What Determines Differences in Foreign Bank Efficiency? Australian Evidence#

Jan-Egbert Sturm* and Barry Williams**

This Version: March, 2007.

Abstract

This study examines the factors that determine difference in efficiency of foreign bank in the host market (Australia). The impact of home market, host market and parent bank characteristics are considered within the frameworks offered by comparative advantage and new trade theories. Parametric distance functions are used to estimate the efficiency of foreign banks in Australia, and the robustness of model specification is tested using both general to specific modelling and extreme bounds analysis. It is found that following clients reduces the efficiency of profit creation. Incumbent bank's market share acts as a barrier to entry, while parent bank profits do not improve host nation efficiency. The limited global advantage hypothesis was found to be relevant for banks from the United Kingdom, while banks from the United States were generally less efficient.

Key words: Foreign bank efficiency, distance functions, extreme bounds analysis, barriers to entry, following clients

JEL codes: G15, G21, C15, C52

Corresponding author: Barry Williams, Faculty of Business, Bond University, Gold Coast, Queensland, Australia. bwilliam@staff.bond.edu.au; Tel. +61 7 5595 2259; Fax + 61 7 5595 1160.

* KOF – Swiss Institute for Business Cycle Research, ETH Zurich, Switzerland and CESifo Munich, Germany.

** Faculty of Business, Bond University, Gold Coast, Queensland, Australia.

1. Introduction

To date it has been largely found that foreign banks are less efficient than domestic banks in developed nations (Berger, et al., 2000) An exception to this body of literature was found in Australia by Sturm and Williams (2004). Thus, Australia provides an ideal environment to address the deeper question of "What factors determine differences in multinational bank efficiency?" In order to address this question, this study will apply parametric distance functions to Australian banking. It will expand the previous research by establishing those factors that determine differences in foreign bank efficiency in the host market. This will provide a detailed test of the limited form of the global advantage hypothesis of Berger, et al. (2000). The limited form of the global advantage hypothesis proposes that the diseconomies of operating multinationally are able to be overcome by banks from some nations with unspecified nation-specific advantages. Studies such as those by Dietsch and Lozano-Vivas (2000) and Beccalli (2004) have illustrated that cross-border differences in efficiency are affected by differences in environmental variables. This study will consider the impact of home nation, host nation and parent bank characteristics upon foreign bank efficiency in the host nation, thus adding a new perspective to the multinational bank efficiency literature, while also considering the roles of the theory of comparative advantage and new trade theory.

In an increasingly globalised financial system, understanding of the factors that determine multinational bank efficiency have increased importance. As discussed by Berger, et al. (2004), the international assets of banks are an order of magnitude larger than international issues of bonds or equity. Yet given this economic importance, the factors that determine difference in multinational bank efficiency are relatively poorly explored. Thus, this paper responds to the call of Berger, et al. (2004) to identify country level characteristics that are associated with advantages in multinational banking. Further, this paper will extend this research agenda by also considering firm level characteristics.

To our knowledge there is no study which explicitly considers the factors that determine foreign bank efficiency from the perspective of the host nation while also explicitly considering those factors that allow a multinational bank to overcome the diseconomies that results from the liability of foreignness (Berger, et al., 2004; Miller

and Parkhe, 2002). A distinctive feature of this study is that estimates of foreign bank efficiency will be drawn from a sample that includes both domestic and foreign banks. This enables us to determine those factors which influence differences in efficiency for banks operating multinationally and ensures that the diseconomies of multinational operations are fully reflected in the second stage model in which we estimate factors determining foreign bank efficiency.

The model of foreign bank efficiency in Australia that will be tested is based upon the previous work of Buch (2003), Berger, et al. (2004) and Williams (1998a; 1998b; 2003) with some appropriate modifications due to the differences in research question being addressed. In particular, the issues of Ricardian comparative advantage theory and new trade theory (Berger, et al., 2004) will be explored within the context of multinational bank efficiency. The use of bank-level data will provide insights to multinational banking that will extend the recent work of Buch (2003) and Berger, et al. (2004) who considered bank mergers at the host and home nation level. Further, this work will extend previous studies considering the efficiency and profitability of foreign-owned banks in Australia (Sturm and Williams, 2004; Williams, 2003).

This study applies parametric distance functions (Coelli and Perelman, 1999) to obtain estimates of foreign bank efficiency. The robustness of factors determining foreign bank efficiency will be established by the application of both general to specific modeling (Hendry, 1995) and extreme bounds analysis as propagated by Levine and Renelt (1992) and modified by Sala-i-Martin (1997). This study finds that the limited global advantage hypothesis of Berger, et al. (2000) applies in the Australian context. Little evidence was found to support the application of defensive expansion theory, the results suggesting that following clients reduces profit creation efficiency. However, the processing of flows of investment income acts to increase profit creation efficiency, but reduces the efficiency of transformation of physical inputs into outputs. The domination of the Australian market by the Big Four banks acts as a barrier to entry, reducing efficiency, consistent with Williams (2003). This indicates that foreign banks competing with the incumbent banks over-used inputs in order to contest with the incumbent banks in terms of service delivery. However, there is some limited evidence to suggest that acquisition of a domestic bank active in retail banking reduces this barrier to entry. Limited evidence only was found to support the

application of new trade theory (Markusen, 1995) to models of multinational bank efficiency.

The remainder of the paper is organized as follows; the next section provides a review of the relevant literature, including a discussion of comparative advantage theory and new trade theory in the context of multinational banking. The third section outlines the method that will be employed in this study and develops the model that will be tested. The fourth section details the sample that will be used in the empirical model. The fifth section discusses the results of the empirical testing. The final section offers the conclusions and provides some suggestions for further research.

2. Literature review

The recent survey by Berger, et al. (2000) concluded that foreign banks are less efficient than the host nation financial institutions in developed nations, with the reverse holding for developing nations. This conclusion is the outcome of studies employing several different efficiency estimation methods as well as using several different samples. Hasan and Hunter (1996) and Mahajan, et al. (1996) both found foreign banks in the United States had lower cost efficiency, while DeYoung and Nolle (1996) found similar results for foreign bank profit efficiency. Berger, et al. (2000) considered both cost and profit efficiency of foreign banks in five different nations (France, Germany, Spain, the United Kingdom and the United States) and found foreign banks to be less cost and profit efficient than domestic banks on average. However, Berger, et al. (2000) also found that for three of the five nations considered, banks from the United States were on average more efficient than domestic banks. Miller and Parkhe (2002) considered fourteen different host nations, employing stochastic frontier estimation of an alternative profit function, also finding domestic banks to be more efficient than foreign banks. In considering these results Berger, et al. (2000) proposed two alternative hypotheses, (i) the home field advantage hypothesis and (ii) the global advantage hypothesis. Under the home field advantage, the liability of foreignness[1] imposes costs on foreign banks such that the

[1] The liability of foreignness are the costs borne by banks operating away from their home market, such costs include monitoring, staff turnover, diseconomies of scale for retail

domestic banks are more efficient than foreign banks. The alternative hypothesis of global advantage has two forms, the general form and the limited form. Under the general form of the global advantage hypothesis, efficient foreign banks from a variety of nations are able to operate across national borders at higher levels of efficiency than domestic banks. The main body of empirical evidence to date has rejected this hypothesis, as did Berger, et al. (2000). The limited form of the global advantage hypothesis proposes that banks from some nations are able to overcome the costs imposed by the liability of foreignness due to nation-specific factors.

Berger, et al. (2000) found the limited form of the global advantage hypothesis supported by the finding that banks from the United States were more efficient than domestic banks in three of five host nations. Beccalli (2004) also found that UK investment firms were more efficient than foreign investment firms in the UK, while also confirming the limited global advantage for both UK and Japanese investment firms operating in Italy, and Japanese investment firms in the UK. In contrast to Berger, et al. (2000) for banks, Beccalli (2004) found US investment firms to be less efficient than domestic investment firms. A recent study by Sturm and Williams (2004) considered foreign banks in Australia, and their results are also suggestive of the limited form of the global advantage hypothesis, finding that foreign banks in Australia were, on average more efficient than domestic banks. Sturm and Williams (2004) suggested that the process that rationed foreign bank licences in Australia during deregulation selected banks possessing attributes that enabled these banks to overcome the liability of foreignness. It was also concluded that diversity of bank types operating in a particular nation are an important source of ongoing innovation and efficiency. The other relevant Australian study was provided by Sathye (2001) who applied Data Envelopment Analysis (DEA) to a sample of 29 banks operating in Australia in 1996 (17 domestic banks and 12 foreign banks) and concluded that there were no significant differences between domestic and foreign banks. Responding to the results of these recent studies, this research will determine those factors that act as a source of limited global advantage in determining bank efficiency.

---

operations, and factors such as culture, language and market structure acting as barriers to entry (Miller and Parkhe, 2002)

The Ricardian law of comparative advantage has been a dominant paradigm for considering cross-border flows for approximately two hundred years. It states that opportunity costs will dictate the source and host nation for trade and investment. For the purposes of this paper, the implication of comparative advantage theory that trade and investment is most likely to occur between nations of dissimilar factor endowments is of most importance (Berger, et al., 2004).

Comparative advantage theory has been questioned by empirical evidence that does not support its assertions (Markusen, 1995). This empirical evidence has led to the development of new trade theory which provides a complementary paradigm. Under new trade theory the comparative advantage framework is modified. The main modifications relevant for this paper are threefold. First, relative characteristics of nations will determine if trade and investment will occur between nations, rather than determining which set of goods will be traded. Second, markets are no longer perfectly competitive and heterogeneous preferences will contribute to the observed trade outcomes. Third, firms can select to invest in foreign nations or trade with those nations.

This new trade theory has been named eclectic theory (Dunning 1977; 1988) with Casson (1990) advancing an internalisation approach to the same issue. Williams (1997) provided a discussion of each of these approaches within the context of the multinational bank and concluded that the differences between these two approaches are not empirically testable. Under eclectic theory, trade and investment are based around the concepts of ownership advantage, location advantage and internalisation. The main focus of the differences between the two eclectic theory and internalisation theory has centered on the issue of whether ownership is separate to internalisation or a subset of internalisation. From an empirical perspective it is not possible to distinguish between these issues in this paper.

Markusen and Venables (1996) developed the convergence hypothesis in which investment will dominate trade as nations become economically similar. As similarities decrease, so trade becomes more likely, consistent with the opportunity cost framework provided by comparative advantage theory, as similarities increase,

new trade theory argues that investment becomes more likely. Given that much of multinational banking is knowledge, skills and communication intensive, and so based upon less tangible assets, the new trade theory lends itself particularly well to multinational banking (Berger, et al., 2004; Buckley, 1988; Williams, 1997). Berger, et al. (2004) addressed the question of new trade theory versus comparative advantage theory in a global study of bank mergers and acquisitions and concluded that both theories were supported.

3. Method

This research will apply a two stage method to establishing the factors that determine foreign bank efficiency in Australia. In the first stage foreign bank efficiency will be estimated, using several different specifications of inputs and outputs, from a pooled sample that includes both domestic and foreign banks. This will ensure that any diseconomies resulting from multinational operations, (Berger, et al.; Buch, 2004), are controlled for. Efficiency will be estimated using the intermediation approach and parametric input-distance functions. In the second stage the efficiency estimated for the foreign banks will be used as dependent variables in pooled regressions in a model developed below.

3.1. Intermediation approach

Consistent with the previous literature in this area, this study will apply the intermediation approach to bank production (Berger and Humphrey, 1992; Berger and Mester, 1997; Markusen and Venables, 1996). In the intermediation approach a bank is viewed as employing inputs such as deposits, staff and equity to produce outputs such as loans and off balance sheet items. As discussed by Berger, et al. (1993), results of efficiency estimates can be sensitive to the specification of inputs and outputs. In order to control for this effect we specify several different combinations of inputs and outputs. This will commence from a parsimonious balance sheet specification, in which banks use equity, employees and deposits to produce loans and off balance items (Model 1), as applied by Allen and Rai (1996), Chang, et al. (1998) and Sturm and Williams (2004). Following this base-line approach, additional outputs will be specified, in which loans are divided into retail components (Model 1a), and additional wholesale activity is included (Model 1b), to determine if this sensitivity analysis produces any further insight. Further sensitivity analysis will be conducted by

applying a revenue-based specification of inputs and outputs as applied by and 1999; Avkiran (2000) and Sturm and Williams (2004) (Model 2). The revenue-based specification will consider inputs as interest expenses and non-interest expenses, while outputs will be specified as net interest income and non-interest income. Table 1 provides a summary of these models. The changes in model specification will result in some changes in sample composition due to data availability.

[INSERT TABLE 1 ABOUT HERE]

3.2. Technique

As this data set does not contain input or output prices for all banks, we are more or less limited to applying the parametric input-distance function proposed by Coelli and Perelman (1999). This approach allows maximum likelihood estimation of a translog function using multiple outputs and inputs. We allow a time trend to influence the efficiency of the banks to reflect the impact of technology shifts and other time-dependent effects. We use the parameterisation from Battese and Corra (1977), replacing σ_V^2 and σ_U^2 with $\sigma^2 = \sigma_V^2 + \sigma_U^2$ and $\gamma = \frac{\sigma_U^2}{\sigma_V^2 + \sigma_U^2}$. The log-likelihood function of this model is presented in the appendix in Battese and Coelli (1993).

3.3. Second-stage model

To our knowledge, no previous studies have modeled factors that determine foreign bank efficiency in the host market. Thus, the foundations provided by the recent work of Berger, et al. (2004), Buch (2003) and Williams (2003), who considered multinational banks (MNBs) from other perspectives, is an appropriate starting point, and so provide an extension of Berger, et al. (2000). This paper will argue that MNB efficiency is a function of home nation effects, parent bank effects, host nation effects, and new trade theory effects, or more formally:

$$EFF_{i,t} = \alpha + \sum_{p=1}^{P} \beta_p \left(Home\ Country\right)_{i,t}^{p} + \sum_{r=1}^{R} \varphi_r \left(Parent\ Bank\right)_{i,t}^{r} + \sum_{q=1}^{Q} \lambda_q \left(Host\ Nation\right)_{t}^{q} + \sum_{r=1}^{R} \gamma_s \left(NewTradeTheory\right)_{i,t}^{s} + \mu_{i,t} \quad (1)$$

where *i* represents the bank and *t* the time period.

Both Berger, et al. (2004) and Buch (2003) considered factors determining cross border mergers, while Williams (2003) considered the profits of foreign banks in Australia. While these issues are not identical to the research question addressed in this study, they provide a common background to consider the motivations and performance of MNBs. While efficiency may not always translate into profitability due to factors such as asset quality and the impact of competitive pricing, it would be expected *a priori* that efficient banks are generally more profitable. Further, the quantity of mergers into or from a particular nation would not always be expected to result in firm-specific efficiency. However, these papers provide a valuable theoretical framework to consider MNB performance, in this case MNB efficiency. Williams (2003) also indicated that there was a need for further research that considered foreign bank efficiency.

3.3.1. Variables for second-stage regression

Home Country Effects.

Following the lead of Berger, et al. (2004) a vector of nation specific factors will be used to represent the traditional comparative advantage approach to cross-border investment. The first of these represent the trade and investment relationships between home and host nations. That banks follow their clients into the host nation is a persistent hypothesis in the MNB literature. This is sometimes termed the defensive expansion hypothesis (Brimmer and Dahl, 1975). As surveyed by Williams (2002) there is considerable evidence advanced to support this hypothesis in terms of bank size, while the evidence supporting this hypothesis in terms of bank profits is less clear-cut. As portfolio investment by foreign investors does not necessarily require a physical presence, while direct investment is more closely aligned with the need for a physical presence, direct investment (excluding portfolio investment) will be used to measure investments from the foreign bank's home nation into Australia. Other possible measures of defensive expansion such as trade measures and investment stocks as well as flows will also be considered. As the evidence has strongly supported the application of the defensive expansion hypothesis to foreign bank size, both internationally and in Australia, it is possible that foreign banks that follow their clients abroad benefit from increased size and thus, possibly, increased efficiency, but that this outcome is not reflected in reported profits.

Nations with higher GDP per capita have more efficient domestic financial systems and so are more likely to be able to export efficient practices, consistent with the previous discussion of parent bank profits. The export of these efficiencies provides a further example of comparative advantage. Further, Buch and DeLong (2004) and Berger, et al. (2004) argued that nations with higher levels of economic development as represented by GDP per capita are also more likely to acquire banks in other nations. They found that banks in nations with lower GDP per capita are more likely to be targets in cross-border mergers. It was concluded that banks from developed nations are more likely to act as acquirers in cross-border mergers and this was presumed to be due to their higher efficiency (Buch and DeLong, 2004). This study will determine if higher home market financial development (as measured by GDP per capita) results in higher efficiency in the host market.

Parent Bank Effects.

Individual firm-level variables were not employed by Berger, et al. (2004), thus inclusion of these variables offers a new perspective to this literature. While Williams (2003) did not find foreign bank profits in Australia to have a significant relationship with their parent profitability, Focarelli and Pozzolo (2001, p 2326) have argued that parent profitability acts as one possible measure of parent efficiency. Those banks operating multinationally possess skills and attributes that enable them to operate in the host market and so potentially overcome the liabilities of foreignness. If a foreign bank's parent is more efficient in the home market, this provides a possible source of a comparative advantage for the bank to apply in the host market and so increases its efficiency in the host market. It is possible that foreign bank parent efficiency, as measured by parent profitability, does not increase foreign bank profits in the host market, but does increase foreign bank efficiency. This study will use both Home Return on Assets (ROA) and Home Net Interest Margins (NIM) to measure parent profits.

Parent size has been found to have an important role in determining the size of foreign banks in the host nation (Cho, 1985; Ursacki and Vertinsky, 1992). However, little evidence has been found to suggest a relationship between parent size and profits in the host nation. Tschoegl (2004) has suggested that the largest bank in each nation is the most likely candidate for successful offshore expansion, while smaller banks have

reduced host nation success. This study will consider two measures of parent size, log of assets and log of equity, to determine if parent size impacts upon measured foreign bank efficiency in the host market. As it is possible that exchange rate effects impact upon the measurement of parent size, this study will translate the parent size measures into Australian dollars using two different exchange rates; (i) the average exchange rate for the relevant financial year; and (ii) the average exchange rate for the relevant balance month.

One possible advantage offsetting the liability of foreignness is experience in operating in the host market. Tschoegl (1982) suggested that experience has two dimensions; (i) generic experience of cross border operations and, (ii) specific experience of operating in the particular nation. However, the studies of Williams (1998a; and 1998b) found no evidence that experience in the host nation impacted upon either profits or size. It is possible that host nation experience impacts upon efficiency, while not affecting foreign bank profits or size. This study will measure experience in the host market as the number of years between the sample year and the year of first transaction based activity.[2]

Host Nation Effects.

As a further measure of comparative advantage theory, this study will also employ a measure of the barriers to entry facing foreign banks in Australia. Unlike the multicountry study of Berger, et al. (2004), in a single country study many of the variables used to represent host nation effects are a constant in each year. In order to overcome this problem Williams (2003) employed a measure of competitor market share. Competitor market share is a measure of the degree of host market competition confronting foreign banks in the host market. Competitor market share is specified as the market share of the four largest banks plus the market share of all other banks in the host market of the same nationality. Market share is defined in terms of assets. It is argued that the dominance of the Australian market by the four major banks (Big 4) acted as a barrier to entry with the large incumbent banks acting as local monopolists.

[2] Measures of generic international experience such as numbers of countries of operation and Euromarket activity tend to be highly correlated with parent size measures, Cho (1985); size measures are already included in this model.

Such dominance requires the foreign banks to be price competitive, and so reducing their observed profits. Further, consistent with the defensive expansion hypothesis that banks follow their clients abroad, the next most important level of competition faced by foreign banks is from those banks from the same nation also seeking the same client base as beachhead into the host nation (Fieleke, 1977), thus the competition offered by foreign banks of the same nationality is also relevant to measuring barriers to entry. It was found (Williams, 2003) that foreign banks profits were negatively related to competitor market share, however this may not necessarily also apply for efficiency. Such competition may result in increased efficiency in the host market, which due to the level of competitive pricing, particularly in the wholesale market, may not be reflected in higher foreign bank profit, despite higher efficiency. Foreign banks are particularly active in the wholesale market in Australia, thus, efficiency in a competitive market may not necessarily result in increased profits.

New Trade Theory.

In order to differentiate between new trade theory and comparative advantage theory this study will apply a number of measures that represent the degree of difference or similarity between Australia as the host nation and the foreign bank's home nation.

A dummy variable will be included to represent commonality of national language. Tschoegl (2004), Buch and DeLong (2004) and Berger, et al. (2004) have argued that if the home and host nation share a common language this can act as a measure of reduced cultural distance so reducing the liability of foreignness. Thus a dummy variable will be included for all foreign banks whose home nation has English as a primary language. Consistent with new trade theory it would be expected that this variable would have a positive sign.

Following Berger, et al. (2004) and also extending their measure of similarity of economies, three other measures representing economic and financial similarity will be used. As discussed above, home nation growth acts as a measure of opportunity cost in the Ricardian tradition; thus consistent with new trade theory, a measure of similarity of growth will be used as a contrasting measure. This measure will be specified as Home Nation real GDP Growth – Australian GDP growth. It would be

expected that this variable would have a negative relationship with foreign bank efficiency in the host nation.[3] Using the measures of economic similarity applied by Berger, et al. (2004) results in two additional measures, for GDP and GDP per capita. Similarity of GDP will have a range between 1 and 0, with 1 indicating identical GDPs. This will be measured as [1 – abs(Home real GDP – Real Australian GDP) / max(Home Real GDP, Australian GDP)].[4] Similarity of GDP per capita will be specified in the same manner. In each case new trade theory hypothesises a positive relationship between these two measures of similarity and foreign bank efficiency in the host nation.

3.3.2. Additional Control Variables

The limited form of the global advantage hypothesis considers that banks from some nations are able to overcome the liability of foreignness due to nation specific factors (Berger, et al., 2000). It is possible that the nation specific factors employed in this model do not capture all the dimensions of nation specific factors that allow a bank to overcome the liability of foreignness. Thus dummy variables for nationality will be included in the model to capture any exogenous nationality effects not otherwise controlled for and to allow comparison with the results of Williams (2003) and previous studies. It is also possible that the credit rating of the parent bank may reflect factors impacting upon efficiency in the host nation. Thus a measure reflecting the ranked credit rating of the parent bank will also be included in the analysis.[5]

As a result Equation (1) can be restated as:

---

[3] As this study employs annual data this specification involves the transformation of the home nation growth measure by a constant that represents annual Australian growth, thus it has a high correlation with home nation growth. Thus the opportunity cost approaches of Moshirian (2001) and Williams (2003) are also relevant. Williams (2003) suggested that a positive relationship for this variable could represent substitution between multinational and international banking.

[4] This formulation was first applied by DeYoung (1997) in the context of efficiency measures.

[5] The ranked credit rating will consider all banks rated as AAA as having a rank of 1, if there are 3 banks with a AAA rating, then the bank with the next lowest rating (Aa1) will be ranked 4, and so forth.

$$
\begin{aligned}
EFF_{i,t} = {} & \alpha + \beta_1 \text{Defensive Expansion}_{it} + \beta_2 \text{GDP per capita}_{it} \\
& + \varphi_1 \text{Parent Profits} + \varphi_2 \text{Parent Size}_{it} + \varphi_3 \text{Experience}_{it} \\
& + \lambda_1 \text{Competitor Market Share}_{it} \\
& + \gamma_1 \text{English Language Dummy}_i - \gamma_2 \text{GDP Growth Difference}_{it} + \gamma_3 \text{Similarity of GDP}_{it} \\
& + \gamma_4 \text{Similarity of GDP per capita}_{it} \\
& \pm \theta_1 \text{Nationality Dummy}_i \pm \theta_2 \text{Ranked Credit Rating}_{it} + \mu_{i,t}
\end{aligned}
$$

3.4. Model Estimation.

In this case the economic theory discussed above does not provide the researcher with a strong framework or prior evidence regarding factors determining foreign bank efficiency. The evidence discussed above was drawn mainly from the literature considering foreign bank size or profits, not efficiency. While this evidence provides a theoretical background to the choice of relevant variables, it does not directly address the research question posed in this paper. This issue will be dealt with by the application of the general to specific approach to model estimation (Hendry (1995) and extreme bounds analysis (Leamer, 1983; Levine and Renelt, 1992). These two approaches, while conceptually different, both address the question of determining a well-specified parsimonious model that represents the underlying data generating process. In each case theory is used as the basis to determine a general unrestricted model. The general to specific approach applies specification tests to generate a parsimonious model of the true underlying process. In the extreme bounds analysis, the sensitivity of each potential variable with respect to model specification is addressed. Those variables which are significant independent upon model specification are considered to be robust.

3.4.1. General to Specific Modelling.

The general to specific approach commences with the generalized model, which is drawn from the relevant theory and is considered to reflect the underlying characteristics of the variable(s) of interest. This model is then reduced in complexity by determining the significance of each individual variable and eliminating those variables that do not meet a pre-selected level of significance. The validity of this reduction is then checked to ensure that relevant variables are not being erroneously

removed. This process is continued until no further variables can be eliminated. The aim is to ensure that a congruent reduced form model is selected.[6]

3.4.2. Extreme Bounds Analysis and Model Uncertainty.

In extreme bounds analysis, as applied by e.g. Temple (1998), deHaan and Sturm (2000), Baxter and Kouparitsas (2004) and Sturm and deHaan (2005) in different settings, an equation of the following general form is estimated:

$$Y_{it} = \alpha M_{it} + \beta F_{it} + \gamma Z_{it} + u_{it}, \qquad (3)$$

where Y_{it} is the dependent variable, i.e. in this case measured foreign bank efficiency, M_{it} a vector of standard explanatory variables drawn from the literature, F_{it} the explanatory variable of interest, Z_{it} a vector of up to three (Levine and Renelt, 1992) possible additional explanatory variables, and u_{it} the usual error term.

This approach commences with a vector of explanatory variables that are always significant, a variable F is then added to the model and an additional vector, Z, of up to three additional variables are then added to the model. The vector Z is based upon economic theory as being suggested by theory as being related to Y, with, however, less conclusive empirical support than the vector M. The process of respecifying the vector Z continues until all possible combinations of the Z vector have been exhausted. From this process a vector of the estimated β coefficients and their associated standard errors are obtained. The lowest value minus twice its standard deviation is calculated, as is the highest value plus twice its estimated standard deviation. The extreme bounds test considers these to be the highest and lowest observed β. If these values encompass both positive and negative values then it is concluded that the variable F is not robustly related to Y (Levine and Renelt, 1992). As argued, however, by Temple (2000), it is rare for any model to dominate all alternatives in all dimensions. Sala-i-Martin (1997) argues that this approach sets too rigid a threshold and instead the distribution of the estimated β vector and its

[6] See Campos, et al. (2005)for a more thorough discussion, the general to specific approach is sometimes called the London School of Economics (LSE) approach.

associated standard deviation should be considered. It is suggested, instead, that if 90% of the estimated β coefficients are significantly different from zero at the five percent significance level, then the variable F should be considered as being strongly correlated with the dependent variable (Sturm and deHaan, 2005). Further, the cumulative distribution function of β should also be considered. As stated by Sala-i-Martin (1997), if a large percentage of the estimated β lie on one side of zero, it is more likely to be correlated with Y than a variable with a far smaller percentage of its estimated coefficients lying to one side of zero. Thus this paper will use the approach of Sala-i-Martin and report not only the extreme bounds for each parameter, but also the unweighted parameter estimate of the β and its unweighted standard deviation, as well as the unweighted cumulative distribution function and the percent of the estimated β significant at the five percent level.

Unlike the situation in Sala-i-Martin (1997), this study is not able to refer to a prior stream of research into the determinants of foreign bank efficiency to establish those variables that should comprise the M vector; this study is the first that these authors are aware that models the determinants of foreign bank efficiency. Thus the basic model will commence with an intercept only.

4. Sample

This study will consider banks operating in Australia between 1988 and 2001. The banks in the sample will be categorized as Big 4, Other Domestic and Foreign, following Sturm and Williams (2004). The primary data source is the bank's annual reports with additional details being obtained from the Reserve Bank of Australia (RBA) *Bulletin* and the Australian Prudential Regulation Authority (APRA). The foreign banks in this study will be subsidiary banks only, as data relating to foreign bank branches is not available.

Data for the second stage regressions were obtained from a number of sources. Details regarding foreign bank parents (parent size, profits and credit ratings) were obtained from Moody's *Credit Opinions: Financial Institutions*. Foreign bank home nation trade and investment data were obtained from the Australian Bureau of Statistics. The

parent nation data was sourced from the IMF's International Financial Statistics. All estimations for both the first and second stages are based upon the pooled sample.

The characteristics of the sample are listed in Table 2, while Table 3 has the descriptive statistics of the inputs and outputs to be used in the estimation of bank efficiency. All values in Table 3 are in thousands of Australian dollars, except for employee numbers. Table 3 shows the Foreign banks are proportionately more active in off balance sheet financing, the Other Domestic banks are proportionately more active in housing finance, unsurprisingly, the Big Four banks are the largest. It should be noted that some of the foreign banks have no housing loans. This is a strategic choice by these banks not to conduct this type of financing; and as such is a valid output decision. As this model is estimated in logarithmic form; 1 was added to all values to allow logarithms to be taken of all values.[7]

[INSERT TABLES 2 AND 3 ABOUT HERE]

5. Results

5.1 Stochastic frontier results

The results for the pooled estimation each of the models of bank efficiency are summarized in Table 4, with the correlations between the models also shown in Table 4. The results are consistent with Sturm and Williams (2004), in that the correlations between Models 1, 1a and 1b are highest, while the correlations with Model 2 are lower. The average estimated efficiency of between 80 per cent and 85 per cent is marginally higher than previously found, which would be accounted by the differences in technique (and the associated differences in assumptions regarding the error term) and small differences in sample.[8] The overall pattern of efficiency estimates are also similar to Sturm and Williams (2004).

---

[7] In the case of foreign banks, restructures of the Australian banks resulted in that bank being treated as a new bank, as in the case of the merger of Bank of Tokyo and Mitsubishi Bank in Japan to result in the establishment of Bank of Tokyo/Mitsubishi Australia.

[8] The sample employed in this study includes two additional observations for the Other Domestic Banks and 5 additional observations for the Foreign Banks.

What is also interesting about these results is that while on average the foreign banks are less efficient than the domestic banks over the entire sample period, a foreign bank represented the highest measured efficiency for each of the four models of efficiency, although not the same foreign bank for each model. This result would tend to support the limited global advantage hypothesis of Berger, et al. (2000). Further, it indicates that the variability within the sample of bank types does not result in noticeably lower efficiency for the foreign banks per se. The parent characteristics data is shown in Table 5.

[INSERT TABLES 4 AND 5 ABOUT HERE]

5.2 Second stage results

The results for the fully specified (generalized) model are shown in Table 6. These results are characterized by relatively few significant variables, thus indicating the need for further analysis to find a parsimonious reduced form model. The model has been estimated with the dummy variable representing UK ownership being omitted and represented by the constant. Further, the English Language dummy was collinear with a subset of the nation specific dummy variables. As Berger, et al. (2004) found that the United Kingdom and the United States had idiosyncratic nation-specific advantages as both importers and exporters of financial services, the English language dummy was omitted in order to be able to further consider the impact of these idiosyncrasies in the Australian case.

[INSERT TABLE 6 ABOUT HERE]

General to specific modelling was conducted first, using the critical value of 5%. Independently of these results, each variable is subjected to an extreme bounds analysis to check the sensitivity of its significance to different model specifications, i.e. 2324 alternative combinations of variables out of the Z vector were applied to determine the robustness of each variable to these alternative specifications. Due to the differences in technique and approach, the two different types of analysis produce some differences in results. In particular, the general to specific approach rejected competitor market share as part of the congruent reduced form model, while extreme

bounds analysis underlined its importance in explaining efficiencies as measured by Models 1, 1a and 1b. The results for the general to specific modeling and the extreme bounds analysis can be seen in Tables 7 and 8. In the extreme bounds analysis the cumulative distribution function is emphasized when determining the significance of a variable, with the critical value of 95% being used.

Home Nation Effects.

Consistent with Williams (2003), little evidence was found to support the following clients (defensive expansion) effect. In the case of Models 1 and 1b, the coefficient for Home Nation Investment Income is positive and significant. This variable is measured using the IMF's balance of payment conventions, in that a negative value represents a flow from the host nation (Australia) to the home nation. Given this measurement, as income flows from Australia to the home nation *reduce*, so foreign bank efficiency increases. Given that investment income flows are not necessarily correlated with investment flows in a given year, then it is unlikely that this reflects a client following effect. In the case of Model 2, as investment income from the host nation to the home nation increase, so the efficiency of the profit creation process increases. This would suggest that these investment income flows generate fee income for the foreign banks, potentially via transaction processing and foreign exchange services, which is profitable, but that offering services of this type for this purpose is not necessarily efficient in terms of physical inputs and outputs.

Previous Australian studies have found that following clients acts to increase size (Williams, 1998), but not profits (Williams, 2003). This difference may be explained by considering the results for the profit-based model of bank efficiency (Model 2), which found bank efficiency in profit creation is reduced by following clients as represented by Home Nation Capital Stock or Home Nation Capital Flow. Taken together with the results of previous studies, it can be concluded that following clients will increase size and some types of efficiency but not profits in the host nation.

Parent Bank Effects.

Parent bank profits, as measured by parent Return on Assets (and NIM in the extreme bounds analysis), were found to be efficiency reducing for Model 1b indicating that parent profitability does not translate into efficiency in the host market. In the case of

Model 1a, the retail model, the general to specific results supported the argument the experience in Australia increases the efficiency of foreign bank participation. This result is intuitive in the sense that retail banking is highly dependent upon distribution networks and increased time in Australia would reduce the costs associated with developing the required critical mass and brand name presence. No evidence was found to indicate that parent size has any effect on foreign bank efficiency in the host nation.

Host Nation Effects.

The extreme bounds analysis demonstrates the impact of barriers to entry for foreign banks, as Competitor Market Share 1 was found to be negative and significant for Models 1, 1a and 1b. A dummy variable indicating the Bank of Western Australia was not significant.[9] The Bank of Western Australia is the only foreign-owned bank in this study representing the acquisition of a domestic retail bank by a foreign bank.[10] Thus, these results indicate that for the foreign banks the large market share of the incumbent Big Four banks acted as a significant barrier to entry, reducing foreign bank efficiency, consistent with Williams (2003) for foreign bank profits. Thus the foreign banks wishing to compete with the incumbent banks operated at a less efficient level, indicating the over-use of inputs in order to compete, so reducing efficiency. It is worth noting that these effects had no impact upon the efficiency of profit creation.

New Trade Theory.

The results for variables representing New Trade theory are somewhat mixed. The relevant variables were found to be significant only in Model 1a. The signs of the significant variables are also not strongly supportive of New Trade Theory. Extreme bounds analysis found real growth differences to robustly reduce efficiency in the host

[9] As the only foreign bank in the study representing a takeover of a domestic bank and the only retail focussed foreign bank, a dummy variable was included for this bank to determine if these idiosyncratic differences have any impact upon efficiency.

[10] The acquisition of United Permanent Building Society by the National Mutual Royal Bank (a joint venture involving the Royal Bank of Canada) is included in the sample.

market. Given that this study applies annual data for a single host nation, the calculation of this variable effectively involves the transformation of the home nation growth measure by an annual constant representing host nation growth. Thus this variable is unsurprisingly highly correlated with home nation growth. The positive coefficient found is more supportive of the substitution argument of Williams (2003), in that as the home nation grows international banking (offshore activity conducted from the home market) is substituted for multinational banking (offshore activity conducted offshore). This argument is more consistent with the traditional Ricardian comparative advantage approach. Similarly the general to specific model results for the index of comparative size are more supportive of comparative advantage theory than New Trade Theory, with a negative relationship found suggesting that as difference increase so too efficiency increases. In contrast, the measure of comparative economic development is supportive of New Trade Theory. This mixed result is similar to Berger, et al. (2004) who found that both comparative advantage theory and new trade theory both had a role to play in the determination of cross border mergers. These results support a similar outcome, but in a less conclusive manner, with the results more strongly supporting the comparative advantage approach. Given that this study is considering foreign bank efficiency in the host nation, this difference in subject matter may explain the differences in results. However, Berger, et al. (2004) considered New Trade Theory in a multi country multi year study. This study considers foreign banks efficiency in a single nation study. Before the application of New Trade Theory to foreign bank efficiency in the host nation can be rejected it will be appropriate to conduct a multi host nation, multi year study.

Control Variables.

In the general to specific model United Kingdom ownership was represented by the constant, which was consistently significant and positive. This result was not confirmed by the extreme bounds analysis, the dummy variable representing United Kingdom ownership marginally significant (at the ninety percent level in two cases). Thus, this result for United Kingdom ownership provides some weak support for the

limited form of the global advantage hypothesis of Berger, et al. (2000)[11]. However, this result does differ from Berger, et al. (2000) in that no evidence is found of banks from the United States displaying higher efficiency. Instead, this study finds that banks from the United States are generally less efficient than the sample of foreign banks operating in Australia employed in this study. Some evidence was found that Swiss banks are also less efficient in their operations in Australia, but this result represent two years of operations for one bank (N.M. Rothschilds) and could represent start up effects.

A dummy variable representing ING Bank was found to have a significant negative relationship with efficiency as measured by Model 2 (as ING is the only bank from the Netherlands in the study, a Netherlands dummy is effectively a dummy for ING Bank). This was found by both the general to specific model and the extreme bounds analysis. ING bank proves largely an internet-based banking service, with the sample data for ING covering 2000 and 2001. This result indicates that a strategy focused upon internet delivery does not improve the efficiency of profit creation, especially during the initial phases of internet operation. Again, this is most likely due to the initial start up costs associated with establishing an internet-based presence in a foreign market.

6. Conclusions

This study has applied parametric distance functions to estimate the efficiency of foreign banks in Australia, and then employed general to specific modelling and extreme bounds analysis to determine a robust model of foreign bank efficiency. The limited global advantage hypothesis of Berger, et al. (2000) is supported by this study, with banks from the United Kingdom being found to be more efficient than other foreign banks. Interestingly, banks from the United States were found to be significantly less efficient. It is found that following clients does not improve the

[11] While Merrett (1990) found banks from the UK underperformed Australian banks, that study was based upon pre-deregulation data, particularly the nineteenth century. As discussed by Pauly (1987), deregulation resulted in a major restructure of foreign bank operations in Australia. Further, Beccalli (2004) found UK investment firms to be on average more efficient in Italy.

efficiency of transforming inputs into outputs. However, following clients (defensive expansion) reduces the efficiency of the process of profit creation in the host nation. This result provide at least a partial explanation for the conclusion of Williams (2002) that following clients increases size but not profits. It was also found that the processing of investment income flows from the home nation reduces the efficiency of transformation of physical inputs into physical outputs, but that this processing improves the efficiency of revenue creation. The market share of competitor banks, particularly the incumbent Big Four banks, acts as a barrier to entry to the Australian market resulting in reduced efficiency due to the need to over-use inputs in order to compete with the dominant banks. However, internet banking seems to reduce the efficiency of the profit creation process and so this approach does not, in this case, offer the reduction in barriers to entry initially anticipated, at least in the startup phases. Weak and mixed evidence was found to support the application of new trade theory to a model of determinants of foreign bank efficiency; however, more study in a multi-country framework is necessary before this can be considered conclusive.

References

Allen, Linda, and Anoop Rai, 1996, Operational efficiency in banking: An international comparison, *Journal of Banking and Finance* 20, 655-672.

Avkiran, Necmi Kemal, 1999, The evidence on efficiency gains: The role of mergers and the benefits to the public, *Journal of Banking and Finance* 23, 991-1013.

Avkiran, Necmi Kemal, 2000, Rising productivity of Australian trading banks under deregulation 1986-1995, *Journal of Economics and Finance* 24, 122-140.

Battese, George, and Tim Coelli, 1993, A stochastic frontier production function incorporating a model for technical efficiency effects, Working papers in Econometrics and Applied Statistics (Armidale).

Battese, George, and G Corra, 1977, Estimation of a production frontier model: With application to the pastoral zone of Eastern Australia, *Australian Journal of Agricultural Economics* 21, 169-179.

Baxter, Marianne, and Michael Kouparitsas, 2004, Determinants of Business Cycle Comovement a Robust Analysis, NBER Working Paper (Cambridge).

Beccalli, Elena, 2004, Cross-country comparisons of efficiency: evidence from the UK and Italian investment firms, *Journal of Banking and Finance* 28, 1363-1383.

Berger, Allen N., Claudia M. Buch, Gayle DeLong, and Robert DeYoung, 2004, Exporting financial institutions management via foreign direct investment mergers and acquisitions, *Journal of International Money and Finance* 23, 333-366.

Berger, Allen N., Robert DeYoung, Hesna Genay, and Gregory F. Udell, 2000, Globalisation of financial institutions: Evidence from cross-border banking performance, *Brookings-Wharton Papers on Financial Service* 3, 23-120.

Berger, Allen N., and David B. Humphrey, 1992, Measurement and Efficiency Issues in Comercial Banking, in Zvwi Griliches, ed.: *Output measurement in the service sector* (University of Chicago Press, Chicago).

Berger, Allen N., William C. Hunter, and Stephen G. Timme, 1993, The efficiency of financial institutions: A review and preview of research past, present, and future, *Journal of Banking and Finance* 17, 221-249.

Berger, Allen N., and Loretta J. Mester, 1997, Inside the black box: What explains differences in the efficiencies of financial institutions, *Journal of Banking and Finance* 21, 895-947.

Brimmer, Andrew F., and Frederick R. Dahl, 1975, Growth of American International Banking: Implications for Public Policy, *The Journal of Finance* 30, 341-361.

Buch, Claudia, 2003, Information or regulation: What drives the international activities of commercial banks?, *Journal of Money, Credit and Banking* 35, 851-869.

Buch, Claudia M., and Gayle L. DeLong, 2004, Cross-Border Bank Mergers: What Lures the Rare Animal?, *Journal of Banking and Finance* 28, 2077-2102.

Buckley, Peter J., 1988, The limits of explanation: testing the internalization theory of the multinational enterprise, *Journal of Business Studies* 19, 181-193.

Campos, Julia, Neil Ericsson, and David Hendry, 2005, General to specific modeling: An overview and select bibliography, Board of Governors of the Federal Reserve System International Finance Disucssion Papers.

Casson, Mark, 1990, Evolution of multinational banks: A theoretical perspective, in G Jones, ed.: *Banks as Multinationals* (Routledge, London).

Chang, C. Edward, Iftekhar Hasan, and William Hunter, 1998, Efficiency of multinational banks: an empirical investigation, *Applied Financial Economics* 8, 689-696.

Cho, Kang-Rae, 1985. *Multinational banks; Their identities and determinants* (UMI Research Press).

Coelli, Tim, and Sergio Perelman, 1999, A comparison of parametric and non-parametric distance functions: with application to European railways, *European Journal of Operational Research* 117, 326-339.

deHaan, Jakob, and Jan-Egbert Sturm, 2000, On the relationship between economic freedom and economic growth, *European Journal of Political Economy* 16, 215-241.

DeYoung, Robert, 1997, Bank mergers, x-efficiency and the market for corporate control, *Managerial Finance* 23, 32-47.

DeYoung, Robert, and Daniel Nolle, 1996, Foreign-owned banks in the United States: Earning market share or buying it?, *Journal of Money, Credit and Banking* 28, 622-636.

Dietsch, Michel, and Ana Lozano-Vivas, 2000, How the environment determines banking efficiency: a comparison between French and Spanish industries, *Journal of Banking and Finance* 24, 985-1004.

Dunning, John H., 1977. *Trade, location of economic activity and the MNE: a search for an eclectic approach* (The Macmillan Press Ltd.).

Dunning, John H., 1988, The eclectic paradigm of international production: a restatement and some possible extensions, *Journal of International Business Studies* 19, 1-31.

Fieleke, Norman S., 1977, The growth of US banking abroad: an analytical survey, Key issues in international banking.

Focarelli, Dario, and Alberto Franco Pozzolo, 2001, The patterns of cross-border bank mergers and shareholdings in OECD countries, *Journal of Banking and Finance* 25, 2305-2337.

Hasan, Iftekhar, and William Curt Hunter, 1996, Efficiency of Japanese multinational banks in the United States, *Research in Finance* 14, 157-173.

Hendry, David, 1995. *Dynamic Econometrics* (Oxford University Press, Oxford).

Leamer, Edward, 1983, Lets take the con out of econometrics, *American Economic Review* 73, 31-43.

Levine, Ross, and David Renelt, 1992, A sensitivity analysis of cross-country growth regressions, *American Economic Review* 82, 942-963.

Mahajan, Arvind, Nanda Rangan, and Asghar Zardkoohi, 1996, Cost structures in multinational and domestic banking, *Journal of Banking and Finance* 10, 283-306.

Markusen, James, 1995, The boundaries of multinational enterprises and the theory of international trade, *Journal of Economic Perspectives* 9, 169-189.

Markusen, James, and Anthony Venables, 1996, The increased importance of direct investment in North Atlantic economic relationships: a convergence hypothesis, in M Canzoneri, W Ethier, and CV Grilli, eds.: *New Transatlantic Economy* (Cambridge, London).

Merrett, David, 1990, Paradise lost? British banks in Australia, in Geoffrey Jones, ed.: *Banks as Multinationals* (Routledge, London and New York).

Miller, Stewart R., and Arvind Parkhe, 2002, Is there a liability of foreignness in global banking? An empirical test of banks' X-efficiency, *Strategic Management Journal* 23, 55-76.

Miller, Stewart R., and Arvind Parkhe, 2002, Is there a liability of foreignness in global banking? An empirical test of banks' X-Efficiency, *Strategic Management Journal* 23, 55-75.

Pauly, L, 1987. *Foreign Banks in Australia: The politics of Deregulation* (Australian Professional Publications, Sydney).

Sala-i-Martin, Xavier, 1997, I just ran two million regressions, *American Economic Review* 87, 178-183.

Sathye, Milind, 2001, X-efficiency in Australian banking: An empirical investigation, *Journal of Banking and Finance* 25, 613-630.

Sturm, Jan-Egbert, and Jakob deHaan, 2005, Determinants of long-term growth: New results applying robust estimation and extreme bounds analysis, *Empirical Economics* 30, 597-617.

Sturm, Jan-Egbert, and Barry Williams, 2004, Foreign banks entry, deregulation and bank efficiency: Lessons from the Australian experience, *Journal of Banking and Finance* 28, 1775-1799.

Temple, Jonathan, 1998, Robustness of the Augmented Solow Model, *Journal of Applied Econometrics* 13, 361-375.

Temple, Jonathan, 2000, Growth regressions and what the textbooks don't tell you, *Bulletin of Economic Research* 52, 181-205.

Tschoegl, Adrian E., 1982, Foreign bank entry into Japan and California, in Alan M. Rugman, ed.: *New theories of the multinational enterprise* (Croom Helm).

Tschoegl, Adrian E., 2004, Who owns the major US subsidiaries of foreign banks? A note, *International Financial Markets Institutions and Money* 14, 255-266.

Ursacki, Terry, and Ilan Vertinsky, 1992, Choice of entry timing and scale by foreign banks in Japan and Korea, *Journal of Banking and Finance* 16, 405-421.

Williams, Barry, 1997, Positive theories of multinational banking: Eclectic theory versus Internalisation theory, *Journal of Economic Surveys* 11, 71-100.

Williams, Barry, 1998, Factors affecting the performance of foreign-owned banks in Australia: A cross-sectional study, *Journal of Banking and Finance* 22, 197-219.

Williams, Barry, 1998, A pooled study of the profits and size of foreign banks in Australia, *Journal of Multinational Financial Management* 8, 211-231.

Williams, Barry, 2002, The defensive expansion approach to multinational banking: Evidence to date, *Financial Markets, Institutions & Instruments* 11, 127-203.

Williams, Barry, 2003, Domestic and international determinants of bank profits: Foreign banks in Australia, *Journal of Banking and Finance* 27, 1185-1210.

Table 1: Summary of Models Employed:

	Inputs	Outputs
Model 1	(i) employees, (ii) deposits and borrowed funds, (iii) equity capital.	(i) loans, (ii) off balance sheet activity.
Model 1a (retail model)	(i) employees, (ii) deposits, (iii) equity capital.	(i) loans less housing loans, (ii) housing loans, (iii) off balance sheet activity.
Model 1b (wholesale model)	(i) employees, (ii) deposits, (iii) equity capital.	(i) loans, (ii) investments, (iii) off balance sheet activity.
Model 2 (revenue model)	(i) interest expenses, (ii) non-interest expenses.	(i) net interest income, (ii) non-interest income.

Table 2: Sample Characteristics.

	Model 1				Model 1a				Model 1b				Model 2			
	Big4	Other Domestic	Foreign	Total	Big4	Other Domestic	Foreign	Total	Big4	Other Domestic	Foreign	Total	Big4	Other Domestic	Foreign	Total
1988	2	3	13	18	2	1	3	6	2	3	13	18	4	8	7	19
1989	3	8	15	26	3	4	12	19	3	8	15	26	4	9	8	21
1990	3	8	13	24	3	8	13	24	3	8	13	24	4	10	7	21
1991	4	9	13	26	4	9	13	26	4	9	13	26	4	10	7	21
1992	4	9	12	25	4	9	12	25	4	9	12	25	4	10	7	21
1993	4	9	11	24	4	9	11	24	4	9	11	24	4	12	7	23
1994	4	10	11	25	4	10	11	25	4	10	11	25	4	10	7	21
1995	4	10	9	23	4	10	9	23	4	10	9	23	4	11	5	20
1996	4	10	6	20	4	10	6	20	4	10	6	20	4	11	4	19
1997	4	7	6	17	4	7	6	17	4	7	6	17	4	8	4	16
1998	4	5	4	13	4	5	4	13	4	5	4	13	4	9	5	18
1999	4	5	5	14	4	5	5	14	4	5	5	14	4	7	6	17
2000	4	5	4	13	4	5	4	13	4	5	4	13	4	8	7	19
2001	4	5	3	12	4	5	3	12	4	5	3	12	4	8	4	16

Model 1: Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans, (ii) off balance sheet activity. Model 1a: Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans less housing loans, (ii) housing loans (iii) off balance sheet activity. Model 1b Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans, (ii) investments, (iii) off balance sheet activity. Model 2: Inputs: (i) interest expenses, (ii) non-interest expenses. Outputs: (i) net interest income, (ii) non-interest income.

Table 3: Descriptive Statistics.

All values in $A,000 except Employees.

Panel A: All banks					
Series	Obs	Mean	Std. Error	Minimum	Maximum
Deposits	334	16,627,473	31,670,293	2,607	191,000,000
Employees	341	7,497	14,146	43	50,366
Housing loans	361	4,080,611	7,811,910	0	47,679,000
Loans	334	17,246,386	33,448,542	188,471	208,000,000
Non-interest income	321	494,091	961,216	1,678	6,522,999
Off balance sheet activity	304	7,925,736	17,324,183	0	96,141,000
Equity capital	364	1,699,438	3,484,645	21,999	23,556,999
Interest income	324	2,030,574	3,564,893	31,235	19,918,999
Interest expense	322	1,324,700	2,272,543	6,150	12,958,999
Investments	334	3,599,697	6,158,195	2,700	45,165,999
Non-interest expense	283	872,726	1,440,134	8,131	8,348,999

Panel B: Big four banks:					
Series	Obs	Mean	Std. Error	Minimum	Maximum
Deposits	56	78,631,183	34,541,815	27,577,499	191,000,000
Employees	56	38,552	6,608	22,500	50,366
Housing loans	56	18,759,232	9,994,634	4,370,841	47,679,000
Loans	56	81,615,712	38,934,619	26,445,398	208,000,000
Non-interest income	56	2,124,322	1,125,816	626,499	6,522,999
Off balance sheet activity	52	41,359,625	19,934,037	5,510,000	96,141,000
Equity capital	56	8,674,520	4,393,153	2,491,899	23,556,999
Interest income	56	9,281,054	2,835,641	4,902,799	19,918,999
Interest expense	56	5,834,337	2,030,585	3,103,399	12,958,999
Investments	56	14,866,742	6,556,399	6,403,099	45,165,999
Non-interest expense	56	3,450,101	1,160,910	1,799,699	8,348,999

Panel C: Other domestic banks					
Series	Obs	Mean	Std. Error	Minimum	Maximum
Deposits	134	6,803,024	7,403,338	267,770	37,853,918
Employees	134	2,242	2,368	45	11,495
Housing loans	139	2,544,646	3,461,435	0	20,300,100
Loans	134	6,655,576	7,763,194	188,471	39,698,998
Non-interest income	133	233,326	565,918	1,678	4,331,999
Off balance sheet activity	119	1,392,368	1,877,616	0	9,826,000
Equity capital	157	597,805	815,295	21,999	3,858,999
Interest income	133	763,401	764,347	46,361	3,310,999
Interest expense	133	538,757	550,861	6,150	2,457,599
Investments	134	1,932,073	3,369,209	54,484	29,246,999
Non-interest expense	131	334,516	574,008	22,322	4,260,999

Panel D: Foreign banks					
Series	Obs	Mean	Std. Error	Minimum	Maximum
Deposits	144	1,657,115	2,037,772	2,607	12,322,799
Employees	151	644	788	43	3,311
Housing loans	166	414,926	1,093,813	0	6,386,400
Loans	144	2,069,206	2,564,837	295,810	16,633,098
Non-interest income	132	65,217	107,813	2,121	580,545
Off balance sheet activity	133	699,486	893,698	5,772	5,086,258
Equity capital	151	258,060	304,297	21,999	1,576,768
Interest income	135	271,368	276,123	31,235	1,344,199
Interest expense	133	211,849	198,942	21,494	947,099
Investments	144	769,886	914,925	2,700	5,051,665
Non-interest expense	96	103,689	111,618	8,131	568,217

Table 4: Average efficiency scores.

All Banks.

Series	Obs	Mean	Std.Error	Minimum	Maximum
Model 1	280	0.83	0.12	0.24	0.96
Model 1a	261	0.83	0.09	0.51	0.96
Model 1b	280	0.86	0.08	0.51	0.97
Model 2	272	0.87	0.10	0.16	0.97

Correlation between efficiency scores: All Banks.

Observations \ Correlation	Model 1	Model 1a	Model 1b	Model 2
Model 1	280	0.70	0.63	-0.03
Model 1a	261	261	0.61	-0.01
Model 1b	280	261	280	-0.08
Model 2	232	221	232	272

Foreign Banks.

Series	Obs	Mean	Std.Error	Minimum	Maximum
Model 1	125	0.80	0.17	0.24	0.96
Model 1a	112	0.83	0.11	0.51	0.96
Model 1b	125	0.85	0.10	0.51	0.97
Model 2	85	0.85	0.13	0.16	0.97

Correlation between efficiency scores: Foreign Banks.

Observations \ Correlation	Model 1	Model 1a	Model 1b	Model 2
Model 1	125	0.74	0.68	-0.15
Model 1a	112	112	0.64	-0.16
Model 1b	125	112	125	-0.17
Model 2	78	73	78	85

Model 1: Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans, (ii) off balance sheet activity.
Model 1a: Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans less housing loans, (ii) housing loans (iii) off balance sheet activity.
Model 1b Inputs: (i) employees, (ii) deposits, (iii) equity capital. Outputs: (i) loans, (ii) investments, (iii) off balance sheet activity.
Model 2: Inputs: (i) interest expenses, (ii) non-interest expenses. Outputs: (i) net interest income, (ii) non-interest income.

Table 5.

Descriptive statistics: Parent Characteristics.

Series	Obs	Mean	Std.Error	Minimum	Maximum
Efficiency Model 1	125	0.80	0.17	0.24	0.96
Efficiency Model 1a	112	0.83	0.11	0.51	0.96
Efficiency Model 1b	125	0.85	0.10	0.51	0.97
Efficiency Model 2	85	0.85	0.13	0.16	0.97
Home Country					
Home Nation Investment Income	127	-0.43	1.74	-3.53	2.34
Trade with Australia as a share of GDP	129	0.03	0.02	0.00	0.06
Home nation capital flow	128	1.28	1.27	-0.67	6.05
Home nation capital stock	129	21.87	12.70	0.75	57.06
Log (Home Nation GDP per capita)	132	10.30	0.50	7.89	11.10
Parent Bank					
Home Return on Assets	132	0.63	0.62	-1.66	3.02
Home Net Interest Margin	121	2.52	1.37	-1.62	4.93
Log(Home Assets) (Avg. Annual Ex Rate)	132	12.13	1.04	9.04	14.04
Log(Home Capital) (Avg. Annual Ex. Rate)	127	9.44	1.10	6.79	12.71
Experience in Aust.	132	19.50	16.93	0.00	66.00
Host Nation					
Competitor Market share	132	0.58	0.08	0.46	0.71
New Trade Theory					
Dummy English Language	132	0.58	0.49	0.00	1.00
Real growth differential to Australia	132	-0.30	2.61	-6.37	9.06
Index of comparative economic size	132	0.19	0.17	0.02	1.00
Index of comparative economic development.	132	0.76	0.18	0.08	1.00
Control					
Ranked Home Credit Rating	109	97.38	54.74	16.00	183.50
Dummy Canada	132	0.02	0.12	0.00	1.00
Dummy Germany	132	0.05	0.21	0.00	1.00
Dummy Hong Kong	132	0.01	0.09	0.00	1.00
Dummy Japan	132	0.26	0.44	0.00	1.00
Dummy Jordan	132	0.02	0.15	0.00	1.00
Dummy Singapore	132	0.05	0.21	0.00	1.00
Dummy Switzerland	132	0.02	0.15	0.00	1.00
Dummy UK	132	0.32	0.47	0.00	1.00
Dummy USA	132	0.25	0.43	0.00	1.00
Dummy Bank WA	132	0.06	0.24	0.00	1.00
Dummy ING = Dummy Netherlands	132	0.02	0.12	0.00	1.00

Table 6

Fully Specified Model.

(t-statistics in parentheses).

Dependent Variable: Efficiency Score for each model.

Variable	Model 1	Model 1a	Model 1b	Model 2
Constant	0.5971	4.1691	0.0306	-8.1585
	(0.25)	(1.29)	(0.02)	(1.63)
Home Country				
Home Nation Investment Income	0.0182	-0.0006	0.0109	-0.0649
	(1.44)	(0.04)	(0.96)	(3.25) ***
Trade with Australia as a share of GDP	1.3129	5.4204	-0.3458	19.7568
	(0.20)	(0.75)	(0.06)	(2.00) **
Home Nation Capital Flow	0.0224	0.0101	0.0173	-0.0275
	(2.09) **	(0.93)	(1.79)	(1.75)
Home Nation Capital Stock	-0.0054	-0.0036	-0.0031	-0.0187
	(1.24)	(0.74)	(0.84)	(2.60) **
Log (Home Nation GDP per capita)	0.0225	-0.3869	0.1233	0.5231
	(0.10)	(1.23)	(0.77)	(1.10)
Parent Bank				
Home Return on Assets	-0.0548	-0.0647	-0.0377	0.0594
	(1.69)	(1.86)	(1.31)	(1.11)
Home Net Interest Margin	0.0583	0.0460	-0.0139	-0.0011
	(1.51)	(1.21)	(0.46)	(0.02)
Log (Home Assets)	-0.0022	0.0174	-0.0243	0.2586
(Avg. Annual Exchange Rate)	(0.04)	(0.34)	(0.58)	(3.25) ***
Experience in Australia	0.0144	0.0327	-0.0008	-0.0315
	(1.11)	(1.85)	(0.21)	(1.27)
Host Nation				
Competitor Market Share	-0.1629	-0.1324	0.1608	-0.7001
	(0.51)	(0.41)	(0.56)	(1.29)
New Trade Theory				
Real Growth differential to Australia	0.0021	0.0025	0.0011	-0.0118
	(0.36)	(0.41)	(0.21)	(1.22)
Index of comparative economic size	-1.7504	-3.0270	-1.1821	4.3424
	(1.77)	(2.27) **	(1.57)	(2.07) **
Index of comparative economic	0.3185	0.4908	0.3564	0.8478
Development	(1.20)	(1.79)	(1.55)	(1.98)
Control				
Ranked Home credit rating	0.0000	0.0001	0.0001	-0.0004
	(0.07)	(0.12)	(0.33)	(0.59)
Dummy Canada	0.6928	1.5273	0.2784	-2.1296
	(0.69)	(0.96)	(0.84)	(1.00)
Dummy Germany	0.0502	0.3985	-0.1934	
	(0.06)	(0.27)	(0.79)	
Dummy Japan	-0.1380	-0.1443	-0.2863	-0.8204
	(0.21)	(0.15)	(0.90)	(0.56)
Dummy Singapore	-0.3774	0.1490	-0.4230	
	(0.41)	(0.10)	(1.55)	
Dummy USA	-0.5986	-0.6821	-0.3993	0.4757
	(1.01)	(0.73)	(1.49)	(0.36)
Dummy Bank WA	0.5444	1.0231	0.0256	-0.6595
	(0.57)	(0.67)	(0.11)	(0.32)
Dummy ING = Dummy Netherlands	1.0302	2.5352	0.5097	-4.1877
	(0.84)	(1.37)	(0.80)	(1.59)

* = significant at 10% level, ** = significant at 5% level and *** = significant at 1% level.

The Dummy variable representing UK banks is omitted and represented by the constant.

Relevant data for the parent bank of Arab Bank (Australia) and Rothschilds (Australia) was not available, and some relevant data for Hong Kong was also not available, so these banks were omitted from the second stage regressions.

Table 7

General to specific model.

(t-statistics in parentheses)

Dependent Variable: Efficiency Score for each model.

	Model 1	Model 1a	Model 1b	Model 2
Constant	0.8616	3.4480	0.8962	1.0182
	(21.09) ***	(4.25) ***	(42.31) ***	(15.02) ***
Home Country				
Home Nation Investment Income	0.0301		0.0147	-0.0430
	(5.21) ***		(3.39) ***	(-3.94) ***
Home nation capital stock				-0.0082
				(-3.32) ***
Log (home Nation GDP per capita)		-0.2808		
		(-3.49) ***		
Parent Bank				
Home Return on Assets		-0.0509	-0.0280	
		(-3.24) ***	(-2.14) **	
Experience in Aust.		0.0191		
		(3.30) ***		
Host nation				
New Trade Theory				
Index of comparative economic size		-1.5072		
		(-3.67) ***		
Index of comparative economic		0.4360		
Development		(3.18) ***		
Control				
Dummy Switzerland	-0.3616			
	(-2.26) **			
Dummy USA	-0.1895		-0.0971	
	(-2.41) **		(-2.57) **	
Dummy ING				-0.3855
				(-2.22) **

Table 8

Extreme Bounds Analysis.

Dependent Variable: Efficiency Score for each model.

Model 1.

	Lower Extreme Value	Upper Extreme Value	Percent Significant at 5% level	Cum.Distr.Function (0)	Average Coefficient	Average Standard Deviation
Home Country						
Home Nation Investment Income	-0.004	0.056	98.54	1.00	0.028	0.007
Trade with Australian as a share of GDP	-18.286	9.942	8.65	0.80	-2.621	2.459
Home nation capital flow	-0.028	0.048	2.15	0.73	0.007	0.010
Home nation capital stock	-0.015	0.008	65.58	0.90	-0.004	0.002
Log (Home GDP per capita)	-0.446	0.365	69.28	0.93	-0.118	0.050
Parent Bank						
Home Return on Assets	-0.164	0.036	79.65	0.98	-0.051	0.020
Home Net Interest Margin	-0.104	0.105	19.45	0.83	-0.026	0.021
Log (Home Assets) (Avg. Annual Exchange Rate)	-0.126	0.152	10.84	0.59	-0.009	0.025
Experience in Aust.	-0.018	0.022	48.15	0.83	-0.005	0.003
Host Nation						
Competitor Market Share	-1.386	0.399	88.25	0.99	-0.609	0.167
New Trade Theory						
Real growth differential to Australia	-0.020	0.024	24.14	0.81	0.006	0.005
Index of comparative economic size	-2.623	0.715	24.48	0.93	-0.446	0.273
Index of comparative economic development.	-0.512	0.875	1.16	0.56	0.029	0.124
Control						
Ranked Home Credit Rating	-0.001	0.001	0.73	0.54	0.000	0.000
Dummy Canada	-0.660	1.451	0.00	0.77	0.151	0.200
Dummy Germany	-0.847	1.088	0.00	0.72	0.103	0.189
Dummy Hong Kong	-0.996	0.797	0.00	0.63	-0.073	0.162
Dummy Japan	-0.681	1.022	3.01	0.77	0.094	0.112
Dummy Jordan	-1.524	1.118	0.56	0.54	0.007	0.118
Dummy Singapore	-1.256	0.857	0.22	0.52	-0.029	0.193
Dummy Switzerland	-1.078	1.110	19.66	0.84	-0.237	0.178
Dummy UK	-0.379	0.705	9.90	0.88	0.128	0.100
Dummy USA	-0.902	0.598	42.00	0.94	-0.171	0.101
Dummy Bank WA	-0.946	1.213	0.04	0.79	0.154	0.190
Dummy ING = Dummy Netherlands	-1.070	2.099	0.04	0.73	-0.109	0.212

Model 1a

	Lower Extreme Value	Upper Extreme Value	Percent Significant at 5% level	Cum.Distr.Function (0)	Average Coefficient	Average Standard Deviation
Home Country						
Home Nation Investment Income	-0.029	0.043	46.82	0.89	0.010	0.006
Trade with Australian as a share of GDP	-17.083	11.468	1.98	0.87	-2.440	1.965
Home nation capital flow	-0.021	0.042	4.86	0.88	0.011	0.009
Home nation capital stock	-0.008	0.010	0.60	0.57	0.000	0.001
Log (Home GDP per capita)	-0.835	0.340	69.58	0.96	-0.099	0.045
Parent Bank						
Home Return on Assets	-0.131	0.030	71.51	0.97	-0.039	0.018
Home Net Interest Margin	-0.097	0.064	8.30	0.82	-0.020	0.017
Log (Home Assets) (Avg. Annual Exchange Rate)	-0.089	0.150	1.12	0.60	0.006	0.019
Experience in Aust.	-0.014	0.047	2.45	0.63	0.000	0.002
Host Nation						
Competitor Market Share	-1.273	0.266	89.59	0.99	-0.450	0.165
New Trade Theory						
Real growth differential to Australia	-0.012	0.023	55.77	0.94	0.008	0.004
Index of comparative economic size	-3.962	0.707	1.12	0.65	-0.106	0.183
Index of comparative economic development.	-0.194	1.081	61.88	0.96	0.242	0.106
Control						
Ranked Home Credit Rating	-0.001	0.001	0.60	0.60	0.000	0.000
Dummy Canada	-0.900	1.756	0.00	0.80	0.098	0.121
Dummy Germany	-1.011	1.463	0.00	0.82	0.089	0.108
Dummy Hong Kong	-1.347	1.152	0.00	0.74	-0.090	0.105
Dummy Japan	-0.688	0.785	0.04	0.66	-0.022	0.067
Dummy Jordan	-2.055	1.381	6.50	0.65	0.049	0.071
Dummy Singapore	-1.187	1.273	0.00	0.52	-0.002	0.115
Dummy Switzerland	-1.451	1.492	8.22	0.78	-0.093	0.107
Dummy UK	-0.687	0.632	4.30	0.81	0.048	0.057
Dummy USA	-0.892	0.549	7.83	0.82	-0.052	0.059
Dummy Bank WA	-0.845	1.602	9.08	0.86	0.108	0.106
Dummy ING = Dummy Netherlands	-1.135	2.189	0.00	0.55	-0.015	0.131

Model 1b

	Lower Extreme Value	Upper Extreme Value	Percent Significant at 5% level	Cum.Distr.Function (0)	Average Coefficient	Average Standard Deviation
Home Country						
Home Nation Investment Income	-0.004	0.036	98.67	1.00	0.017	0.005
Trade with Australian as a share of GDP	-9.983	9.238	2.32	0.72	-0.921	1.270
Home nation capital flow	-0.020	0.032	0.90	0.67	0.003	0.007
Home nation capital stock	-0.009	0.005	60.15	0.92	-0.002	0.001
Log (Home GDP per capita)	-0.257	0.246	33.82	0.88	-0.053	0.033
Parent Bank						
Home Return on Assets	-0.117	0.015	95.31	0.99	-0.042	0.014
Home Net Interest Margin	-0.105	0.032	77.11	0.97	-0.035	0.014
Log (Home Assets) (Avg. Annual Exchange Rate)	-0.079	0.086	0.99	0.53	-0.002	0.016
Experience in Aust.	-0.015	0.006	49.70	0.95	-0.003	0.002
Host Nation						
Competitor Market Share	-0.790	0.510	79.35	0.96	-0.301	0.119
New Trade Theory						
Real growth differential to Australia	-0.015	0.014	4.26	0.73	0.003	0.004
Index of comparative economic size	-1.221	0.605	1.72	0.81	-0.154	0.159
Index of comparative economic development.	-0.302	0.575	7.27	0.85	0.097	0.082
Control						
Ranked Home Credit Rating	-0.001	0.001	4.39	0.65	0.000	0.000
Dummy Canada	-0.423	0.883	0.00	0.82	0.097	0.106
Dummy Germany	-0.555	0.686	0.00	0.68	0.041	0.095
Dummy Hong Kong	-0.467	0.565	0.00	0.57	0.018	0.089
Dummy Japan	-0.511	0.422	2.67	0.71	0.034	0.058
Dummy Jordan	-1.046	0.656	4.65	0.64	-0.052	0.064
Dummy Singapore	-0.699	0.564	0.00	0.59	0.015	0.099
Dummy Switzerland	-0.616	0.653	19.66	0.84	-0.120	0.094
Dummy UK	-0.237	0.432	21.04	0.91	0.075	0.051
Dummy USA	-0.536	0.228	49.57	0.94	-0.091	0.052
Dummy Bank WA	-0.473	0.768	9.55	0.85	0.102	0.095
Dummy ING = Dummy Netherlands	-0.777	1.216	0.39	0.80	-0.092	0.114

Model 2

	Lower Extreme Value	Upper Extreme Value	Percent Significant at 5% level	Cum.Distr.Function (0)	Average Coefficient	Average Standard Deviation
Home Country						
Home Nation Investment Income	-0.104	0.003	99.83	1.00	-0.031	0.011
Trade with Australian as a share of GDP	-29.546	16.125	0.04	0.70	-2.554	4.131
Home nation capital flow	-0.057	0.026	27.54	0.96	-0.021	0.011
Home nation capital stock	-0.027	0.007	19.15	0.85	-0.004	0.003
Log (Home GDP per capita)	-0.597	0.514	2.67	0.72	-0.044	0.066
Parent Bank						
Home Return on Assets	-0.145	0.160	0.00	0.79	0.025	0.028
Home Net Interest Margin	-0.121	0.135	0.00	0.58	0.006	0.026
Log (Home Assets) (Avg. Annual Exchange Rate)	-0.149	0.281	0.77	0.68	-0.010	0.029
Experience in Aust.	-0.036	0.037	0.04	0.55	-0.001	0.003
Host Nation						
Competitor Market Share	-1.661	1.366	0.47	0.70	0.131	0.259
New Trade Theory						
Real growth differential to Australia	-0.038	0.023	0.22	0.81	-0.006	0.007
Index of comparative economic size	-1.246	3.530	0.04	0.74	0.293	0.405
Index of comparative economic development.	-1.165	1.089	0.69	0.54	-0.006	0.164
Control						
Ranked Home Credit Rating	-0.002	0.001	0.00	0.70	0.000	0.000
Dummy Canada	-2.032	1.325	0.00	0.75	-0.110	0.187
Dummy Germany	0.000	0.000	0.00	0.50	0.000	0.000
Dummy Hong Kong	0.000	0.000	0.00	0.50	0.000	0.000
Dummy Japan	-0.901	1.798	0.00	0.62	0.045	0.108
Dummy Jordan	-1.700	2.039	0.00	0.59	0.033	0.102
Dummy Singapore	0.000	0.000	0.00	0.50	0.000	0.000
Dummy Switzerland	-2.038	1.383	0.00	0.52	-0.010	0.169
Dummy UK	-1.029	0.937	0.04	0.62	0.021	0.100
Dummy USA	-0.643	1.562	0.04	0.67	0.047	0.096
Dummy Bank WA	-1.595	1.657	0.00	0.74	0.075	0.166
Dummy ING = Dummy Netherlands	-3.801	0.731	61.10	0.94	-0.348	0.205

Table 9.

Summary of Results.

Significant variables only (95% confidence interval).

Dependent Variable: Efficiency Score for each model.

GETS= general to specific model. EBA = extreme bounds analysis. +ve = positive sign; -ve = negative sign

	Model 1	Model 1a	Model 1b	Model 2
Home Country				
Home Nation Investment Income	GETS +ve EBA +ve		GETS +ve EBA +ve	GETS –ve
Home nation capital stock				GETS –ve
Home Capital Flow				EBA –ve
Log (home Nation GDP per capita)	EBA -ve	GETS –ve EBA -ve		
Parent Bank				
Home Return on Assets	EBA –ve	GETS –ve EBA –ve	GETS –ve EBA –ve	
Parent NIM			EBA –ve	
Experience in Aust.		GETS +ve		
Host Nation				
Competitor Market Share	EBA –ve	EBA –ve	EBA –ve	
New Trade Theory				
Real Growth Difference		EBA +ve		
Index of comparative economic size		GETS -ve		
Index of comparative economic Development		GETS +ve EBA -ve		
Control				
Dummy Switzerland	GETS -ve			
Dummy USA	GETS –ve EBA -ve		GETS –ve EBA –ve (93.9%)	
Dummy ING				GETS –ve EBA –ve (94.4%)