countries. The data, however, are the most extensive for Switzerland and Liechtenstein[2]. A bank has to fulfill the following criteria to be considered: a share of income from fees and commissions in total income of, at least, one third and a documented strategic orientation towards private banking activities. At the outset, the sample consists of 94 Swiss and Liechtenstein banks, but only 79 of them are useable for estimation[3]. Ten institutions, however, are neglected because of their size (the two big banks) or an outly-

[1] The term "private bank" is used to describe a bank that is specialized in private banking and wealth management, not to discriminate "private" banks from publicly-owned or incorporated banks.

[2] For these two countries, the figures for 2007 were amended in the meantime.

[3] Data for, at least, three years are necessary to calculate growth rates and lagged growth rates for certain variables. Referring to 2007, 68 of the 141 Swiss wealth managers which are classified as global, large, medium and small players (micro players, defined as having AUM below 1 billion CHF, are not considered) in Swiss Bankers Association (2009) are in our sample. Their market coverage with respect to the assets under management is about 75%.

ing growth rate of assets related to mergers and acquisitions. The final estimation sample consists of 69 wealth managers, with five of them operating in Liechtenstein. Most of the observations are for the 2005-2007 period, one bank has data back to 2002. Except indicated otherwise, all monetary figures are in million Swiss francs (CHF), and in real 2006 terms. Two of the main variables in the data set are the assets under management (AUM) and the net new money inflow (NNM). Client assets include managed fund, discretionary and advisory assets, as well as fiduciary, savings and time deposits. Assets held for custody and transactional purposes are not included. New money (newly acquired minus the withdrawn client assets) does not include interest and dividend income from the managed assets, as well as the change in assets which is due to market and currency fluctuations.

The measures to be explained in this study are the fee margin, the cost-income ratio, and two growth indicators. Profitability in asset management is described by a margin which is calculated as the ratio of the net income from fees and commissions to AUM (in basis points). The cost-income ratio (CIR) is obtained by dividing total administrative expenses by total net income. Depreciation is included with the operating costs to account for the fact that not all banks may own property in phyiscal capital, and therefore have higher expenses due to renting and leasing. See the next Section for a discussion of the pros and cons of using the CIR as an efficiency measure. As growth in private banking is understood in terms of increasing the level of managed client assets, the first growth variable we apply is the net inflow of new money relative to AUM at the beginning of the year. This is interpretable as the growth in AUM due to the ability to raise new money. The remaining increase in client assets is attributed to investment performance.

Among the potential determinants of profitability, efficiency and growth are bank size, specialization, the composition of managed assets, the amount of assets managed per employee, salaries paid and capital strength. Size is measured by the logarithm of total assets managed[1]. The performance of wealth managers is supposed to differ also with respect to their specialization in private banking activities. A readily available indicator of specialization (diversification) is the share of net income from fee-based activities in total net income. As different types of products and business fields are not equally intense in terms of costs and revenues, Welch (2006) suggests that the activity mix is one of the main influences on the efficiency of financial institutions[2].

Two additional variables capture the structure of the managed assets. Firstly, we consider the share of AUM invested in own funds (in "own administered collective investment schemes") and, secondly, the part of assets administered under discretionary management mandates. Remarkably, the two associated fractions are hardly correlated. Other, non-discretionary assets make up the remaining assets (most of them by far). Wealth managers perceive investment in own funds as a growth driver (being related to net new money growth) and may use it to signal exclusivity and superior investment skills (Cocca and Geiger, 2007). In the private banking industry, discretionary mandates, as well as assets in own funds, are valued as a profit-generating device. Both types of funds are associated with relatively higher margins (Cocca and Geiger, 2007). However, "in-house" investing and offering sophisticated products for mandated assets may well lead to higher incomes, but such strategies might also be more intense in terms of effort and costs.

The volume of assets managed per employee (in million CHF) and personnel costs per capita (in 1000 CHF) are further potential determinants of profitability, efficiency and growth. Additionally, capital strength is used as an indicator for bank stability and risk (aversion). As the Bank for International Settlements (BIS) tier 1 capital ratio is not available for most institutions in the sample, the balance sheet capitization is applied. Table 1 (see Appendix A) provides descriptive statistics for all the determinants mentioned above (with size in million CHF). Some further attributes are represented by binary variables capturing geographical and ownership differences across private banks. First, we employ a dummy variable taking on the value 1 (and zero otherwise) if the bank operates in Liechtenstein, another one indicates foreign-controlled banks or subsidiaries of foreign institutions. Further dummies indicate whether the bank has more than one location within Switzerland (or Liechtenstein) and whether there are offices abroad. Domestic banks are additionally divided into independent banks and subsidiaries of a larger financial group. It seems worth mentioning that almost all independent Swiss banks in the sample are family-owned (with family property of 50% and beyond). With the corresponding binary variable indicating domestic, but dependent banks, the base group finally consists of

[1] The number of employees or the income from fees and commissions could be applied as size indicators as well. As these, however, are highly correlated with AUM, similar results are obtained as with total assets.

[2] A siliar argument is put forward by DeYoung (1997). He argues that, with respect to efficiency comparisons, peers should feature a similar product mix.

independent Swiss banks with one domestic location and no foreign representations. Of the 69 banks in the estimation sample, 5 operate in Liechtenstein, 40 are foreign-controlled and 8 are domestic but part of a larger financial group. Multiple domestic locations are indicated for 40 banks, 23 have offices abroad.

2. Hypotheses and relevant literature

2.1. Profitability. The first set of hypotheses shall be composed for the fee margin earned on managed assets. Larger banks might be more profitable because of economies of scale or the possibility to extract rents due to market power. As it is defined, however, the fee margin, rather than a measure of overall profitability, is a price variable. Consequently, its heterogeneity at the bank level may not reflect direct effects of scale[1]. Cocca (2008a) argues that smaller private banks pursue business strategies that earn higher margins, which is supported by a significantly negative correlation between the fee margin and bank size within our sample. If the size differential vanishes after controlling for cost factors and efficiency, there might be an indication that the associated strategical focus is a response to scale diseconomies of smaller banks.

Pricing decisions are to be influenced by specialization (diversification) as well. One hypothesis is that banks earning a larger share of their income through fee-based activities are also able to achieve a higher margin. On the other hand, diversification with respect to income sources is presumed to result in increased profitability (evidence for European banks is provided by Beckmann, 2007; and Carbó Valverde and Rodríguez Fernández, 2007). As a consequence, wealth managers with substantial retail banking activities could use the corresponding surpluses to engage in price competition. Fee margins of Swiss and Liechtenstein banks, however, are strongly increasing with the degree of specialization in wealth management.

Another important determinant of bank profitability is capital strength. A common view in the retail banking literature is that a higher capitalization indicates lower default risk, which enables banks to refinance at a lower cost (Pasiouras and Kosmidou, 2007)[2]. On the other hand, a negative relation of the equity to assets ratio and bank performance might be deduced from the conventional risk-return hypothesis (Pasiouras and Kosmidou, 2007). Most studies, however, observe the profitability of well-capitalized banks to be relatively higher. As the relations mentioned above are of lesser significance for banks which are highly specialized in wealth management services, we propose another role of the capitalization variable. As it is argued by Goddard et al. (2004a), a high capital-assets ratio might be interpreted as signalling "that a bank is operating over-cautiously and ignoring potentially profitable diversification or other opportunities" (Goddard et al., 2004a, p. 1073). If this is the case for wealth managers as well, we might presume capital strength to be negatively related to asset growth as well as the fees that can be charged.

There is much research in favor of a significant relation between the cost-income ratio (CIR) and bank margins as well as profits. With respect to European banks, Vander Vennet (2002) suggests that "operational efficiency has become the major determinant of bank profitability". While Pasiouras and Kosmidou (2007) view a high CIR primarily as a measure of poor expenses management, Maudos and Fernández de Guevara (2004) argue that the CIR depicts the quality of the management in selecting highly profitable assets and low-cost liabilities. A management quality interpretation of the CIR is also employed in this paper. To find out whether it is represented in differential asset management margins, structural factors, such as the average level of salaries and the assets managed per employee, are controlled for. Cocca and Geiger (2007) observe that lower fees per unit of AUM are charged by banks with more AUM per employee. One possible explanation for this is that with an increasing volume of funds to be managed, the less intense the relation between the client advisor and the client can be. Such a limited attention to the client probably leads to a "smaller penetration of the client base with products and services" (Cocca and Geiger, 2007, p. 62).

Another question to be studied is whether there is persistence of profits (POP) also in the private banking industry. Margins not converging to the industry average over time may indicate the presence of market power or the ability to deter entry (Berger et al., 2000; Goddard et al., 2004a). Evidence on persistence effects with the profitability of retail banks is found by Berger et al. (2000), Goddard et al. (2004a,b) and Carbó Valverde and Rodríguez Fernández (2007). Additional hypotheses are related to factors which are specific to the wealth management context. Firstly, the fee margin should be higher for banks with larger shares of assets being mandated or invested in own funds (Cocca and Geiger, 2007). With respect to our estimation sample,

[1] For example Pasiouras and Kosmidou (2007) find that, in the European Union, smaller banks are more profitable. They argue that this result is consistent with previous studies that observed economies of scale mainly for smaller banks. The issue of scale economies in banking, however, remains controversial (Vander Vennet, 2002).

[2] Additionally, Pasiouras and Kosmidou (2007) argue that banks with higher capital levels also need less external funding and, therefore, have higher profits. Another reason for a positive capital-profits relation is that holding equity capital is relatively costly compared to debt (because of tax reasons and the dilution of control), so banks seek to recover some of these costs through higher margins (Saunders and Schumacher, 2000).

the correlation between margins and asset composition is much stronger for the latter group of assets. Secondly, we also test whether pricing policies differ with respect to past growth and investment performance.

As with efficiency and growth below, heterogeneity in fee margins may be expected to emerge as well with respect to the location of operations (Switzerland or Liechtenstein), ownership (foreign banks, domestic banks being part of a larger financial group) and the number of locations (multiple domestic ones and/or locations abroad).

2.2. Efficiency. The literature of efficiency in financial institutions is vast and fragmented with respect to the efficiency concepts and the measurement concepts used (see, amongst others, Berger and Mester, 1997; Bauer et al., 1998; or Goddard et al., 2007). As with profitability before, we will not refer to the cross-country aspects of efficiency comparisons (for which Pasiouras (2008), provides an overview).

The cost-income ratio (or efficiency ratio) is a very popular measure of efficiency as it is easily calculated and readily available. It is seen as the key indicator of efficiency within the banking community, as well as by analysts and regulators (Vander Vennet, 2002; Forster and Shaffer, 2005; Beccalli et al., 2006). However, the CIR has some drawbacks. Firstly, a strict measurement of productive efficiency is diluted as both revenues and costs depend on the development of prices. A high value for the CIR is both compatible with poor cost management and fierce competition in output markets. Because of this interpretation ambiguity (Bikker and Bos, 2004; DeYoung and Rice, 2004), the CIR rather is a profitability measure. Secondly, the calculation of simple accounting ratios, such as the CIR, does not automatically ensure comparisons to adequate peers. The researcher has to take care of the fact that efficiency ratios are not easily comparable across firms with differences in size and business models (DeYoung, 1997; Welch, 2006). Therefore, frontier efficiency measures of managerial best practice are generally favored over traditional accounting ratios (Berger and Humphrey, 1997)[1]. Nevertheless, "the measured efficiencies from all of the useful approaches should be reasonably consistent with standard non-frontier performance measures, such as return on assets or the cost/revenue ratio" (Bauer et al., 1998, p. 87). Bikker and Bos (2004) argue that such a consistency is thwarted in case there are differential effects of competitional forces on revenues. As a consequence, a robustness analysis with respect to frontier efficiencies shall accompany our results generated from using the CIR.

At the outset, the relation between bank size and efficiency seems ambiguous. On the one hand, larger banks might benefit from scale economies and market power (see Forster and Shaffer (2005) for details on the potential relation between size and efficiency in retail banking)[2]. Larger banks might also be able to hire managers with increased cost-management skills but, on the other hand, to run a large bank is more complex as well (DeYoung, 1997). The potential for scale effects in private banking seems to be limited due to the services nature of wealth management activities[3]. Possibly, a size effect can only be achieved "by advising fewer clients with larger assets" (Cocca, 2008b). In our data sample, the correlation between the CIR and size is low, but the cost-income ratio seems to be strongly related to the assets managed per employee.

Specialization and diversification are presumed to have a two-edged influence on efficiency as well. A higher productivity with increased specialization might be opposed by higher (personnel) costs. Additionally, economies of scope might arise in integrated business models (Cocca, 2008a). The evidence on the relation of profitability to efficiency is mixed. Whereas Berger (1995) and Berger and Mester (1997) find a positive relation, Casu and Molyneux (2003) and Pasiouras (2008) do not. Weill (2004) reports that cost efficiency measures are positively correlated with bank profits for most countries under study, but not for Switzerland. He takes the observed negative connection as an indication of weak competition with profitable banks behaving inefficiently (enjoying the so-called "quiet life"). Well-capitalized banks are found to be more efficient by Pasiouras (2008), a relation that is not confirmed by Casu and Molyneux (2003).

In addition to the hypotheses related to the potential determinants of the cost-income ratio mentioned above, we will also test whether there is persistence in efficiency ratios. Berger and Humphrey (1997) report that, across the retail banking literature, there is apparent evidence of persistence of relative efficiencies across firms over time. Finally, it is presumed that asset growth and efficiency are connected as expansionary strategies might be costly, at least in the short run.

[1] Non-parametric frontier methods, for example, use optimization techniques and are viewed as producing more objective comparisons and efficiency rankings. Efficiency considerations based on several inputs and outputs can be condensed to a single measure. At the same time, it is possible to locate the sources of input overuse and output underproduction.

[2] Pasiouras and Kosmidou (2007) find a significantly positive relation between bank size and efficiency. Berger and Humphrey (1997) do as well, but argue that it is less clear whether this is due to a benefit from scale economies.

[3] One cost factor for which there are marked differences between small and large private banks are the costs to be incurred to meet regulatory standards and requirements. Bührer et al. (2005) argue that the "regulatory burden" is much larger for smaller institutions.

2.3. Growth. Two indicators for private banks' growth are applied in this study: the increases in assets due to both the net inflow of new money and the investment performance. The literature on retail banks measures growth mainly with respect to the balance sheet total. Nevertheless, several hypotheses can be derived which are suitable in the wealth management context as well. Tests on the so-called "law of proportionate effect" (LPE), for example, deal with the relationship between growth and size, as well as with persistence effects. The LPE is based on the presumption that the growth rates of firms may, on average, be equal (and random). As a consequence, the distribution of firm size would become more skewed and concentrated over time. Tschoegl (1983) derives three testable hypotheses for the LPE. We test the first two of these for the wealth management industry in Switzerland and Liechtenstein: that growth is independent of initial size and that there is no growth persistence.

A relation of growth with (initial) bank size may well be presumed to emerge from efficiency advantages of large firms, the exercise of market power, or the ability to pursue entry-deterring strategies (Goddard et al., 2004a). No size-growth connection is found by Tschoegl (1983) in his early, international study. The same result emerges for European banks in Goddard et al. (2004a) and, with one exception, Wilson and Williams (2000). For the USA, however, Goddard et al. (2002) and Janicki and Prescott (2006) report that large banks seem to grow faster. Tschoegl (1983) argues that current growth is not a good predictor of growth rates in subsequent periods. Goddard et al. (2004a) reject the second LPE hypothesis by observing positive growth persistence for a sample of European banks.

Goddard et al. (2004a) also find that banks with a high capital-assets ratio tend to pursue relatively cautious growth policies. Profitability seems to be another important determinant, a prerequisite for future growth (Goddard et al., 2004a). As private banks increase their scale of operations by attracting inflows of new money, it may be presumed that the corresponding efforts are supported by signals related to high profits as well as investment skills. Cocca and Geiger (2007) argue that wealth managers attract money by superior investment performance. In this respect, clients will recognize a bank's competence especially with funds increasing in value that are invested 'in-house' or under management mandates.

3. Methodological framework

In order to study the determinants of key figures for the wealth management industry, we employ the following estimation process. The variables to be explained are the fee margin, the CIR, as well as the growth in assets due to NNM and performance. The estimated models are similar for the dependent variables and involve the explanatory factors described in Section 1. As persistence effects are to be examined, a dynamic panel estimation of the form:

$$y_{it} = \alpha_i + \rho\, y_{i,t-1} + \boldsymbol{\beta}'\, \boldsymbol{x}_{t-1} + \varepsilon_{it}$$

is utilized, where y is the respective dependent variable and $\boldsymbol{x}$ is a vector of explanatory variables with $\boldsymbol{\beta}$ as the corresponding coefficient vector. As a lag of the dependent variable is considered, the principal estimation method is dynamic one-step GMM (Arellano and Bond, 1991) with robust standard errors. Heterogeneity (bank-specific effects) thereby is accounted for through taking first differences. The lagged regressand, which necessarily is correlated with the error term(s), is instrumented by its second lag[1] and the first differences of the explanatory variables. In the end, results from System GMM estimation (Arellano and Bover, 1995; Blundell and Bond, 1998) are reported. In this setting, the differenced equation is amended by a level equation with an instrument set consisting of the lagged difference of the dependent variable and the levels of all the exogenous ones (including a constant). Tests on autocorrelation of orders one and two (Arellano and Bond, 1991) are used to ensure that the model is not misspecified[2]. Instrument validity is evaluated by use of the Hansen (1982) *J*-test from the two-step model, which is robust to heteroscedasticity but may be weakened with many instruments (Roodman, 2009a,b). Potential endogeneity of explanatory variables is no issue in the model described above as the first lags of the regressors are considered. That is, the characteristics of the wealth managers at the beginning of the period are used to examine the banks' performance over the year.

If the past of the dependent variable proves insignificant (if there is no persistence), a non-dynamic estimation is applied for robustness purposes. Thereby, the primary choice is a random-effects (RE) panel model. Fixed effects (FE) are not considered in these cases due to the following reasons. Firstly, time-invariant information (such as binary variables) cannot be used in FE estimation. Secondly, there is little within variation in our data due to the short sample period. In such cases, the inclusion of individual effects would leave no variation to be explained by the applied regressors. The test

[1] In principle, lagged levels of the dependent variable, dated $t - 2$ and earlier, are eligible instruments. Using only the first of them follows the advice to keep the list of instruments short, in order to avoid bias from overfitting endogenous variables (see Roodman, 2009a).

[2] If the error in the original model is assumed to be free of autocorrelation, then the first-differenced errors are serially correlated. Second order autocorrelation (in the first-differenced residuals) should be absent to ensure consistency of the estimates.

for individual effects with unbalanced panels of Baltagi and Li (1990) is applied, which is a refinement of the test of Breusch and Pagan (1980). In case its null hypothesis of no random effects is accepted, a pooled model is estimated by ordinary least squares (OLS). The absence of serial correlation in the non-dynamic panel models is examined by the test proposed by Wooldridge (2002).

4. Results

The estimation results from the dynamic panel models are presented in Table 2 (see Appendix A). The equation for the fee margin over AUM features but two significant factors. On the one hand, margins are persistent to a large degree within the wealth management industry, as it is frequently found for profits in retail banking (see Section 2.1). The lagged dependent variable shows a coefficient of about 0.59. Such strong persistence indicates that market forces do not exact a reversion of margins to the industry average, at least in the short run. Market power and entry deterrence abilities may also enable individual private banks to maintain above-average margins for a certain time. Among the other potential determinants, only the previous growth by an acquisition of new money is significant (at the 10% level). Private banks with success in attracting new funds seem to obtain potential for increasing profit margins as well.

Although many of the variables that describe size, specialization, asset structure, efficiency and capital strength are correlated to the fee margin individually[1], none of them emerge to be significant in the full model. After controlling for the respective other bank characteristics, the individual effects seem to cancel out as, with respect to heterogeneity of margins, two groups of banks with rather homogenous characteristics seem to be present. The smaller wealth managers are the ones that pursue strategies which enable higher margins (Cocca, 2008a). Although they are specialized in advising very wealthy clients (Cocca and Geiger, 2007; Cocca, 2008b), their investment in own funds, the assets managed per employee and the salaries paid are comparably low – three factors that are positively correlated to margins across the entire sample. Additionally, smaller banks are significantly better capitalized. Rather surprisingly, having in mind the importance of offering sophisticated products within the industry, banks with high shares of mandated assets do not earn higher margins[2]. Also specialization and past investment performance do not convey additional information on how to characterize wealth managers with respect to their fee margins. The same is true for geographical and ownership differences, as well as for the number and site of locations.

Two observations from Table 2 lead us to estimate also a non-dynamic model for the fee margin equation. Firstly, the *p*-value for the AR(1) test is above 0.05 and, secondly, the lagged margin is only significant at the 10% level. As the lagrange multiplier (LM) test on individual effects of Baltagi and Li (1990) prefers the random effects (RE) model to pooled OLS[3], results from using RE are reported in Table 3 (see Appendix A). Tests on non-significance are based on robust standard errors. With the non-dynamic estimation, several effects emerge being statistically significant. Institutions that are more specialized in private banking activities, as well as banks with higher salaries, charge relatively higher margins. The former result is, in principle, consistent with the notion that more diversified banks charge lower fees to gain market shares. The success of such strategies, however, may be doubted in view of the persistence effect found in the dynamic model. With more assets managed per employee, fee margins decrease. This result is in line with limited client attention argument of Cocca and Geiger (2007). As an additional outcome, also the difference between the fees of banks from Switzerland and Liechtenstein is found to be different from zero. Neither of the two growth variables seems to be a discriminatory factor in this setting. Leaving them out of the list of explanatory variables leads to a gain in observations and degrees of freedom. By doing so (the corresponding results are not shown in tabular form), the share of mandated assets (positively) and the CIR (negatively) emerge as additional determinants. This suggests that management quality and offering sophisticated products might as well play a role in shaping profits. None the less, we are inclined to not attach too much value to the results just described, as the misspecification of the dynamic model is not very severe and the influence of past on present margins is fairly strong. Once the persistence effect is accounted for, the information content of several factors individually correlated with the fee margin vanishes. In neither model, however, there is evidence on size effects or on a significant association to the investment in own funds, the capital ratio or past performance.

[1] As mentioned in Section 2.1, margins are negatively correlated with bank size and increasing with the degree of specialization. The fee margin is also higher for banks with a larger share of assets in own funds, higher personnel costs per employee and for banks which are better capitalized. The correlation with AUM per employee, however, is significantly negative.

[2] The fee margin and the share of assets under discretionary management mandates are not even significantly correlated in our sample.

[3] The *p*-value for the test with pooled OLS as the null hypothesis is 0.00. The serial correlation test of Wooldridge (2002) accepts the null of no autocorrelation in the errors of a panel model with a *p*-value of 0.55.

A strong persistence effect emerges for the cost-income ratio (see Table 2), which is in line with previous evidence on efficiency in the banking industry (Berger and Humphrey, 1997). According to the results from the autocorrelation and instrument validity tests, the dynamic model is well specified. The fact that no size effect on efficiency is found coincides with the notion that scale effects are little conceivable with the management of client assets. Larger banks may well possess an improved cost management, but also are inherently more complex to run. Specialization and asset structure cannot be used to distinguish efficient from inefficient banks either. If a stronger focus on private banking activities leads to respective productivity gains, foregone economies of scope may counter an improvement of efficiency measures. Given personnel costs (which are negatively significant), more assets managed per employee, ceteris paribus, are associated with higher cost-income ratios. This is in line with the prior observation that fee margins are negatively correlated with funds managed per staff member. Our results do not confirm the observation of Weill (2004) that profitable Swiss banks are relatively inefficient. At least for the private banks in the applied sample this can be negated, as the lagged fee margin is insignificant. Additional influences are found present for past growth through new money (linked to lower values for the CIR) and the existence of multiple locations within the country (such banks have a higher CIR).

Due to the drawbacks of the cost-income ratio as a measure of efficiency (see Section 2.2), we also apply inefficiency scores from non-parametric data envelopment analysis (DEA) as an alternative. Details on the calculation of these figures can be found in Appendix B. Using scores from DEA analysis as a dependent variable, however, leads to some complications with respect to estimation (which are also described briefly in Appendix B). Suitable methods were derived by Simar and Wilson (2007). In these models, however, none of the regressors is significant at conventional levels, except for a persistence effect also in these measures. Replacing the CIR with DEA scores as an explanatory variable does not affect the results from the three other equations. This might be due to the fact that the CIR and the DEA scores are related to a relatively large extent. The associated correlation coefficient for the pooled sample is 0.28, which is rather high compared to the correlations reported by Bauer et al. (1998). For our sample of wealth managers it might be concluded that cost-income ratios are useful measures of managerial competence. Ambiguities in interpretation do not seem to be very important as the impact of competitional forces on the revenue side can be presumed relatively homogenous within our sample of banks.

The equation for the AUM growth due to new money is well specified and the lagged NNM share is positively significant at the 5% level. Thus, there is also persistence in the part of growth that is due to the inflow of new funds. Initial bank size, however, is no indicator of a subsequently emerging, disproportionate acquisition of money. Both results are in line with those reported by Goddard et al. (2004a) for European retail banks, and the latter finding confirms the absence of a size-growth relationship in private banking observed also by Cocca and Geiger (2007) and Cocca (2008b). Simple preestimation correlation analysis (associated results are not shown in tabular form) reveals that growth is correlated with the AUM share in own funds, personnel costs per employee, and the fee margin. From these factors, ceteris paribus, only the lagged margin is statistically significant. Thus, if wealth managers are able to attract funds by signalling competence with a high share of assets invested in own funds, such an effect is hidden behind signals associated with high margins and profitability. High fees, for example, may provide an indication of which banks offer innovative products promising high returns. Superior past investment performance does not seem to be rewarded by an increased inflow of new money, which is against the argument provided by Cocca and Geiger (2007). As well surprising is that our results confirm the observation of Goddard et al. (2004a), who found that well-capitalized banks grow more slowly. Thus, it seems that the capital strength also of wealth managers conveys information about the coutiousness behind different business models.

Investment performance makes up the final variable to be analyzed. The first observation is that there is no persistence in investment success, as the coefficient of lagged performance is not statistically different from zero. Therefore, the non-dynamic model in Table 3 will be discussed. The associated test on the pooled data does not reject the null of no random effects (with a *p*-value of 0.89). As serial correlation is present, we estimate a pooled OLS model with Newey and West (1987) standard errors[1]. Also with growth measured in the performance context, size and specialization do not appear to be important determinants. A superior investment performance is evident for banks with a larger share of mandated assets and wealth managers who pay higher salaries.

[1] Regrettably, too few observations are present for several banks to pursue the involved correction for serial correlation. Therefore, the number of useable observations (banks) is reduced to 134 (50).

The imposition of large AUM volumes per head seems detrimental to growth via market success. Poor cost management, depicted by high values for the CIR, is an indicator for poor performance as well. Ceteris paribus, also banks with locations outside their home country exhibit lower growth figures in this respect.

Conclusions

This paper systematically explores the performance determinants for institutions that are specialized in private banking activities. For the example of Swiss and Liechtenstein banks, it is examined which attributes characterize wealth managers with high margins, superior cost efficiency and growth. Preeminent features of banks that charge a higher fee margin over mananged assets are a high degree of specialization in wealth management, comparatively low levels of assets managed per employee, and higher salaries paid. In a dynamic model, however, a fairly significant margin persistence effect masks out most of the factors that are individually correlated with profitability. In this setting, fee margins are found to be higher for private banks with more recent growth through the inflow of net new money. Interestingly, wealth managers with less assets managed and higher salaries paid per head turn out to feature the lowest cost-income ratios. The attraction of new money seems to be fostered by signalling competence via high margins rather than through a large importance of bank-own funds or management mandates. Past performance is unrelated to new money inflows as well, which is rather surprising. Additionally, well-capitalized banks appear to pursue more cautious growth policies. Superior investment performance is associated with a higher share in mandated assets and higher salaries. The level of assets managed per employee, as well as cost management abilities are reflected in market success too. There is, however, no persistence found for the investment performance of wealth managers in Switzerland and Liechtenstein. No effects emerge from bank size and only little heterogeneity in overall performance can be traced back to the structure of assets, the size and location of the bank's network, and differences in ownership.

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Appendix A

Table 1. Descriptive statistics

Characteristic	Mean	St. dev.	Minimum	Maximum
AUM	21547.64	32173.78	452.00	187759.20
Fee income share	67.11	11.85	41.51	98.76
AUM in own funds	7.81	11.07	0.00	46.67
AUM under DMM	25.30	14.40	0.27	69.81
AUM per employee	61.14	27.72	20.92	182.72
Personnel costs per employee	240.39	95.11	114.92	912.40
Capital ratio	18.62	10.47	3.69	53.42
Fee margin	73.61	23.11	18.44	169.32
Cost-income ratio	60.96	11.53	34.54	88.54
AUM growth through NNM	6.28	11.03	-13.58	51.56
Performance	6.19	7.06	-19.62	26.13

Notes: This Table presents descriptive statistics on the largest estimation sample (154 observations on 69 banks) for the following bank characteristics: the level of assets under management (AUM, million CHF), the share of income from fees and commissions in total income (%), the shares of assets in own funds and under discretionary management mandates (%), the AUM managed per employee (million CHF), the personnel costs per employee (1000 CHF), the share of equity capital in the balance sheet (%), net income from fees and commissions relative to AUM (the fee margin, basis points), the cost-income ratio (%), net new money relative to AUM of the previous period (AUM growth through NNM, %), and the AUM growth due to the investment performance (%).

Table 2. Results from dynamic panel estimation

	Fee margin	CIR	NNM share	Performance
Log(AUM)	-0.652 (0.80)	-1.016 (0.28)	-0.358 (0.81)	1.213 (0.37)
Fee income share	0.202 (0.41)	-0.155 (0.22)	-0.014 (0.89)	0.065 (0.40)
AUM in own funds	-0.021 (0.91)	0.060 (0.34)	-0.040 (0.66)	-0.038 (0.71)
AUM under DMM	0.029 (0.72)	-0.024 (0.69)	-0.035 (0.70)	0.170* (0.09)
AUM per employee	-0.185 (0.32)	0.152* (0.07)	0.018 (0.84)	-0.329** (0.00)
Personnel costs per employee	0.042 (0.35)	-0.045** (0.01)	0.003 (0.94)	0.066** (0.01)
Capital ratio	0.088 (0.63)	-0.043 (0.72)	-0.358** (0.03)	0.008 (0.95)
Fee margin	0.587* (0.06)	0.115 (0.17)	0.264** (0.01)	-0.117* (0.07)
CIR	-0.033 (0.83)	0.750** (0.00)	0.146 (0.11)	-0.171** (0.03)
AUM growth through NNM	0.199* (0.08)	-0.084* (0.07)	0.332** (0.03)	0.041 (0.53)
Performance	0.113 (0.18)	-0.006 (0.91)	0.084 (0.20)	0.046 (0.57)
Liechtenstein	-3.670 (0.32)	-1.013 (0.77)	3.622 (0.22)	2.055 (0.65)
Foreign	-0.864 (0.82)	-0.435 (0.80)	-3.648 (0.19)	-1.000 (0.66)
Dependent	-3.729 (0.28)	-2.324 (0.43)	-2.604 (0.45)	1.711 (0.56)
Domestic locations	-1.505 (0.74)	5.470** (0.02)	-0.088 (0.98)	1.177 (0.69)
Locations abroad	-1.156 (0.78)	-0.894 (0.64)	1.629 (0.54)	-5.786** (0.04)
Constant	25.000 (0.45)	25.544 (0.13)	-12.637 (0.42)	10.785 (0.42)
Number of banks	69	69	66	66
Number of observations	154	154	150	150
Number of instruments	26	26	25	25
AR(1) test (*p*-value)	0.054	0.016	0.019	0.177
AR(2) test (*p*-value)	0.390	0.217	0.708	0.693
Hansen test (*p*-value)	0.169	0.313	0.655	0.661

Notes: This Table presents results on how the four key figures vary across banks with certain characteristics. The dependent variables (see the column headers) are the fee margin, the cost-income ratio (CIR), the growth in AUM due to the net inflow of new money (termed NNM share in the column header), and the growth in assets due to the investment performance. All models are estimated by System GMM. The explanatory variables, apart from the dummies, are lagged once. The *p*-values for the *t*-test on non-significance are given in parentheses. One asterisk is for statistical significance at the 10% level, two of them indicate significance at the 5% level.

Table 3. Results from non-dynamic models

	Fee margin		Performance	
Log(AUM)	-2.491	(0.42)	1.321	(0.21)
Fee income share	0.549**	(0.00)	0.047	(0.51)
AUM in own funds	0.326	(0.12)	-0.025	(0.80)
AUM under DMM	0.022	(0.83)	0.116*	(0.08)
AUM per employee	-0.420**	(0.00)	-0.234**	(0.05)
Personnel costs per employee	0.099**	(0.01)	0.050*	(0.07)
Capital ratio	0.200	(0.42)	0.053	(0.61)
Fee margin			-0.080	(0.29)
CIR	-0.192	(0.21)	-0.145*	(0.10)
AUM growth through NNM	0.116	(0.31)	0.108	(0.10)
Performance	0.137	(0.17)		
Liechtenstein	-8.217**	(0.03)	1.618	(0.64)
Foreign	1.093	(0.80)	-1.467	(0.42)
Dependent	-5.511	(0.33)	1.493	(0.51)
Domestic locations	-1.410	(0.84)	1.566	(0.51)
Locations abroad	-1.085	(0.85)	-5.695**	(0.01)
Constant	66.945**	(0.01)	5.079	(0.67)
Number of banks		69		50
Number of observations		154		134
Estimation method		RE		OLS

Notes: This Table presents results from non-dynamic models for the fee margin and the investment performance as dependent variables. The fee margin equation is estimated by use of a random-effects (RE) panel model with robust standard errors. OLS with Newey and West (1987) standard errors and a presumed serial correlation of order 1 is applied for the performance equation. The explanatory variables, apart from the dummies, are lagged once. The *p*-values for the *t*-test on non-significance are given in parentheses. One asterisk is for statistical significance at the 10% level, two of them indicate significance at the 5% level.

Appendix B. Inefficiency scores from data envelopment analysis

Data envelopment analysis (DEA) is a non-parametric method that uses linear programing techniques to calculate (in)efficiency scores for so-called decision-making units (DMU). The obtained scores measure efficiency relative to a best-practice benchmark which is identified from the dataset at hand. That is, the most efficient DMU make up the estimated production frontier. In this paper, scores for the (pure) technical efficiency of private banks are estimated. As it is hardly possible to obtain sensible price information for the wealth managers' inputs and outputs, we refrain from an assessment of economic (cost and profit) efficiency. The applied model features an input-minimization orientation and variable returns to scale (Banker et al., 1984), and yields indicators of proportional input overuse (output underproduction). The net income from fees and commissions and the net inflow of new money are chosen as outputs, the input vector consists of AUM, personnel expenditures and other operating costs. Scores are normalized to 1 (100%) for efficient DMU, lower values are assigned to inefficient banks. A score of 0.8, for example, indicates that a 20% reduction of all inputs (while maintaining the output level) would be needed to reach the efficient benchmark. To match the CIR with respect to the direction of (in)efficiency, the reciprocal values of these scores are used.

Replacing the CIR for DEA scores in case differences in efficiency are to be explained is a more challenging task. Casu and Molyneux (2003), for example, discuss several problems emerging in this context and possible solutions to these. Tobit regression has been commonly applied to account for the censored nature of DEA efficiency scores. However, Simar and Wilson (2007) show that tobit (as is OLS) is not the proper choice. Another important problem is that the DEA efficiency scores are relative measures which gives rise to the so-called "dependency problem" (the fact that efficiency scores are partly interdependent leads to a violation of the independence assumption in regression analysis), which invalidates standard inference techniques (Casu and Molyneux, 2003). As Simar and Wilson (2007) argue, the estimated DEA efficiency scores "are serially correlated, and in a complicated, unknown way". Some previously proposed bootstrap-based solutions to these complexities were considered inappropriate by Simar and Wilson (2007). The algorithms they provide and recommend instead (based on truncated regression with suitably bootstrapped standard errors) shall be applied in our empirical investigation. With algorithm # 2 in Simar and Wilson (2007), inefficiency scores are additionally corrected for estimation bias.