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Optimizing Portfolio Performance and Risk Mitigation: An Econometric Analysis of Safety-First Approach in the Banking Sector

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Abstract

A Safety-First Principle is used to derive models of the portfolio composition of the commercial banking sector in Pakistan. For econometric estimation we use data and for forecasting various models are estimated, with and without restrictions implied by the theory, such as symmetry on asset characteristics and the equivalent of Engel conditions. The best specification of the system of asset demand equations is a dynamic version which allows for adjustment costs or adjustment constraints in the alignment of the portfolio and which also disaggregates the various types of bank loans rather than treating them as perfect substitutes. That model provides information on the complements and substitutes amongst the assets that conforms to economic intuition. It also fits the data well and is a good forecaster and is shown to provide information that can assist the SBP in forecasting, as an example, real GDP. It is also noted that it dominates the expected utility model on all criteria.

Keywords: Asset demand equations • Adding-up constraints • Disaggregation

Introduction

Numerous approaches have been advanced over the years to explain the portfolio behaviour of financial firms. These can perhaps be categorised roughly into "banking firm models", "transactions and precautionary balance models" and "complete portfolio models". Amongst the latter the predominant models have based upon the maximisation of the expected utility of portfolio profit or, more simply, on the trade-off between the mean and variance, certainty-equivalent, of profit. Within the formal models the Safety First model of has largely been ignored in the econometric literature as a vehicle for explaining portfolio behaviour. It has been used in the theoretical literature in money and finance, for example, in the context of the decision to hold a riskless asset in a portfolio framework, compared to the choice of such an asset in a portfolio under a mean-variance objective function. Also, three variants of it were proposed but, as variants, none provides a general safety-first objective function. In this paper we apply model to the portfolio disposition of the banking sector taken in aggregate. As our case study we use the banking sector. This is a substantial sector and it has changed relatively little (though it has changed as we note in the section over the years, and certainly this is so in regard to other similar sized economies, which have changed radically consequent upon global deregulation. Accordingly, we use a long historical set of data; with its obvious econometric advantages. Also, we assume that all banks in the sector have the same objectives, face the same constraints and interest yields or costs. In effect, the latter are "market" rates, which are readily available [1].

Studies of individual banks are not possible because of data requirements and the long time-span of our study (which involves changes in the status of some banks, for example). As we shall note later (only note for reasons of space) the banking sector has gone through periods when it was told by the government and the central bank that it was not, as it were, being adventurous enough in its lending to "riskier" clients and was nationalised as a result and then later on, a process of privatisation was begun with more intent by the authorities. From these potted facts alone we might garner support for our use of the safety-first approach: prior to nationalisation, during it when banks would be intent on protecting their (the nation's) balance sheet and subsequently after privatisation, to ensure that they were not judged to be reckless enough to be re-nationalised. In regard to the Banking Sector as such, we note again that the domestic banks were nationalised. The main purpose of that process was to render the banks more efficient and more capable of meeting the credit needs of the economy, especially of the agricultural and the public sector. Having achieved those initial objectives, banking reforms were introduced in two phases. The main aim of the first set of reforms was to generate more competition in the Banking Sector, by such steps as freeing entry of private banks into the market, by downsizing the branches of the major Nationalised Commercial Banks and the Development Finance Institution. The second phase of the reforms was to complete that process of privatisation and liberalisation [2].

Literature Review

The SBP uses conventional instruments to control the size of the balance sheets of the banks: cash and liquidity ratios; open market operations; its discount and window rates. Those instruments it has employed over our data period: and open market operations together (especially) with alterations in the discount rate have been the predominant in attempts to alter money market conditions: as they seem to be in recent times. On occasions it has also used credit ratio constraints in an endeavour to limit the expansion of banking sector loans. We refer to these shortly and especially should they be binding and effective constraints on the banking sector's portfolio allocation in the Kuhn-Tucker sense. Before we do so we summarise the main categories in the portfolio. The balance sheets of the constituent banks in the Banking Sector, whether under domestic or foreign ownership, are similar to, and their financial items in their portfolios embrace, the same broad categories (apart from the absence of derivatives) familiar from Western Banking Sectors. There the constituents have been categorised as endogenous or exogenous for the econometric modelling reported later and, as remarked above, the notation is the basis of that used in the modelling. The rates of return are weighted averages for each item, hence the uses of WA. In the econometric work reported on in

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Section 5 we shall also see that the desired levels of the endogenous portfolio variables are replaced by their ratios to a sum of exogenous scalar variables. Also, the interest rates, which, or their expectations, would be amongst the set of exogenous variables are also transformed from their intrinsic values. Hence, we do not now consider the basic variables listed. We will present their transformed values in Section 4, where we will also consider their order of integration [3].

Taking the constraint to be binding and effective then would have altered the status of the non-cash component of liquid assets from endogenous to exogenous. The details of some of these credit ratios and directives are rather sketchy. However, from the information we have been able to garner from the SBP, an examination of the banking sector's balance sheets over the relevant episodes, suggest that these constraints did not impinge upon the banks own choice of portfolio. Additionally in estimating the behavioral equations described below, we included numerous combinations of dummy variables to test for any "structural" changes to the equations due to the above-mentioned controls or directives. None of the coefficients on the dummies were statistically different from zero. Also, given the preceding comments on the controls on banks' portfolios, all assets, except for the holdings of Provincial Government Securities are taken to be endogenous. It claiming that we follow the vast majority of studies of expected utility (mean-variance) portfolio selection by arguing that the interest rates on the assets are either set by the banks themselves (on the basis of market conditions or central bank rate setting) before they determine their portfolio allocation, or are given by the activities of the Ministry of Finance or the central bank, in regard to such securities as Treasury Bills and Government Bonds. Provincial Government Securities are a kind of anomaly in the financial system: they are no longer issued and they are redeemed according to the choice of the Provincial Governments themselves. The rate of return on them is fixed for all time; and as they have been redeemed the quantity in the banking sector has declined over time [4].

Discussion

Similarly, in respect of the liabilities side of the portfolio, the working assumption is that the rates of interest on deposits are set by the banks, in line with SBP policy and conditions in the financial market. Then, for given income of the non-banking sector, the latter's demand for deposits, hence obviously, the banking sector's supply of deposits, becomes exogenous. Capital and Reserves are also traditionally taken to be exogenous. In respect of loans these have all had to be taken at weighted averages of the various types of loans within a given sector. These are the only rates that are available from the SBP, and they mean, of course, that we have to use the broad categories of sectors that we have done: there being no information on loans to the various economic agents in each category and their interest costs. The Call Money Rate is used for the cost of banking sector borrowing from the central bank. We might expect that this cost would bear some relationship to the discount rate. As remarked earlier, we assume that all banks in the banking sector have the same probability distribution of profits, use the safety-first rule and have identical disaster levels of profit. Suppose that the bank forms expectations of the returns on the assets (which are their actual returns determined by them or by monetary conditions or by the central bank: as noted earlier), and hence an estimate of the risk (variance) attached to them at any given time when the portfolio allocation is being determined. Additionally, therefore, it is assumed that the bank works in a competitive environment so that its demand for any asset will not affect its promised return [5].

Clearly, it is a strong assumption that the banking sector's portfolio is in an optimum position at all times. There are several ways in which the possibility that a dynamic adjustment process is involved in the determination of the optimum portfolio. in their system-based study of the interaction between financial intermediaries, is the partial stock adjustment principle. The econometric results reported here are based on that as the best specification of a dynamic structure: the alternatives, such as the use of wider distributed lag framework, are almost impossible to estimate in this non-linear environment. Unless FIML is employed then the parameter estimates will depend upon which equation is omitted. Of course, it can happen that the system of equations to be estimated is too large or too non-linear to produce convergence; and so it might seem that the system is singular. In that eventuality the literature has suggested the use of the estimator SUR, even though it cannot generate unique parameter estimates. It does have the advantage that any contemporaneous covariance between the residuals is accommodated in the estimation. Before providing the detailed estimates for the best model, a dynamic model, we give summary statistics for the in-sample estimates to confirm the superiority of that model. The superior specification is equation with the symmetry condition imposed. Later it will be shown that the best dynamic model does outperform the best static model in explaining the portfolio items over the in-sample period [6].

Conclusion

Our econometric study focused on assessing the safety-first approach and portfolio selection in Pakistan's banking sector. Through rigorous analysis and evaluation, several key findings have emerged. Firstly, it is evident that risk management plays a crucial role in the banking sector's stability and resilience. By adopting a safety-first approach, banks can effectively mitigate potential risks and safeguard their assets. This involves prioritizing the preservation of capital and minimizing the probability of incurring significant losses. Secondly, portfolio selection is a vital aspect of optimizing returns while managing risk. Our study highlights the importance of diversification, asset allocation, and risk-return trade-offs in constructing a well-balanced and efficient portfolio. By spreading investments across various financial instruments and sectors, banks can reduce their exposure to individual risks and enhance the overall stability of their portfolios. The safety-first approach in the banking sector offers a robust framework for optimizing portfolio performance and mitigating risks. By considering risk-adjusted returns, tailoring strategies to individual risk profiles, and embracing continuous evaluation and adaptation, banks can achieve long-term stability and resilience. Effective communication, integration of technology, and the incorporation of ethical and sustainable factors further enhance the effectiveness of this approach.

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Conflict of Interest

None.

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