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Banking Innovations and New Income Streams: Impact on Banks'

Performance¹

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¹ VIKALPA, The Journal for Decision Makers, 40(1) 28–41, © 2015 Indian Institute of Management, Ahmedabad;

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Executive Summary

Innovation, one the key drivers of growth, has been defined by the Oxford Dictionary² simply as a new method, idea, product, etc. Innovation is a long process depending critically on recognition of new, external information, assimilating it, and applying it to commercial ends (Cohen & Levinthal, 1990). Along this process, several of the new concepts may get waylaid even in the gestation period and be forced to exit. There are coherent patterns in the stimuli for innovation, types of innovation, and in barriers to innovation, including economic barriers (Utterback & Abernathy, 1975). Economic barriers to innovation can include the need to create necessary incentives for adoption and for destabilization of incumbents (See, for example, Morris, 1986).

This appears to be especially relevant while discussing innovative bank income streams in the Indian context. Innovation in banking has encapsulated new technology and channels, new products and services, new markets and institutions, and new business models. This has led the banks to diversify into new income streams comprising non-interest income, of which fee income is a crucial component. This paper asks whether the move to innovation in income streams and the consequent rising diversification in income has impacted profitability and stability of income positively for Indian banks. While banks have adopted new income streams owing to an overriding concern to reduce dependence of profitability on fund-based sources and diversify the income generation, the consequences in terms of stability of earnings seems unclear. While some studies (see, for example, Busch & Kick, 2009; Smith, Staikouras, & Wood, 2003; Davis and Tuori, 2000) point to a positive impact of diversification on financial performance and risk profile, others show a negative impact of the move into fee-based activities on risk-adjusted performance of banks (Stiroh & Rumble, 2006; Stiroh, 2004; De Young & Roland, 2001). In the Indian context, RBI former Deputy Governor, Gopinath (2011) indicated that fee-based income may not be less risky than

² Oxford Dictionaries (innovation). Accessed on February 10, 2013 through oxforddictionaries.com/definition/english/innovation

traditional lending activities and there is a need to understand the underlying risks and effectively monitor the provision of such services.

Diversification has been more pronounced for banks in the United States and Europe. De Young and Rice (2001) observed that between 1980 and 2001, non-interest income in the US commercial banking system increased from 0.77 percent to 2.39 percent of the aggregate banking industry assets, and increased from 20.31 percent to 42.20 percent of the aggregate banking industry operating income. For developed countries, Kaufman and Larry Mote (1994) showed an increase in the share of non-interest income to total income in the banking sectors of most developed countries between 1982 and 1990. Esho et al. (2004) pointed out that Australian credit unions diversified their activities in the 1990s to reduce their reliance on interest revenue which took three primary forms: (i) a change in pricing policy with transaction fees on loans and deposits; (ii) new financial services including insurance, funds management, and off-balance sheet activities that generated commissions and facility fees; and (iii) shift in the portfolio mix of assets away from personal loans and advances into residential lending.

Importantly, Feldman and Schmidt (1999) pointed out that the composition of non-interest income had been changing for the US economy with fee income becoming the dominant source of non-interest income received by banks made possible by technological and regulatory changes opening up new sources of non-interest income.

Gamra and Plihon (2011) suggested that emerging market banks are required to innovate in services and products, to differentiate strategies, and fundamentally transform their business into a much wider array of non-traditional services. This paper shows that from 1997 to late 2007, emerging market banks saw non-interest income as a share of net operating revenue rise from 28.2 percent to around 36.7 percent with the biggest increase of non-interest income being in trading.

The shift towards non-interest income has been significant for Indian banking. Umakrishnan and Bandopadhyay (2005), compared the difference in income composition for new generation private sector banks, foreign banks, public sector and cooperative banks during 1999-2004 and concluded that the share of interest income in total income had been declining over the years. The RBI Report on *International Trade in Banking Services* (2010) showed

that foreign bank branches operating in Indian had been more successful in generating income from fee-based services than Indian banks' branches operating outside India. Interestingly, the report also pointed out that while for foreign banks operating in India, derivative, stock, securities, foreign exchange trading services' and 'financial consultancy and advisory services' were the major source of fee income, for Indian banks operating abroad, the largest proportion of fee income came from 'credit-related services' and 'trade-finance related services'. Uppal (2010) showed that for banks in India, interest income was continuously decreasing on account of deregulation in interest rates and non-interest income was rising. Sahoo and Mishra (2012) related greater extent of operational diversification in banks with greater fluctuations in financial performance.

Much of such shift in the Indian context has been contributed by the private sector and the foreign sector. Private sector banks and foreign banks in India have been successful in generating a greater proportion of their income from fee-based sources, while public sector banks in India have lagged behind in this context. In the recent years, there has been increasing efforts by public sector banks to reduce dependence on fund-based sources majorly through sale of third party products. However, as Figure 1 shows, the proportion of non-interest income in total income has not changed much for public sector banks, implying a full-fledged resistance in adoption of non-interest streams. The economic explanation of such behaviour could be that banks are unsure of the strategic implications of such a shift.

The primary role of a bank is to accept deposits and make loans, profit being the difference between the costs of deposits and the earnings from lending. However, in the last two decades, the environment facing banks have changed drastically, with banks' income no longer confined to lending and income generated from its own funds. Fee-based income or income earned from sources that do not involve exposure to bank's own funds is globally becoming more and more important for the bank's income statement.

Following the methodology of diversification scores developed by Stiroh and Rumble (2006), this paper uses such diversification scores generated for a comparative analysis of bank groups in India. Using multiple regression analysis, it questions the impact of diversification and increasing share of fee-based income on profitability and risk-adjusted profitability measures for all banks in India over the period 2005-2012. The paper thus tries to delve into

the diversification brought about by the move to innovative income sources and its impact on bank profitability and income stability.

LITERATURE REVIEW

The primary role of banks as intermediaries channelizing savings into investments is underlined by deposit-taking and lending activities. Smith et al. (2003) pointed out that while the basic functions of banks and other financial service companies remained relatively constant over time, these functions are now being provided through different products and services. Economic forces have led to financial innovations, in turn fostering competition and diminished to an extent of cost advantage. Traditional banking, as a result, has lost profitability, with banks diversifying into new activities that may bring higher returns.

The shift of banks towards new business lines and fee-based income has been more prominent in developed countries and therefore much of such literature has emanated from the banking industries of Europe and the United States. De Young and Rice (2004 b) documented that for the US economy, a part of increases in non-interest income flow was coming from new lines of business made possible by deregulations introduced since 1990s while a part stemmed from producing traditional banking services with new production processes that were made possible by advances in information technology, communications channels, and financial processes.

In this context, a vital question being raised in economic literature is whether the growth in income from fee-based activities has contributed to greater stability in bank income. Davis and Tuori (2000) showed that banks obtained diversification benefits in increasing non-interest income, which in turn helped to smooth profitability. Smith et al. (2003) examined the variability of interest and non-interest income and their correlation for banking systems of EU countries for the period 1994-1998. This paper finds that an increased importance of non-interest income for most bank categories have stabilized profits in the European banking system in those years. However, it does not establish that non-interest income is invariably more stable than interest income.

Chiorazzo, Milani, and Salvini (2008) found that income diversification increased risk-adjusted returns for Italian banks during the period 1993-2003. Busch and Kick (2009), studying the impact of growth of non-interest income on the financial performance and risk

profile of German banks between 1995 and 2005, found evidence that risk-adjusted returns on equity and total assets had both been positively affected by higher fee income activities for German universal banks. They also found that savings and commercial banks having a greater share of fee-based income charged lower interest margins, implying subsidization between interest and fee business.

Inaba and Hattori (2007) showed that Japanese commercial banks had also been expanding their fee-based business and found a positive correlation between Japanese commercial banks' fee business income and net interest income in the second half of the 1990s. They pointed out that this relationship led to an increase in the variability of their ROA but did not affect their management stability over that period. However, during 2001-2005, such a positive correlation was not clearly observed.

Umakrishnan and Bandopadhyay (2005) indicated that diversifying to fee-based income was a more viable option for banks in the long run and needed constant feel of the market requirement, innovation, and skill upgradation. Arora and Kaur (2009) examined the internal determinants for diversification of banks in India using aggregate bank level data for foreign sector banks, nationalized banks, private banks, and the SBI group. They found that risk, cost of production, regulatory cost, and technological change were very significant for bringing variation in the income structure of the banks.

However, many studies pointed to a greater dependence on non-interest income contributing to increased volatility in bank income. De Young and Roland (2001) and Stiroh (2004) found this to hold for the US firms. DeYoung and Roland (2001), analysing the quarterly movements in revenues and profits at 472 large and medium-sized banks between 1988 and 1995, found that earning volatility increased with greater share of revenue coming from fee-based activities. They pointed out three reasons why fee-based income may not be more stable than traditional banking activities. Firstly, banks may have qualitatively different relationships with their fee-based customers as opposed to their traditional banking customers, with relationship with the latter tending to be stronger. For example, during a downturn, the fall in revenue from fee-based income like mutual fund sales may be sharp while interest earnings from lending activities is not likely to fluctuate much. Secondly, expanding production of fee-based activities requires much greater fixed costs than increasing production of lending activities. Thirdly, as fee-based activities do not require banks to hold capital against them, banks can take advantage of this to raise return to equity.

This creates incentives for banks to arbitrage risk-based capital regulations by transforming on-balance sheet risk from interest-based activities to off-balance sheet risk from fee-based activities.

De Young and Rice (2003) showed that large banks tended to generate relatively more non-interest income. The paper also found that well-managed banks relied less heavily on non-interest income while relationship banking tended to generate non-interest income. Further, some technological advances (e.g. cashless transactions, mutual funds) are associated with increased non-interest income while other technological advances (e.g. loan securitization) are associated with reduced non-interest income at banks.

Stiroh (2004) examining the link between risk-adjusted bank performance and diversification, for community banks from 1984 to 2000 showed that higher non-interest income was negatively linked with risk-adjusted performance. Esho et al. (2004) pointed out, in their study spanning 198 Australian credit unions, that increased reliance on fee income generating activities was associated with increased risk.

Stiroh and Rumble (2006) showed that diversification benefits were more than offset by increased exposure to non-interest activities. These non-interest activities were volatile but not more profitable than lending activities. Stiroh and Rumble (2006) decomposed the impact of the move to greater fee-based activities into a “direct exposure effect” (coming from a greater dependence on new activities) and an “indirect diversification effect” (coming from the resultant change in revenue concentration). Analysing the performance of the US financial holding companies (FHCs) from 1997 to 2002, this paper showed that while FHCs adopted ‘cross-selling’ for diversifying revenue and lowering costs, this actually meant exposure to multiple income streams with similar shocks and the greater correlation across revenue streams significantly hampered diversification benefits.

Vallascas, Crepi, & Hagendorff (2011) analysing the impact of income diversification on the performance of Italian banks during the recent financial crisis, showed that institutions which were diversified before the crisis experienced the largest decline in performance during the financial crisis.

In the Indian context, Sahoo and Mishra (2012) found that the banks with greater extent of operational diversification suffered from the problem of greater fluctuations in financial performance and a larger asset base did not necessarily help a bank to bring in stability in its financial performance. Moreover, greater efforts by the banks towards creating entry barrier or image advantage raised fluctuations in their financial performance.

While banks in India have recognized the importance of raising income from fee-based income activities and thereby reducing the dependence on fund-based income, there are many challenges in the way of moving to more fee-based activities and sustaining them, especially for public sector banks. It may be that, banks face certain barriers to adopting the orientation relevant to such new business lines, recognizing that fee-based income may not contribute to stable income and that the right choice of activities for income diversification are unclear.

DEFINITION AND METHODOLOGY

The empirical analysis uses data on revenue sources and performance measures banks in India for the period 2005-2012. The key variables to be used are identified and the importance of these variables is discussed in the context of the study.

Variables Definitions

Diversification Scores

Following methodological construct of Stiroh and Rumble (2006), diversification scores are built for the banks. In this paper, *two* diversification ratios are considered. The first considers the diversification in bank income into interest and non-interest income and the second considers the diversification of non-interest income into 'commission, exchange and brokerage income' and other components. 'Other Income' for banks in Indian comprises of 'commission, exchange and brokerage', net profit (loss) on sale of investments, net profit (loss) on revaluation of investments, net profit (loss) on sale of land and other asset, net profit (loss) on exchange transactions, and miscellaneous income. In the study, the income from 'commission, exchange and brokerage' is denoted as 'fee income'³.

³ The incomes included in 'commission, exchange and brokerage' include trade finance related services; payment and money transmission services; fund management services; financial consultancy and advisory services; underwriting services; clearing and settlement services; derivative, stock, securities, foreign exchange trading services (RBI, 2010).

This methodologically improves upon the existing literature by introducing a diversification score for non-interest income which will help to underline *how* banks are generating their non-interest income. The components of non-interest income other than fee income are largely income generated from the bank's own investment. This diversification score thus helps to know if the banks are generating their non-interest income from only fee income or only their own investments or have they diversified the non-interest income generation by focusing on both.

Further, this refinement in methodology also helps to find the impact of such diversification of non-interest income on bank performance. This is important in the face of many studies showing that trading/ investment income tends to be volatile and generate lower-risk adjusted returns (Gamra & Plihon, 2011; Stiroh & Rumble, 2006; Umakrishnan & Bandopadhyay, 2005). Importantly, it is 'commission, exchange, and brokerage' which *encapsulates income being generated from provision of new services and products by banks in the recent years*. Considering a separate diversification score for this component implies that focus can be on the impact of diversification of non-interest income on profitability and stability of income for banks. The first diversification of an independent variable score simply sees the impact of diversified income on bank performance. However, the second diversification score goes beyond that to underline the impact of the banks' movement into *newer income streams* (which had the most profound impact on 'fee income' in the years under study) on bank performance.

It helps to analyse whether with banks focusing on generating non-interest income, the movement to newer income streams (which will raise 'fee income') should bring in better performance or should the banks focus more on income from their own investments to positively impact profitability and stability. Further, the focus can also be on the *distribution* of non-interest income into fee-based and other components of non-interest income.

Further, along with studying the impact of the share of fee income in total income (SH_{FEE}), and the share of non-interest income in total income (SH_{NON}) on bank performance, the paper also considers the impact of the share of fee-income in non-interest income (SH_{FOT}) on bank performance. It becomes crucial to consider separately the income generated from 'fee income', along with 'other or non-interest income' to see the implication of both the

increasing share of non-interest income and the increasing ‘fee-income’ in non-interest income on bank profitability and stability.

Thus, diversification scores are generated from these two different indicators. Following methodological construct of Stiroh and Rumble (2006), diversification scores are defined as follows:

$$DIV (1) = 1 - (SH_{NON}^2 + SH_{IN}^2) \dots \dots \dots (1)$$

$$DIV(2) = 1 - (SH_{FOT}^2 + SH_{OT}^2) \dots \dots \dots (2)$$

where,

SH_{IN} = Share on interest income in total income

SH_{NON} = Share of non-interest income or other income in total income

SH_{FOT} = Share of ‘fee-income’ in non-interest/ other income

SH_{OT} = Share of ‘other components’⁴ in non-interest/ other income

DIV 1 measures the degree of diversification in the banks revenue and a higher score reflects a greater degree of revenue diversification for the bank. A score of zero would suggest that all of the bank’s revenue is coming from fee-based or fund-based sources, while a score of 0.5 would mean a complete diversification. Again DIV 2 reflects the diversification in non-interest income. Thus, a score of zero would suggest that bank is generating all its non-interest income from either ‘fee-income’ or ‘other components’ and a score of 0.5 would suggest that the bank is generating non-interest income equally from both the components. The diversification scores are calculated from interest income, other income and ‘fee income’ averaged over the period 2005-2012 for each individual bank, unlike in Stiroh and Rumble (2006) where diversification scores for each period were averaged.

Risk-adjusted Measures of Performance

RAROE and RAROA (see for example, Stiroh & Rumble, 2006; Busch & Kick, 2009) are constructed as below:

$$RAROA = \frac{\overline{ROA}}{\sigma_{ROA}} \dots \dots \dots (3);$$

⁴ Net profit (loss) on sale of investments; Net profit (loss) on revaluation of investments; Net profit (loss) on sale of land and other asset; Net profit (loss) on exchange transactions and Miscellaneous income

$$RAROE = \frac{\overline{ROE}}{\sigma_{ROE}} \dots \dots \dots (4);$$

where, ROA is the average Return on Assets for the individual banks over the period 2005-2012, \overline{ROE} is the average Return on Equity for the individual bank over the period 2005-2012, σ_{ROA} and σ_{ROE} represent standard deviation of ROA and ROE. It may be seen that RAROA and RAROE are ‘Sharpe ratios’ defined by the average profits divided by the standard deviation of profits and represent profits per unit of risk.

A third measurement of risk adjusted performance is also introduced following Stiroh and Rumble (2006), the ‘Z’ score, defined as

$$Z = [\overline{RAROA} + \overline{E/A}] / \sigma_{ROA} \dots \dots \dots (5),$$

where E/A is the mean equity to asset ratio, the Z score thus shows risk adjusted performance, with a higher score denoting a better performance.

Methodological Construct

- a. A comparative study of the share of income coming from fee-based activities for public sector banks⁵ vis-à-vis private sector banks (Old and New) and foreign banks⁶ is done
- b. The Z scores are compared with the Diversification ratios for banks groups
- c. For analysing the impact of diversification on risk adjusted performance, two basic empirical specifications are used:

$$X_i = \beta + \beta_1 \overline{DIV(1)}_i + \beta_2 \overline{SH_{NON}}_i + \beta_3 \overline{LASS}_i + \beta_4 \overline{LCAP}_i + \beta_5 \overline{RNPA}_i \dots \dots \dots (6)$$

$$X_i = \beta + \beta_1 \overline{DIV(2)}_i + \beta_2 \overline{SH_{FOT}}_i + \beta_3 \overline{LASS}_i + \beta_4 \overline{LCAP}_i + \beta_5 \overline{RNPA}_i \dots \dots \dots (7)$$

$$X_i = \beta + \beta_1 \overline{DIV(2)}_i + \beta_2 \overline{SH_{FEE}}_i + \beta_3 \overline{LASS}_i + \beta_4 \overline{LCAP}_i + \beta_5 \overline{RNPA}_i \dots \dots \dots (8)$$

where, the dependent variable X_i is \overline{ROA} , \overline{ROE} , \overline{RAROA} , \overline{RAROE} , and \overline{ZScore} respectively of the *i*th bank averaged over the period 2005-2012; and the predictor or independent variables are DIV (1), DIV (2), $\overline{SH_{NON}}$, $\overline{SH_{FEE}}$ and $\overline{SH_{FOT}}$. DIV (1) and DIV (2) are

⁵ IBA categorizes nationalized banks and State Bank of India & its Associates together as Public sector banks.
⁶ RBI data classifies Scheduled Commercial Banks in India into five different groups according to their ownership and / or nature of operation, as under: (i) State Bank of India and its Associates, (ii) Nationalized Banks, (iii) Private Sector Banks, (iv) Foreign Banks, and (v) Regional Rural Banks. Regional rural banks are not included in the purview of this study. Further, Private sector banks are further categorized as Old and New Private sector banks. The final groups considered for the study are as follows: Group A: Public sector banks [a). State Bank of India and its Associates, b) Nationalized Banks], Group B: Private Sector Banks a). Old Private Sector Banks b). New Private Sector Banks]; Group C: Foreign Banks

diversification scores defined earlier in equations 1 and 2; SH_{NON} and SH_{FEE} are Share of 'fee-income' and non-interest income and other income in total income respectively. The first specification is denoted as Model 1, second specification as Model 2, and the third specification as Model 3. It may be underlined that Model 1 sees the impact of non-interest income share and diversification of total income on dependent variables, while Model 2 assesses the impact of 'share of 'fee-income' in non-interest income and diversification of non-interest income on dependent variables. Model 3 sees the impact of 'share of 'fee-income' in total income and diversification of non-interest income on dependent variables.

For independent variables, both average diversification ratios and average SH_{FEE} and SH_{NON} are considered. This is to ascertain that the impact of increasing income being derived from non-interest/fee based sources is clearly understood. Control variables Log (Assets) [LASS], Log (Capital) [LCAP], Ratio of Net Non-Performing Assets to net Advances [RNPA] are also introduced (See for example, Stiroh & Rumble, 2006; De Young & Rice, 2004)

Data Source

Data on income, expenditure, assets, liabilities, and important ratios for banks in India over the period 2005-2011 are obtained from RBI database⁷ and CMIE Prowess database. Data is obtained on 81 banks in total as banks not in operation in 2011 are not considered in the sample. Z scores cannot be computed for all banks in the sample due to unavailability of data on total capital for some banks in the group. Data of the crosssectional sample of 81 banks in India is thus obtained, providing one observation averaged over the period 2005-2011. Only those banks which have data for the last year, 2011, are included. This means that a bank incorporated in any year from 2005 to 2010, would be included, while if it closed down business in any year from 2005 to 2011, it would not be included in the sample.

EMPIRICAL FINDINGS

The paper considers the share of income generated from fee-based and non-fee based sources for banks in India over the period 2005-2011. It first presents a comparative analysis of

⁷ Source: Reserve Bank of India (2012). Selected ratios of scheduled commercial banks, Accessed on May 6, 2012 through www.rbi.org.in -

income generated from fee and non-fee income for different bank groups in India. Using diversification ratios, DIV 1 and DIV 2, it further compares the diversification in portfolio for banks groups in India and uses Z scores to compare the risk adjusted performance between different bank groups. Additionally, the impact of diversification in income and rising share of fee-based income in other income on risk adjusted performance for banks in India is examined using regression analysis.

Distribution and Diversification of Total Income

For public sector banks, the proportion of fee-based income in total income over the period 2005-2011 is on the average 6.25 percent, while for new private sector banks and foreign banks, it is 14.41 percent and 16.10 percent respectively. Table 1 shows the percentage of income coming from fee-based activities for the three groups of banks considered in this study. As shown in Table 1, the percentage of fee-based income (commission, exchange, and brokerage) in total income for public sector banks has fallen marginally from 6.67 percent in 2007 to 5.84 percent in 2009. It stood at 6.31 percent in 2011. For private sector banks (Old), there has been a fall from 5.4 percent in 2006 to 4.71 percent in 2011.

Both private sector banks (new) and foreign banks have been active in generating a considerable amount of their income from fee-based services. For private banks (new), the percentage of fee-based income (commission, exchange and brokerage) in total income has increased from 13.9% in 2005 to 15.05 % in 2011. For foreign banks, percentage of fee-based income (commission, exchange, and brokerage) in total income stood at 16.2 percent in 2011.

Table 2 gives the percentage of 'interest income' and 'other income' in total income for the three groups of banks considered for the study. As seen from the Table, the percentage of non-interest income in total income for public sector banks has increased from 13.71 percent in 2005 to 16.74 percent in 2011. For private sector banks (old), there has been a rise from 10.53 percent in 2005 to 11.88 percent in 2011. For private banks (new), the percentage of non-interest income in total income has increased from 21.66 percent in 2005 to 23.15 percent in 2011. For foreign banks, share of non-interest income in total income stood at 29.65 percent in 2011. Evidently, while for all banks, the share of non-interest income in the total income has increased over this period, the same cannot be said about the proportion of fee-income in total income which has increased markedly only for new private and foreign banks. Table 3 shows the share of fee-income in non-interest income and diversification in

non-interest income for different bank groups, and table 4 gives the diversification scores for the different groups and their Z scores. . It may be seen that diversification of total income for public sector banks stand at around 0.23 (DIV1) suggesting a moderately diversified portfolio with low variability in diversification between banks in this group. The diversification of total income for private banks (new) is slightly better at 0.3, and while for foreign banks, it is around 0.34 (DIV1), the variability in diversification between banks in this group is much higher. Private banks (old) have a moderately diversified portfolio again (DIV1 at 0.22) with higher variability in diversification compared to public sector and new private sector banks. Z scores giving risk adjusted performance are the highest for public sector banks (6.98) though with high variability between banks in the group. While foreign banks have low Z scores at 1.54, the variability of risk-adjusted performance is also lower than for other bank groups.

It may be also be seen from Table 5 that for the Indian banking industry as a whole, the share of non-interest income to in the total income stands (SH_{NON}) at 11 percent % with a maximum of 51 percent %. Again the share of fee income in total income (SH_{FEE}) is 9 percent % for the industry.

Distribution and Diversification of Non-interest Income

It is also observed that the share of 'fee income' in non-interest income stands at an average of 46 percent for the Indian banking industry (Table 5). This implies that the distribution of non-interest income is in favour of an increasing share of fee income, also corroborated for the different bank groups as seen in Table 3. The diversification in total income stands at 0.27 implying a moderately diversified portfolio for the Indian banks. However, diversification in non-interest income is quite high at 0.39, implying a greater diversification of non-interest income compared to total income (Table 5). Looking once again at Table 3, it is observed that public sector banks not only generate much of their non-interest income from 'fee income' (SH_{FOT} at 43%), they also have a diversified non-interest income base. Private banks (new) have around 62 percent of non-interest income coming from 'fee income' with high diversification of non-interest income. Private banks (old) also have a well-diversified non-interest income portfolio, with 40 percent of the non-interest income coming from 'fee income'. Foreign banks have relatively lesser diversification in non-interest income, but 49 percent of the non-interest income is generated from 'fee income'.

Impact of Diversification on Risk-adjusted Performance

The descriptives of key dependent variables, averaged over 2005-2011, as given in Table 6, show that there is high variability in performance measures and risk-adjusted performance for banks in India over this period. ROA averages around 0.90 for banks in India while ROE averages around 11.26 but with a high variability; however, risk-adjusted performance measures (RAROA, RAROE, and Z score) average around 4 - 4.5 with considerable variability.

The descriptive statistics for the key predictor variables and control variables is seen in Table 5. As seen in the Table, diversification in total income (DIV1) varies from 0.1 to 0.5, with a mean of 0.27 for the sample representing a moderately diversified portfolio for the banks in India. Diversification in non-interest income stands higher at 0.39.

The share of income coming from commission, exchange, and brokerage activities averages around 9 percent for banks in India while the share of income contributed by non-fund based activities together averages around 11 percent for Indian banks (Table 5). The share of 'fee' income in non-interest income is high at 46 percent. Further, control variables (Log Assets, Log Capital, Ratio of Non-performing Assets to Income) are introduced, all of which can have potential impact on performance (as measured by profitability and risk-adjusted profitability). Here again, there is a wide variability in these variables for banks in India over this period.

Analysing the impact of diversification and increasing share of income coming from fee-based sources, using the empirical specifications as specified in equation (6), (7), and (8), the author fails to accept the null hypothesis that there is no improvement in the relation between set of independent variables and dependent variables when predictor variables are added. As seen in Table 7, the ANOVA F values are significant, for all of the three empirical specifications, referred to as Model 1, Model 2, and Model 3.

The beta values and significance are presented in Table 8 and the impact direction of predictor variables is shown in Table 9. The collinearity statistics suggests that tolerance levels are high. It is seen that for the dependent variable ROA, the impact of diversification on total income and increasing share of fee-income in both total income and non-interest income are significant. However, for ROE and risk adjusted measures, the impact of diversification scores and SH_{FEE} , SH_{FOT} , and SH_{NON} is not statistically significant. The beta

values show that impact of diversification in total income is positive on profitability but negative on risk-adjusted measures. However, increasing non-interest income in total income has positive impact direction while increasing diversification of non-interest income may have negative impact on profitability and risk adjusted measures, though the results are not statistically significant. Again, the impact direction and beta values show a positive impact of increasing share of 'fee income' in both total income and non-interest income on profitability as well as risk-adjusted measures.

IMPLICATIONS OF RESULTS

The paper questions how the innovation-led diversification has been impacting bank profitability and stability of income in the Indian context. There are two distinct ways in which this paper tries to add to the existing body of literature. First, it tries to see the impact of diversification in non-interest income separately from diversification in total income. The rationale behind this is the fact that the major components of non-interest income in recent years have come from innovative income streams and gestation of new products and services which have all contributed to increasing 'fee income' and consequent diversification of non-interest income. This is in keeping with global and Indian studies that have focused separately on fee-income based diversification and other non-interest income based diversification strategies (Stiroh & Rumble, 2006; Gamra & Plihon, 2011; Umakrishnan & Bandopadhyay, 2005; Sahoo & Mishra, 2012). Secondly, while the results show a positive impact of diversification for profitability, the paper underlines that the impact direction of diversification in total income on risk-adjusted measures clearly suggests the need to choose stable sources of fee-income for future. Moreover, the diversification in non-interest income may not impact profitability and risk-adjusted income positively as discussed.

Evidently, for foreign and private sector banks (new) a greater proportion of income comes from fee-based activities, compared to public sector banks. However, as seen in the empirical results, while diversification and increasing share of fee-income in total income positively impact Return on Assets, the impact on Return on Equity or other risk-adjusted performance measures is not statistically significant. Moreover, the impact direction of diversification measures may be negative, which is in agreement to what many studies have shown in the

US, European, Australian, and Indian context (Stiroh & Rumble, 2006; Stiroh, 2004; De Young & Roland, 2001; Esho et al., 2004; Inaba & Hattori, 2007; Sahoo & Mishra, 2012). The results suggest that while public sector banks need to generate more income from fee-based activities, it would be imperative to choose sources of fee-based income that remain stable and have a positive impact on risk-adjusted measures.

The choice of income streams from which non-interest income can be generated under these circumstances becomes relevant. Encouragingly, greater proportion of 'fee-income' in non-interest income impacts positively both profitability and risk-adjusted performance measures. However, diversification of non-interest income may, in fact, negatively impact profitability or stability of income. Economic literature points out that the impact of fee-based income and other components of non-interest income, especially trading income, will be different on stability of income. Gamra and Plihon (2011), for example, show that fee income can generate some improvement in the risk-adjusted measures, while trading income imply lower performance as measured by risk-adjusted returns. Stiroh and Rumble (2006) point to trading income as the most volatile part of the non-interest income. Again, for fee-based income, the choice of new products or streams can determine the likely stability of income. Umakrishnan and Bandopadhyay (2005) also point out in the Indian context that investment income is the most volatile across all ownership groups.

CONCLUSION

The paper looks at the impact of new business lines and income streams on banks' profitability and stability. It is clear that adoption of innovations leading to new business lines confront certain barriers even as these evolve from gestation to implementation. Globally, the impact of adoption of these income streams and the consequent diversification, on profitability and stability of income for banks has not been clear.

In Indian banking, the move to innovation adoptions and new income streams has been more pronounced for new private and foreign banks, while there appears to have been certain hesitation on the part of public sector and old private banks. The study points out that while the impact of diversification of both total income and 'non-interest' income (encapsulating newer income streams) on profitability is positive and significant, the other impact on

stability is not. The implications of the study may be that banks adopting new income streams must choose those that are likely to enhance stability of income. As seen in the paper, the distribution of non-interest income can significantly impact stability of income as increasing ‘fee-income’ in non-interest income may have a positive impact on risk-adjusted performance. Trading income, an important component of non-interest income, seems to be more volatile while core service income or the fee, commission, and brokerage income generated from provision of new products and services may lead to greater stability in income. Future research needs to delve deeper into these aspects of innovation led businesses that banks may consider for adoption.

LIMITATIONS AND FUTURE RESEARCH DIRECTION

The study has confined itself to finding the impact of increasing diversification on performance for banks in India, and has not delved into the impact separately for different bank groups. This could be an important direction of research in future. Further, on account of data being unavailable on the various components of non-interest and fee income, the impact of increasing share of various components of fee-based income on profitability and stability could not be analysed, which needs to be looked into in future. This will help in understanding which components of fee-income can contribute to profitability and stability for banks.

Table 1: Fee-based Income as % of Total Income (SH_{FEE})

Year	2005	2006	2007	2008	2009	2010	2011	Average
Public sector banks	6.23	6.34	6.67	6.02	5.84	6.31	6.31	6.25
Private sector banks (new)	13.9	15.81	14.72	13.68	13.42	14.26	15.05	14.41
Private sector banks (old)	5.28	5.4	5.35	5.01	4.53	4.51	4.71	4.97
Foreign banks	16.52	16.26	15.82	15.3	14.53	18.06	16.2	16.10

Table 2: 'Interest Income' as % of Total Income (SH_{IN}) and 'Other Income' as % of Total Income (SH_{NON})

Year		2005	2006	2007	2008	2009	2010	2011	Average
Public sector banks	SH _{IN}	86.29	87.39	86.66	86.54	86.22	88.44	83.26	86.40
	SH _{NON}	13.71	12.61	13.34	13.46	13.78	11.56	16.74	13.60
Private sector banks (new)	SH _{IN}	78.34	78	79.18	81.47	78.3	80.6	76.85	78.96
	SH _{NON}	21.66	22	20.82	18.53	21.7	19.4	23.15	21.04
Private sector banks (old)	SH _{IN}	89.47	87.98	87	87.1	86.67	88.5	88.12	87.83
	SH _{NON}	10.53	12.02	13	12.9	13.33	11.5	11.88	12.17
Foreign banks	SH _{IN}	69.59	71.79	69.75	67.06	72.62	72.22	70.35	70.48
	SH _{NON}	30.41	28.21	30.25	32.94	27.38	27.78	29.65	29.52

Percentage of "Interest Income" in total income is denoted as SH_I,
Percentage of "Other Income" in total income is denoted as SH_{NON}

Table 3: Share of Fee Income in Non-interest Income and Diversification in Non-interest Income

Bank Groups		SH _{FOT}	DIV2
Public sector banks	Mean	0.43	0.41
	SD	0.17	0.05
Private sector banks (new)	Mean	0.62	0.40
	SD	0.16	0.05
Private sector banks (old)	Mean	0.40	0.40
	SD	0.15	0.05
Foreign banks	Mean	0.49	0.36
	SD	0.24	0.10

Table 4: Diversification Scores and Z Scores for Different Bank Groups

Bank Group		DIV1	DIV 2	Z SCORE
Public sector banks	Mean	0.23	0.41	6.98
	St Dev	0.03	0.05	4.73
Private sector banks (new)	Mean	0.30	0.40	4.86
	St Dev	0.04	0.05	4.67
Private sector banks (old)	Mean	0.22	0.40	6.02
	St Dev	0.05	0.05	5.68
Foreign banks	Mean	0.34	0.36	1.54
	St Dev	0.10	0.10	1.04

Table 5: Descriptives of Predictor and Control Variables

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Predictor variables					
SH _{NON}	81	0.11	0.07	0.00	0.51
DIV 1	81	0.27	0.09	0.10	0.50
SH _{FEE}	81	0.09	0.11	0.01	0.58
SH _{FOT}	80	0.46	0.21	0.07	0.91
DIV 2	75	0.39	0.08	0.16	0.49
Control variables					
LASS	68	5.01	1.01	2.89	6.67
LCAP	67	3.16	0.76	1.51	4.51
RNPA	80	2.28	5.71	0.00	48.32

Table 6: Descriptives of Key Dependent Variables

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	81	-11.50	4.60	0.9	2.2
ROE	81	-17.67	24.46	11.3	8.1
RAROA	81	-1.43	21.84	4.1	4.8
RAROE	81	-1.42	58.78	4.3	7.4
ZSCORE	68	-.64	21.88	4.5	4.5

Table 7: Model R square and ANOVA F Value

Model 1		
Independent Variable	Model R Square	ANOVA F Value
ROA	0.42	8.645*
ROE	0.55	14.672*
RAROA	0.38	7.456*
RAROE	0.17	2.53**
ZSCORE	0.36	6.611*
Model 2		
Independent Variable	Model R Square	ANOVA F Value
ROA	0.25	3.577*
ROE	0.52	12.089*

RAROA	0.33	5.424*
RAROE	0.15	1.912
ZSCORE	0.31	4.811*
Model 3		
Independent Variable	Model R Square	ANOVA F Value
ROA	0.46	9.240*
ROE	0.54	12.720*
RAROA	0.33	5.5078
RAROE	0.13	1.702
ZSCORE	0.32	4.983*

Table 8: Multiple Regression Results

MODEL 1			MODEL 2			MODEL 3		
Dependent Variables	Unstandardized Coefficients	Standard Error	Dependent Variables	Unstandardized Coefficients	Standard Error	Dependent Variables	Unstandardized Coefficients	Standard Error
ROA								
(Constant)	0.349	0.634	(Constant)	2.41*	0.89	(Constant)	1.41***	0.77
SH _{NON}	-0.194	1.822	SHFOT	0.98***	0.55	SHFEE	6.09*	1.2
DIV 1	5.904*	1.418	DIV 2	-2.68	1.63	DIV 2	-1.53	1.38
LASS	-0.204	0.135	LASS	-0.35**	0.13	LASS	-0.15	0.12
LCAP	0.132	0.163	LCAP	0.40**	0.17	LCAP	0.22	0.14
RNPA	-0.017	0.015	RNPA	0	0.05	RNPA	-0.01	0.04
ROE								
(Constant)	-9.86**	4.81	(Constant)	-0.34	5.96	(Constant)	-2.94	6.06
SH _{NON}	7.98	13.84	SHFOT	0.43	3.7	SHFEE	11.56	9.38
DIV 1	7.62	10.76	DIV 2	-18.04	10.99	DIV 2	-16.41	10.81
LASS	5.92*	1.03	LASS	6.09*	0.91	LASS	6.488*	0.95
LCAP	-3.21**	1.24	LCAP	-3.25*	1.11	LCAP	-3.49*	1.09
RNPA	-0.06	0.11	RNPA	-0.27	0.36	RNPA	-0.31	0.35
RAROA								
(Constant)	-0.81	3.44	(Constant)	0	4.44	(Constant)	-0.57	4.56
SH _{NON}	14.7	9.88	SHFOT	1.79	2.75	SHFEE	5.91	7.06
DIV 1	-3.25	7.68	DIV 2	-4.06	8.17	DIV 2	-2.62	8.13
LASS	2.35*	0.73	LASS	2.84*	0.68	LASS	3.05*	0.71
LCAP	-2.27**	0.89	LCAP	-2.74*	0.83	LCAP	-2.96*	0.82
RNPA	0	0.08	RNPA	-0.19	0.27	RNPA	-0.19	0.26
RAROE								

(Constant)	4.43	6.93	(Constant)	8.88	8.89	(Constant)	9.05	9.23
SH_{NON}	36.34** *	19.92	SH_{FOT}	7.78	5.52	SH_{FEE}	14.7	14.3
DIV 1	-1.13	15.49	DIV 2	-12.96	16.38	DIV 2	-8.09	16.48
LASS	0.97	1.48	LASS	1.71	1.35	LASS	2.23	1.45
LCAP	-2.52	1.79	LCAP	-3.14***	1.66	LCAP	-3.90*	1.66
RNPA	-0.08	0.16	RNPA	-0.7	0.53	RNPA	-0.68	0.54
ZSCORE								
(Constant)	-1	3.55	(Constant)	-0.42	4.52	(Constant)	-1.33	4.65
SH_{NON}	14.73	10.24	SH_{FOT}	2.3	2.8	SH_{FEE}	8.16	7.22
DIV 1	-2.19	7.99	DIV 2	-3.52	8.3	DIV 2	-1.58	8.24
LASS	2.39*	0.81	LASS	2.86*	0.72	LASS	3.17*	0.77
LCAP	-2.31**	0.97	LCAP	-2.73*	0.87	LCAP	-3.05*	0.87
RNPA	0	0.08	RNPA	-0.19	0.27	RNPA	-0.19	0.27

The superscripts *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 9: Impact Direction of Predictor Variable

Variables	Impact Direction				
	ROA	ROE	RARAOA	RAROE	ZSCORE
LASS	Negative	Positive*	Positive*	Positive	Positive*
LCAP	Positive	Negative*	Negative*	Negative*	Negative*
RNPA	Negative	Negative	Negative	Negative	Negative
DIV1	Positive*	Positive	Negative	Negative	Negative
SH_{NON}	Negative	Positive	Positive	Positive***	Positive
DIV2	Negative	Negative	Negative	Negative	Negative
SH_{FOT}	Positive***	Positive	Positive	Positive	Positive
SH_{FEE}	Positive*	Positive	Positive	Positive	Positive

The superscripts *, **, and *** denote statistical significance at the 1%, 5% and 10% levels, respectively.

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