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Income Diversification and Performance of Islamic Banks

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Abstract

This paper investigates the effect of income diversification on the performance of Islamic banks in Malaysia, Saudi Arabia, Kuwait, United Arab Emirates, Bahrain and Qatar where they operate alongside conventional banks in a dual banking system. Accounting data was drawn from 68 conventional and 42 Islamic banks from 1997 to 2009. The main focus was to see whether a greater reliance on non-financing income impacts on earnings quality and, if so, how this may vary between Islamic and conventional banks. Commission and fee income, trading income and other non-financing income constitute non-financing income. For conventional banks, this is known as non-interest income, but in Islamic banking the payment and receipt of interest is prohibited so this «other income» is referred to as non-financing income (that is, income unrelated to deposit-taking and loan granting). Islamic banks operate as universal banks and offer retail and wholesale financing plus investment banking services. Using various empirical approaches, we find that non-financing income positively influences banks' risk-adjusted performance on a net overall impact basis. Greater income diversification on its own increases income volatility and this negatively impacts banks' risk-adjusted performance. Islamic banks are found to be more focused on deposit/loan financing and less diversified in terms of non-financing income activities compared to conventional banks. We find that Islamic banks appear to be less susceptible to earnings volatility given their lower diversified income source. Islamic banks have lower profitability (on average) on a risk-adjusted basis when compared to their conventional counterparts.

Keywords: Islamic Banking; Income Diversification; Bank Risk; Performance.
JEL Codes: G21; G32.

1 Introduction

The changing legislative landscape and moves to a universal banking model have enabled both conventional and Islamic banks to diversify beyond their traditional lending activities. Questions arise as to the motives driving this activity. Amongst the various reasons proffered for banks to undertake diversification, efficiency gains through economies of scope and reduction of idiosyncratic risks remain the most popular. It is particularly interesting to examine diversification in Islamic banking as this type of activity is growing rapidly, albeit from a low base – according to TheCityUK (2011) assets of Islamic

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banks (including the Islamic windows of conventional banks) increased to $ 1,041bn at the end of 2009 from $ 947bn in 2008 and annual growth has been increasing at more than 10% over recent years (*Financial Times*, 2011). Islamic finance has evolved on the basis of *Shariá* law, which prohibits the payment or receipt of *Riba* – namely interest. As explained by Abedifar *et al.* (2013) financing principles are governed by Islamic rules on transactions *Figh Al-Muamelat* and abide by both Profit and Loss Sharing (PLS) and non-PLS arrangements (such as leasing contracts). As well as the prohibitions on interest, Islamic banks also face other restrictions – such as the use of many derivatives products, because according to *Shariá* all contracts should be free from excessive uncertainty *Gharar* (Obaidullah, 2005).

A significant recent literature has emerged investigating the motives for bank diversification in traditional banking. Choi and Kotrozo (2006), for instance, argue that banks' ability to re-channel lower cost capital into new activities plays a key role in encouraging diversification. From a resource perspective, managerial efficiency is able to be leveraged across products and geographical lines to facilitate diversification efforts. Earnings volatility reduction, increases in market share and exploitation of tax benefits arising from geographical diversification constitute other factors driving banks' decision to diversify. Valverde and Fernandez (2007) notice that output diversification enhances banks' revenue and helps procure market power advantages. In addition, diversification compensates for lower interest margin from stronger competition in traditional deposit-lending markets. Sanya and Wolfe (2011) add that diversification reinforces banks' role as delegated monitors in harnessing the effects of information asymmetry by cross-selling to customers. The aforementioned authors also note that diversification into non-interest income activities is also viewed as a way to lower cyclical variations in profitability. Likewise, idiosyncratic risks can be reduced through diversification. Ramasastri *et al.* (2004) cite reductions in information asymmetry, income stabilisation, efficiency promotion and the more effective use of relationships (driven by cross-selling motives) as key reasons driving the diversification trend (also see Yasuda (2005)). Landskroner *et al.* (2005) argue that diversification can be driven by exploitation of firm-specific assets in different markets, namely, it increases the efficiency of resource allocation and firms'/banks' debt capacity. Ber *et al.* (2001) also point out that a strategy to diversify can bring about economies of scope in information gathering which in turn provide diversified banks with better knowledge as to how best to serve their customers. Elsas *et al.* (2010) mention that banks that diversify can reap benefits from specific economies of scope given that operationally leveraged banks can enjoy cost advantages. In addition, Elsas *et al.* (2010) also suggest that dramatic changes in the financial industry, brought about by technological advances and deregulation, have driven banks to build new skill sets (or harness existing ones) so that they can capitalise on first mover advantage in chosen activities of diversification.

Wilson *et al.* (2010) and Goddard *et al.* (2008) cite three key reasons driving diversification. Firstly, agency problems arising from separation of ownership from management enable managers to take advantage by engaging in empire building behaviour when undertaking diversification. Secondly, banks that diversify can build market power given that they are able to exploit anti-competitive behaviour via cross subsidization and reciprocal

buying. Thirdly, diversified banks can seize upon opportunities to grow and cut costs after having attained economies of scale. Managerial exploitation of private benefits from diversification could also be the key driver behind the trend as also noted by Laeven and Levine (2007), Mercieca *et al.* (2007) and Harjoto *et al.* (2010). For an excellent review of the bank diversification literature see Stiroh (2010).

As far as we can ascertain there has been no study on diversification in Islamic banking. As noted by Abedifar *et al.* (2013) early work on Islamic banking focuses on the efficiency and production technology features of banks (El-Gamal and Inanoglu, 2002; Yudistra, 2004) whereas more recent studies examine competition (Chong and Liu, 2009; Weill, 2011), asset quality (Beck *et al.*, 2010), stability (Čihák and Hesse, 2010; Wagner, 2010) and other risk dimensions including loan default rates (Baele *et al.*, 2010). Apart from some notable exceptions, the empirical literature suggests no significant differences between Islamic and conventional banks in terms of their efficiency, competition and risk attributes. We use the approach first outlined in Stiroh (2006a) to investigate whether diversification effects are similar (or not) in Islamic and conventional banking.

2 Empirical Evidence on Bank Diversification

Literature that focuses on bank diversification typically finds somewhat mixed evidence as to its performance enhancing capabilities. Demsetz and Strahan (1997), for example, studied listed bank holding companies in the United States from 1980 to 1993 using market based data and found that asset size was positively linked to diversification gains. Kwan (1998) examined the accounts of bank holding companies that owned Section 20 subsidiaries from the 2nd quarter of 1990 to the 2nd quarter of 1997 and found that higher risks assumed by securities subsidiaries did not translate into greater profitability. Given the low return correlation between these Section 20 subsidiaries and the bank subsidiaries, diversification benefits did accrue to the bank holding companies. Using a similar approach Cornett *et al.* (2002) examined accounting data from forty bank holding companies in the United States with Section 20 subsidiaries and discovered that there was an improvement in operating pre-tax cash flow returns for bank holding companies with Section 20 subsidiaries. No rise in risks attributable to a shift into investment banking activities was found. Smith *et al.* (2003) used accounting data from Bankscope when studying 2,655 financial institutions across fifteen countries in the European Union from 1994 to 1998. Non-interest income activities were found to be more volatile compared to interest income business. Notwithstanding that, there was a negative correlation between non-interest income and interest income generating activities. Given this correlation, expansion into a wider range of activities brought about a reduction in earnings volatility. Studies by Ramasastri *et al.* (2004) (on Indian banks), Landskroner *et al.* (2005) (Israeli banks) and Lin *et al.* (2005) (Taiwanese banks) tend to find diversification benefits.

Stiroh (2006b) uses accounting and equity market information from 1997 to 2003 to look at diversification issues for listed bank holding companies in the United States. Total risks were measured by the standard deviation of weekly stock returns (over a year). Equity market volatility was found to be linked to operating choices, *i.e.* a shift to com-

merce and industry related loans and non-interest income generating activities. Overall it was found that larger banks were able to assume greater risks due to internal diversification. Hirtle and Stiroh (2007) drew upon accounting and market based data of 708 credit institutions in the United States from 1997 to 2004 and considered the impact on earnings and risks for financial institutions which specialised in retail financing. It was found that retail banking intensity was inversely related to risk-adjusted market return, and this was especially the case for small and medium size financial institutions. For large financial institutions, the relationship between retail banking intensity and risk-adjusted market returns was found to be neutral. Large financial institutions were found to have no impact on earnings volatility.

Chiorazzo *et al.* (2008) draw upon accounting data for 85 Italian banks from 1993 to 2003 when examining the impact that diversification exerted on returns. By and large, non-interest income activities were seen to exert a positive impact on risk-adjusted returns and gains were not linked to any particular source of non-interest income. Geyfman and Yeager (2009) examine the effects of universal banking on the risks of bank and financial holding companies during pre and post-passage of the 1999 Gramm-Leach-Bliley Act. Equity market based data on public listed banks between 1990 and 2007 were used. On the whole, it was found that universal banks had higher total and systematic risks than banks which were involved in traditional lending business. Post Gramm-Leach-Bliley era, universal banks were found to have achieved modest risk diversification benefits. Investment banking fee generating activities and other non-interest income activities were found to be negatively correlated. In fact, Geyfman and Yeager (2009) discovered that between the years 1990 to 2007, bank holding companies which were involved in investment banking activities had higher total and idiosyncratic risks but similar amount of systematic risks when compared to those which were purely involved in traditional commercial banking activities. Citing Leach (2008), Geyfman and Yeager (2009) were of the opinion that the collapse of the financial markets in the United States in Year 2008 was averted due to the presence of Gramm-Leach-Bliley Act as standalone investment banks were quickly absorbed by «healthy» universal banks.

So far we have reviewed the empirical bank diversification literature that mainly finds performance benefits from diversification. However, others fail to find such positive diversification effects. DeYoung and Roland (2001), for instance, conclude that the income diversification efforts of banks result in declines in performance due to increased earnings volatility. Overall, the aforementioned authors concluded that a shift towards fee based activities was associated with increased revenue volatility, earnings volatility and a higher degree of total leverage. Increased volatility is put down to a number of factors: lower switching costs for fee based income activities compared to lending activities; higher operating leverage (lower fixed costs) and financial leverage (lower capital requirements) of non-interest business areas. The greater volatility in earnings of fee-based income generating activities as enunciated by DeYoung and Roland (2001) is also found in many other studies including DeYoung and Rice (2003), Stiroh (2004a), Stiroh (2004b), Stiroh (2006b), Baele *et al.* (2007), Lepetit *et al.* (2008), Chiorazzo *et al.* (2008), Berger *et al.* (2010), Sanya and Wolfe (2011) and DeJonghe (2010). Others, such as Demirguc-Kunt and Huizinga (2013) in their large cross-country study, find

that diversification only has a positive impact on performance when banks are relatively under-diversified.

3 Methodology

According to Sanya and Wolfe (2011) there are three approaches used to study the impact of income diversification on the performance (risk and profitability) of banks. Firstly, there are studies that use risk return analysis based on simulation results. The second approach analyses actual data for functionally diversified banks involved in non-financing activities by using cross sectional and/or panel data regressions. The third utilises market data as an indication of reactions to a diversification strategy. Given that a majority of the conventional and Islamic banks under consideration are not publicly listed, it would be impossible to apply stock market-related data for analysis. (There are no established reliable sources of information to examine price movements of securities arranged and underwritten by the banks under consideration, particularly *sukuk* or Islamic-compliant debt securities that had been structured, arranged and placed by Islamic banks). As such, in this paper we use the second approach that has evolved around a modern portfolio theory framework. This approach, adopted by Stiroh and Rumble (2006a), has been applied extensively in the bank diversification-performance literature: Lin *et al*. (2005), Goddard *et al*. (2008), Stiroh (2004a, b), Stiroh (2006b), Elsas *et al*. (2010) and Sanya and Wolfe (2011). The following outlines the main features of this approach.

Stiroh and Rumble (2006a) examine the link between diversification of a financial holding company's revenue stream and its risk adjusted performance. Using modern portfolio theory, interest income and non-interest income are regarded as two separate assets. So following this model we can write:

$$E(R_P) = wE(R_A) + (1 - w)E(R_B) \tag{1}$$

$$\sigma_P^2 = w^2\sigma_A^2 + (1 - w)^2\sigma_B^2 + 2w(1 - w)\,\mathrm{Cov}(A, B) \tag{2}$$

where $E(R)$ and $\sigma 2$ represent expected return and variances of subscripted variables respectively whilst $Cov(A, B)$represents covariance between investment A (non-interest income generating activities) and B (net interest income generating activities). W represents the weightage given to each of the investments within the portfolio. Assuming asset A represents non-interest income generating activities and it offers higher and more volatile returns, a shift into non-interest income generating activities will engender several effects as follows. The expected portfolio will yield higher returns given that $E(RA) > E(RB)$. The portfolio variance will increase should the weighted variance of A (non-interest income generating activities) exceed the weighted variance of B (net interest income generating activities). The indirect diversification effect arising from the shift into non-interest income generating activities will depend on the weight given to the share of non-interest income activities *vis-à-vis* the overall income generating activities

and the covariance between non-interest income generating activities and interest income generating activities. One drawback from applying this approach lies in the inability to determine the return specifically from *A* (non-interest income generating activities) or *B* (net interest income generating activities) notwithstanding that the weights or share of *A* and *B* can be determined (this is because although we can apportion income to the different activities it is not possible to apportion costs given that this level of account segmentation is typically not provided by banks).

Stiroh and Rumble (2006a) go on to analyse the diversification-performance relationship by decomposing the impact of strategic shift into non-interest income activities into direct exposure and indirect diversification effects. Undertaking such decomposition facilitates a greater understanding of the channels through which increased non-interest income and diversification impact performance. Such a decomposition impacts performance in the following manner:

$$Y_i = \alpha + \beta_1 \overline{DIV_i} + \beta_2 \overline{SH_{NON,i}} + \gamma \overline{X}_i + \varepsilon_i \tag{3}$$

where Y represents a measure of performance (usually a profits or risk-adjusted return measure), *DIV* represents average revenue diversification, *SHnon* represents the average share of non-interest income and X various control variables. $\beta 1$ measures the impact of diversification and $\beta 1 > 0$ indicates that diversification improves risk adjusted performance. $\beta 2$ gauges the effect of a shift away from net interest income generating activities towards non-interest income generating activities. $\beta 2 > 0$ means that marginal increases in non-interest income can bring about higher risk adjusted performance. An impact arising from a change in *SHnon* on Y is shown as:

$$\partial Y/\partial SHnon = \beta 1(\partial DIV/\partial SHnon) + \beta 2 \tag{4}$$

The first term on the right hand side of Eqn.4, $\beta 1$ $(\partial DIV/\partial SHnon)$ demonstrates the indirect impact of a change in the non-interest income share through changes in diversification. This impact is dependent on $\beta 1$ and the magnitude of non-interest income share. An increase to *SHnon* will be diversifying $(\partial DIV/\partial SHnon > 0)$, if the bank has an initial share of non-interest income below 0.50. The opposite holds true: if the bank has initial share of non-interest income above 0.50, an increase in *SHnon* will be concentrating $(\partial DIV/\partial SHnon < 0)$ the source of income generation. $\beta 2$ gauges the direct exposure effect of increased non-interest income share and indicates the differences in ex-post profits associated with different activities. The sum of indirect and direct effects results in a net effect that demonstrates how risk adjusted performance changes with non-interest income share.

Based on the empirical specification as set out in Eqn.3 two estimation approaches are undertaken. Firstly, a pooled cross sectional analysis is undertaken where all variables are calculated over time and the second uses robust regression estimation to deal with omitted variables and potential endogeneity issues.

Table 1: Sample

Country	Islamic Banks			Conventional Banks			Total
	Commercial Bank	Investment Bank	Sub-total	Commercial Bank	Investment Bank	Sub-total	
Malaysia	16	0	16	19	13	32	48
Saudi Arabia	3	0	3	7	0	7	10
Kuwait	3	3	6	4	1	5	11
Qatar	2	0	2	5	0	5	7
Bahrain	7	3	10	8	1	9	19
United Arab Emirates	5	0	5	8	2	10	15
Grand Total	36	6	42	51	17	68	110

4 Data

Data were drawn from reported annual and quarterly financial statements of Islamic (and Islamic window) banks as well as conventional banks from Malaysia, Saudi Arabia, Kuwait, Qatar, Bahrain and the UAE. Annual financial data were from 1997 to 2009. Quarterly financial data collated were from the first quarter of the year 2002 to the second quarter of 2010. Accounting data rather than market data were used given that a large majority of the banks under consideration are not listed. We removed banks where: net financing income figures were negative; non-financing income figures were negative; and where income derived from the provision of non-financing related services were negative. The annual and quarterly financial information covers 68 conventional and 42 Islamic banks as shown in Table 1.

5 Dependent variables

The dependent variables used in the cross sectional and unbalanced panel estimations comprise various performance and risk measures. The principal performance measures were based on profit ratios comprising return on equity (ROE) and return on assets (ROA), risk adjusted return on equity (RARROE) and risk adjusted return on assets (RARROA). The risk measures comprise the Z-Score and coefficient of variation. Z-Score is a gauge of the number of standard deviations by which profit must decline before plunging a bank into insolvency and it is widely used in the literature as a stability indicator (see, for instance, Lepetit *et al*., 2008; Hesse and Čihák, 2007; Čihák *et al*., 2009; Laeven and Levine, 2009; Čihák and Hesse, 2010). As a cross check we also use the coefficient of variation for return on assets following Craig and dos Santos (1997), Smith *et al*. (2003) and Ramasastri *et al*. (2004).

6 Independent Variables

The income diversification measure applied is this same as in Stiroh and Rumble (2006) based on the Herfindahl Hirschmann index and similar to that used in a wide array of

studies, including Stiroh (2006b), Behr *et al*. (2007), De Jonghe (2010), and Elsas *et al*. (2010). The income diversification measure provides a gauge as to the variation in the breakdown of net operating revenue into net financing income and non-financing income. Non-financing income includes services and fee related income, trading income and other sources of non-financing income which in turn, include gains from the disposal of investments held by a bank. Islamic banks, especially those from the Arabian Gulf region, derive a portion of their non-financing income from gains realised on the sale of investments which can comprise real estate assets and equities in companies deemed to be Islamic compliant.

The simple equation from which the income diversification measure is derived is shown below as Eqn. 5:

$$DIV = 1 - (SH^2_{NET} + SH^2_{NON}) \tag{5}$$

$$SH_{NET} = NET/(NET + NON) \tag{5.1}$$

$$SH_{NON} = NON/(NET + NON) \tag{5.2}$$

where SH^2_{NET} represents share of net interest income (squared), SH^2_{NON} represents share of non-financing income (squared), *NET* represents net financing income and *NON* represents non-financing income. A higher value of *DIV* indicates a more diversified income mix whereas a value of zero means all income comes from a single source (100% concentration), 0.5 is an even split. Decomposition of the income diversification measure into non-financing income facilitates interpretation of the impact that a change in strategy can exact on the share of non-financing income:

$$\delta Y/\delta SH_{NON} = * \beta_1 \text{ x } (\delta DIV/\delta SH_{NON}) + \beta 2 \tag{5.3}$$

where $* \beta_1$ x $(\delta DIV/\delta SH_{NON})$] demonstrates the indirect exposure impact of a change in non-interest income share through changes in diversification and β_2 the direct effect of the increased non-interest income share. As mentioned in Stiroh and Rumble (2006) and Elsas *et al*. (2010) the coefficient on the income diversification measure gauges the indirect exposure effect of increasing non-interest income through diversification which in fact acts as a covariance. The coefficient on share of non-interest income shows the direct effect arising from changes in share of non-interest income. The sum of the direct and indirect effects demonstrates how non-financing income can bring about changes in risk-adjusted performance.

Share of non-financing income was also included in the empirical specification as an independent control variable. A bank with a share of non-financing income of 0.25 and another bank with a share of net financing income of 0.75 will yield the same income diversification measure. Purely on the strength of the income diversification measure, these two banks will appear to be equally diversified. However, the operating strategies driving each of these two banks are entirely different. The earnings quality of these banks is equally likely to be different. Stiroh (2004b) and Stiroh and Rumble (2006) refer to the above shortcomings of the diversification measure based on the Herfindahl Hirschman index. Recognising the above shortcoming, Stiroh and Rumble (2006) further reconstituted the formula that determines income diversification measure from

one that comprised share of financing and non-financing income into one that is based entirely on the share of non-financing income. The reformulated income diversification measure is given as:

$$DIV = 2SH_{NON} - 2SH^{2}_{NON} \tag{5.4}$$

The reconstituted measure simply now reflects how changes in the share of non-financing income alone impacts on income diversification. In addition, following the previous literature that examines bank income diversification (Stiroh and Rumble, 2006; Goddard *et al.*, 2008; Elsas *et al.*, 2010) we also include a number of other controls. These include: Non-interest income/(Non-interest income + Net interest income (shnon); natural log of bank assets (LnAssets); equity/assets ratio (eqyass); loan/assets ratio (finass); asset growth over the relevant time period – quarterly or yearly (totassgrw); non-interest income derived from provision of services/total operating revenue (sernonint); non-interest income derived from other than trading and provision of fiduciary services/total operating revenue (othnonint); loans extended to commerce and industry/total loans (cindfin); loans extended to consumers/total loans (consfin); loans extended to the real estate sector/total loans (refin); loans extended to sectors other than commerce, industry, real estate and consumers/total loans (othfin); and finally a dummy variable equalling 1 for Islamic and zero for conventional banks (_ltype_1). Appendix 1 reports the descriptive statistics and Appendix 2 the correlation coefficients.

7 Results

Table 2 sets out the results arising from weighted and robust regressions by using as dependent variables: return on equity, return on assets, coefficient of variation for return on equity and coefficient of variation for return on assets. As can be seen, robust regressions delivered more statistically significant relationships as compared to those from the weighted regressions. For instance, when a weighted regression was performed against the coefficient of variation for return on equity as the dependent variable, the only statistically significant relationship found involved the income diversification measure. Similarly, no statistically significant relationships were found involving the income diversification measure and share of non-financing income when a weighted regression was performed against mean return on assets and against coefficient of variation for return on assets, respectively.

As can be seen in Table 2, revenue diversification (div) mainly has a negative influence on bank profitability, whereas the share of non-financing income (shnon) has a positive link to ROE and some evidence of a similar link to ROA. So it seems that earning more non-financing income as a proportion of total income boosts profits and a more concentrated income profile (less diversification) boosts performance. The Table also shows some evidence that diversification increases risk (CVROE) whereas increasing the share of non-financing income can have the opposite effect – reducing risk (for the CVROE and CVROA robust regression estimates at least). The Table also highlights the positive

Table 2: Profits, Risk and Diversification – Weighted and robust regression results

	Mean ROE		CVROE		Mean ROA		CVROA	
	Weighted	Robust	Weighted	Robust	Weighted	Robust	Weighted	Robust
div	−.29270491***	−.14592712***	7.3205523*	1.0145144**	0.00367922	−.02496015***	9.9667823	−1.7038147
	(0.08043069)	(0.02971856)	(3.2698837)	(0.3491350)	(0.05107759)	(0.00387171)	(5.81648320)	(0.98766091)
shnon	.19576296***	.19031375***	−0.74624544	−2.1734037***	−0.04446808	.03107666***	−7.9804806	−5.287662***
	(0.05082711)	(0.02033418)	(6.28002150)	(0.23888687)	(0.02944086)	(0.00264509)	(4.34454420)	(0.67477498)
LnAssets	.01828337*	.02143903***	−0.3210783	−.25903756***	.01392018***	.00280544***	−1.0653983*	−.30086066**
	(0.00846104)	(0.00320012)	(0.35742613)	(0.03759513)	(0.00401437)	(0.00041634)	(0.49183871)	(0.10620838)
eqyass	−0.09120239	−.10614489***	−1.3468719	0.2960019	.41376406***	.08515914***	−12.55569***	−6.3662813***
	(0.05328928)	(0.02558123)	(5.81119660)	(0.30052945)	(0.08314139)	(0.00332612)	(2.99463180)	(0.84847385)
finass	.18641797*	.08361271***	5.761857	−.86708425***	0.02573364	.01581051***	−15.250069*	−2.1467782**
	(0.09439399)	(0.02128639)	(13.1880470)	(0.2500735)	(0.0253483)	(0.00277877)	(7.22042090)	(0.70912864)
totassgrw	−0.00089386	−0.00095995	−0.08855785	.02659953***	0.00038964	−0.00004919	.32958173*	−.57177089***
	(0.00071308)	(0.00061902)	(0.15266771)	(0.00727225)	(0.00053513)	(0.00029685)	(0.14600244)	(0.07572457)
trdnonint	0.0186425	0.01754094	6.3102511	−0.06611659	0.00203378	0.0013948	3.5014812	−0.35638917
	(0.03204089)	(0.01013365)	(5.33881100)	(0.11905065)	(0.01618381)	(0.00131734)	(3.32667330)	(0.33612134)
sernonint	−0.04808342	0.00847191	6.6788499	−.56610881***	−0.01387701	−0.00158108	2.9777091	−.88799783*
	(0.04261283)	(0.01271968)	(5.81597960)	(0.14943135)	(0.02142216)	(0.00165367)	(3.85593470)	(0.42190449)
cindfin	0.03912573	−0.02018267	−12.684492	−0.15720065	0.00516756	−0.00136976	8.0429686*	0.72554455
	(0.02968386)	(0.01619167)	(15.696407)	(0.19022047)	(0.02079848)	(0.00212767)	(3.20618620)	(0.54317588)
consfin	.08934122*	.08352136***	−10.582133	−.84343378**	.05298391*	.01265571***	−4.5546796	−4.5526445***
	(0.04449157)	(0.02320455)	(7.3178335)	(0.27260816)	(0.02620043)	(0.00301654)	(3.5718472)	(0.76951557)
refin	−0.00009291	−0.02200073	14.76743	−0.04005943	.13573973***	−.0117443***	0.72221424	4.3749083***
	(0.04514421)	(0.02068343)	(14.701483)	(0.24298993)	(0.03279526)	(0.0026893)	(3.38356400)	(0.68610081)
othfin	−.07123847*	−.03828843*	13.262102	.44072624*	0.0061749	−.00710066***	1.6025291	1.4593715**
	(0.02952818)	(0.01516286)	(10.924588)	(0.17813403)	(0.02278617)	(0.0019727)	(1.9900333)	(0.50343061)
_Itype_1	−0.02446519	−0.00810012	−2.4968964	−0.02769755	−0.00071507	−0.00042488	2.1764004	−0.0477329
	(0.02175482)	(0.00887887)	(3.5394629)	(0.1043094)	(0.01179353)	(0.00115712)	(1.6410239)	(0.29521433)
_cons	−0.15407266	−.23136451***	1.5826857	7.0599277***	−.26547954**	−.04445836***	26.590986*	14.575437***
	(0.13889447)	(0.05413347)	(10.160642)	(0.6359626)	(0.08090128)	(0.00704278)	(10.3081)	(1.7966999)
N	581	581	581	581	581	580	580	579
r2_a	0.09492495	0.27339185	−0.00923929	0.25288053	0.36989674	0.76995437	0.05150148	0.44348541
rmse	0.18403894	0.07849688	46.174843	0.92218508	0.0909943	0.01020431	15.595961	2.6030461

Key: * $p < 0.05$ signifies statistical significance at 5% level; ** $p < 0.01$ signifies statistical significance at 1% level; and *** $p < 0.001$ signifies statistical significance at 0.1% level. N = number of observations, r2_a = adjusted r-squared, rmse = robust median standard errors, standard errors are expressed in parenthesis.

Table 3: Risk-adjusted Profits, Z-Score and Diversification – Weighted and robust regression results

Dep. Variable	RARROE		RARROA		Z-Score	
option	Weighted	Robust	Weighted	Robust	Weighted	Robust
div	−1.1953848***	−.59595539***	0.0446172	−.30268721***	0.04461712	−.30268724***
	(0.32847286)	(0.12136836)	(0.61940854)	(0.04695152)	(0.61940857)	(0.04695151)
shnon	.79948118***	.77722704***	−0.53925629	.37686091***	−0.53925624	.3768609***
	(0.20757407)	(0.08304325)	(0.35702388)	(0.03207657)	(0.35702389)	(0.03207656)
LnAssets	.0746679*	.08755539***	.16880751***	.0340211***	.1688075***	.03402109***
	(0.03455426)	(0.01306904)	(0.0486815)	(0.00504891)	(0.0486815)	(0.00504891)
eqyass	−0.37246372	−.43348775***	5.017641***	1.0327093***	17.144458***	13.159526***
	(0.2176294)	(0.1044718)	(1.0082404)	(0.04033521)	(1.0082405)	(0.04033521)
finass	.76131695*	.34146799***	0.31206715	.19173113***	0.31206718	.19173112***
	(0.38549796)	(0.08693202)	(0.30739419)	(0.03369762)	(0.3073942)	(0.03369762)
totassgrw	−0.00365047	−0.00392036	0.00472509	−0.00059657	0.00472509	−0.00059657
	(0.00291217)	(0.00252802)	(0.00648948)	(0.00359985)	(0.00648948)	(0.00359985)
trdnonint	0.07613459	0.07163588	0.02466328	0.01691453	0.02466326	0.01691452
	(0.13085259)	(0.04138508)	(0.19625806)	(0.01597513)	(0.19625807)	(0.01597513)
sernonint	−0.19636905	0.03459864	−0.16828391	−0.01917345	−0.16828394	−0.01917345
	(.17402758)	(0.0519462)	(0.25978255)	(0.02005378)	(0.25978256)	(0.02005378)
cindfin	0.15978653	−0.08242449	0.06266599	−0.01661081	0.06266601	−0.0166108
	(0.12122666)	(0.06612555)	(0.25221933)	(0.02580188)	(0.25221934)	(0.02580188)
consfin	.36486282*	.34109493***	.6425262*	.15347349***	.64252625*	.15347352***
	(0.18170023)	(0.09476564)	(0.31772778)	(0.03658097)	(0.31772779)	(0.03658097)
refin	−0.00037942	−0.08984932	1.6460908***	−.14242098***	1.6460908***	−.14242097***
	(0.18436556)	(0.08446958)	(0.39770208)	(0.03261259)	(0.39770209)	(0.03261259)
othfin	−.29093254*	−.15636707*	0.0748819	−.08610845***	0.07488191	−.08610844***
	(0.12059087)	(0.06192399)	(0.27632367)	(0.02392259)	(0.27632368)	(0.02392258)
_Itype_1	−0.09991399	−0.03308029	−0.00867156	−0.0051524	−0.00867159	−0.00515241
	(0.08884503)	(0.03626064)	(0.14301803)	(0.01403213)	(0.14301803)	(0.01403213)
_cons	−0.62922114	−.94487527***	−3.2194218**	−.53913835***	−3.2194217**	−.53913823***
	(0.56723458)	(0.22107702)	(0.98107495)	(0.08540653)	(0.98107496)	(0.08540652)
N	581	581	581	580	581	581
r2_a	0.09492495	0.27339186	0.36989674	0.76995437	0.89221563	0.99733852
rmse	0.75160118	0.32057536	1.1034712	0.12374582	1.1034712	0.12374581

Key: * $p < 0.05$ signifies statistical significance at 5% level; ** $p < 0.01$ signifies statistical significance at 1% level; and *** $p < 0.001$ signifies statistical significance at 0.1% level. N = number of observations, r2_a = adjusted r-squared, rmse = robust median standard errors, standard errors are expressed in parenthesis.

link between bank size and profits (and an inverse link to our risk indicators). We also see that consumer credit (consfin) is more profitable yet more risky than other types of credit and there is no difference in the profitability or risk features of conventional or Islamic banks as illustrated in the Islamic dummy coefficient (_ltype_1).

Our findings on the impact of an increase in non-financing income are diametrically opposed to those of Stiroh and Rumble (2006) where they find that a shift towards non-interest income generating activities assumes more risk, whereas increasing income diversification has risk reducing effects. Our findings also differ from those of Stiroh (2004b) and DeYoung and Roland (2001). In these studies, income diversification has a positive impact on earnings, whilst an increase in the share of non-financing income negatively impacts earnings due to higher leverage.

Table 3 examines the link between risk-adjusted returns as well as solvency risk (using the Z-Score). This again provides some evidence that diversification reduces risk-adjusted returns, whereas a shift to more non-financing income increases performance (at least for risk-adjusted ROE and for the robust regression estimates for ROA). Bigger banks have higher risk-adjusted ROE, lower risk-adjusted ROA, and lower insolvency risk. Banks that

Table 4: Robust Regression Estimates – Determinants of Risk Adjusted Returns and Insolvency Risk for Conventional and Islamic Banks

Dep. Variable	RARROE		RARROA		Z-Score	
option	Robust		Robust		Robust	
Bank Type	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic
div	−.49461199*	−.54681383**	−0.11135237	−.41541584***	−0.11135243	−.4154159***
	(0.19898292)	(0.16546774)	(0.07022393)	(0.07668753)	(0.07022393)	(0.07668753)
shnon	.81132476***	.7451426***	.2491432***	.50333536***	.24914319***	.50333539***
	(0.11769162)	(0.13137567)	(0.04166646)	(0.06062918)	(0.04166646)	(0.06062918)
eqyass	−.56339684***	−0.01112774	.21554396***	1.0004111***	12.342361***	13.127228***
	(0.11884843)	(0.22648521)	(0.04162718)	(0.1048357)	(0.04162718)	(0.1048357)
LnAssets	.052365***	.14301867***	0.00665074	.05039667***	0.00665073	.05039666***
	(0.01574973)	(0.02487768)	(0.00551864)	(0.01161415)	(0.00551864)	(0.01161415)
totassgrw	−0.01163554	−0.00344911	.1210581***	.02616855*	.12105812***	.02616857*
	(0.00973004)	(0.00264103)	(0.00870089)	(0.01273901)	(0.00870089)	(0.01273901)
finass	.56202486***	0.07251682	.18975682***	0.10431287	.1897568***	0.10431289
	(0.11874825)	(0.13623667)	(0.04165339)	(0.06284259)	(0.04165338)	(0.06284258)
sernonint	−0.0909887	0.14287503	−0.0399462	0.02239931	−0.03994621	0.02239931
	(0.07439478)	(0.076756)	(0.02605752)	(0.0355255)	(0.02605752)	(0.0355255)
trdnonint	.16973494**	0.11242335	.07164204***	0.02561535	.07164201***	0.02561534
	(0.06070432)	(0.0570714)	(0.02126623)	(0.02639987)	(0.02126623)	(0.02639987)
cindfin	−0.02281927	−.31170482*	−0.00941025	−0.09994515	−0.00941023	−0.09994512
	(0.07939131)	(0.12651883)	(0.02781297)	(0.06067026)	(0.02781297)	(0.06067026)
consfin	.31777868*	.42042835**	.16515464***	0.1125763	.16515472***	0.11257635
	(0.12344644)	(0.15305007)	(0.04335503)	(0.0706131)	(0.04335503)	(0.07061309)
refin	−0.18217155	0.10686196	−.2014445***	−0.03329637	−.2014445***	−0.03329634
	(0.09695266)	(0.17967583)	(0.03411702)	(0.08302822)	(0.03411701)	(0.08302822)
othfin	−0.14246306	−0.0013881	−0.05128346	−0.01621699	−0.05128344	−0.01621702
	(0.07437707)	(0.13620922)	(0.02611571)	(0.06301337)	(0.02611571)	(0.06301337)
_cons	−0.4829083	−1.8246096***	−0.05967177	−.78289104***	−0.05967161	−.78289092***
	(0.28256172)	(0.36815112)	(0.09899891)	(0.17233721)	(0.0989989)	(0.17233721)
N	384	197	383	196	383	196
r2_a	0.35412227	0.33224012	0.59197721	0.74918588	0.99787636	0.99538035
rmse	0.31324246	0.31791496	0.10971353	0.14664303	0.10971351	0.14664302

Key: * $p < 0.05$ signifies statistical significance at 5% level; ** $p < 0.01$ signifies statistical significance at 1% level; and *** $p < 0.001$ signifies statistical significance at 0.1% level. N = number of observations, r2_a = adjusted r-squared, rmse = robust median standard errors, standard errors are expressed in parenthesis.

do more consumer financing are more profitable (on a risk-adjusted basis) and have lower insolvency risk. Again we find no difference between Islamic and conventional banks.

Table 4 uses robust regression to examine the determinants of risk-adjusted returns (both ROE and ROA) and insolvency risk (measured using the Z-Score) for both conventional and Islamic banks. As found in Table 3 the inverse relationship between risk-adjusted returns and the diversification measure (div) is found for Islamic banks, but only for conventional banks in the case of risk-adjusted ROA. We also find an inverse link between diversification and insolvency risk. In the case of the share of non-financing income this appears positively linked to risk-adjusted returns for both types of banks. Banks with a higher share of non-financing income also appear less risky, given the positive relationship with Z-Scores. If we re-estimate the model using the percentile breakdowns of the share of non-financing income, as shown in Table 5, we find that where financing and non-financing income is evenly split (around the 50% level) this has a strong negative impact on risk-adjusted ROE performance, increasing the share of non-financing in this range (however) tends to boost returns.

Table 5: Robust Regression Estimates – Determinants of Risk-Adjusted Return on Equity according to Percentiles Share of Non-financing Income

RARROE	<---------- Share of non-financing income percentile ---------->							
Dep. var.	5th to 15th	15th to 25th	25th to 40th	40th to 50th	50th to 60th	60th to 75th	75th to 90th	90th to 99th
div	−10.492764	33.808595	−37.503517	−557.45274**	283.33703	−4.0820056	0.62249455	0.46531842
	(14.593745)	(52.864143)	(63.968513)	(169.73899)	(148.6968)	(17.903443)	(2.287368)	(30.815117)
shnon	17.249959	−39.385111	34.83475	382.70598**	−151.95927	0.90848628	0.6040809	2.8039847
	(21.82122)	(59.291938)	(55.712696)	(115.09841)	(76.545089)	(3.8810356)	(1.5767374)	(52.683387)
LnAssets	.14473835**	.14102457***	0.04372598	−0.02187203	0.00751816	.11612841**	.13950174***	0.11380585
	(0.04602808)	(0.02606388)	(0.03924949)	(0.03492591)	(0.03933701)	(0.03445161)	(0.03343924)	(0.13669815)
eqyass	0.12121155	−0.0681271	−0.75720796	−3.0374718**	−0.33523051	−.66018074*	0.09293038	−1.0443896
	(0.40472018)	(0.25628496)	(0.4183899)	(0.93224945)	(0.3170776)	(0.27605297)	(0.29333558)	(0.51625569)
totassgrw	0.08660441	−0.0455528	0.36140313	0.23091699	−0.21894478	−0.06586132	−0.00988908	0.15608316
	(0.1073599)	(0.0449927)	(0.21420839)	(0.21005136)	(0.14871907)	(0.07021849)	(0.01043985)	(0.15815512)
trdnonint	.39239335***	−.42112512**	0.09447571	.53149323***	0.08736474	0.15580758	0.00186215	0.68673102
	(0.09874487)	(0.15197357)	(0.32074233)	(0.13239158)	(0.3024907)	(0.16735559)	(0.11698194)	(0.58407516)
sernonint	−0.07325423	−.44139386**	0.46295023	0.30940219	−0.2440894	0.06452567	−0.11013369	0.16738271
	(0.15270304)	(0.13800284)	(0.25591642)	(0.15683484)	(0.30874835)	(0.15404981)	(0.13317159)	(0.32390456)
cindfin	−0.01119703	0.23126581	−0.07114821	−0.2941898	0.14620204	0.26970182	0.06365328	−1.4941088
	(0.23218699)	(0.13538365)	(0.21761244)	(0.15856667)	(0.23197959)	(0.16872035)	(0.16371624)	(0.87351001)
consfin	−0.16529359	.64175683***	1.1027748***	0.3042233	0.21861047	0.43129071	−0.01349328	−56.244589
	(0.30792856)	(0.17784253)	(0.31204999)	(0.21932156)	(0.31667661)	(0.21682444)	(0.24573479)	(141.78604)
refin	−0.42946086	−.54951548**	0.05770432	−0.16124544	0.72081488	−0.06238458	0.20496628	0.53962582
	(0.26601866)	(0.15916934)	(0.19255615)	(0.21063547)	(0.37454072)	(0.19893823)	(0.24771377)	(2.2537023)
_Itype_1	0.11024264	−0.05104805	0.20460179	−0.13865092	−0.17190989	0.00757758	0.15119213	0.02075645
	(0.15411393)	(0.07810738)	(0.12444393)	(0.10459489)	(0.16506901)	(0.09317377)	(0.08914352)	(0.1965209)
_cons	−1.7312922	−4.3005371	4.8411935	121.22062**	−75.257523	0.25881527	−2.242316	−3.0008634
	(0.92185898)	(5.133252)	(10.03111)	(37.041546)	(41.003833)	(7.2625612)	(2.1688461)	(52.486554)
N	56	57	88	63	55	92	88	49
r2_a	0.4995883	0.65316003	0.2188139	0.73122803	0.25792785	0.29547732	0.26730279	0.16823329
rmse	0.27474275	0.17838146	0.32487348	0.24187117	0.32717773	0.30745469	0.32611005	0.54267494

Key: *p < 0.05 signifies statistical significance at 5% level; **p < 0.01 signifies statistical significance at 1% level; and ***p < 0.001 signifies statistical significance at 0.1% level. N = number of observations, r2_a = adjusted r-squared, rmse = robust median standard errors, standard errors are expressed in parenthesis.

8 Conclusion

This paper investigates the effect of income diversification on the performance of Islamic banks in Malaysia, Saudi Arabia, Kuwait, United Arab Emirates, Bahrain and Qatar, where they operate alongside conventional banks in a dual banking system. Accounting data was drawn from 68 conventional and 42 Islamic banks from 1997 to 2009. The main focus was to see whether a greater reliance on non-financing income impacts on earnings quality and if so, how this may vary between Islamic and conventional banks. Commission and fee income, trading income and other non-financing income constitute non-financing income. For conventional banks, this is known as non-interest income, but in Islamic banking the payment and receipt of interest is prohibited so this «other income» is referred to as non-financing income (that is, income unrelated to deposit-taking and loan granting). Islamic banks operate as universal banks and offer retail and wholesale financing plus investment banking services.

Using various modelling approaches, we find that increasing non-financing income as a share of total income can boost risk-adjusted returns and a more concentrated revenue profile also has the same impact. There is some evidence that this relationship is more evident for Islamic banks, given their lower levels of non-financing income, compared to conventional counterparts. We also find that in the case of Islamic banks a more concentrated revenue structure reduces insolvency risk.

Appendix 1 Descriptive Statistics

Conventional Banks

Statistics	quaobs	roe	roa	RAR ROE	RAR ROA	Mean ROE	Mea ROA	SD ROE	SD ROA	CV ROE	CV ROA	Z-Score	eqyass	finass
N	454	454	454	454	454	454	454	456	456	454	453	454	454	454
mean	15.4692	0.14339	0.0366	0.58559	0.44389	0.14339	0.036604	0.244863	0.0824619	4.574609	6.5986	2.829464	0.1967185	0.458947
p50	15	0.1404	0.0167	0.57338	0.20252	0.1404	0.0167	0.244863	0.0824619	1.624297	4.5559	1.669256	0.1160500	0.524350
max	34	1.3461	0.8856	5.49737	10.7395	1.3461	0.8856	0.244863	0.0824619	816.2083	412.31	17.317090	0.9693000	0.831300
min	0	−1.5074	−0.2036	−6.15611	−2.46902	−1.5074	−0.2036	0.244863	0.0824619	−153.0391	−103.08	−0.533580	0	0
sd	8.02494	0.170552	0.09039	0.69652	1.09616	0.17055	0.090392	0	0	40.93003	22.795	2.983391	0.1963472	0.2226
cv	0.51877	1.189425	2.46942	1.18943	2.46942	1.18943	2.469423	0	0	8.94722	3.4545	1.054401	0.9981123	0.48502

Statistics	totassgrw	totassusd	LnAssets	sernonint	trdnonint	othnonint	consfin	cindfin	refin	findep	othfin	div	shnon	shnet
N	387	454	454	454	454	454	448	448	448	452	448	454	454	454
mean	0.28986	1.26E+07	15.4550	0.6072	0.21296	0.17986	0.130183	0.30773	0.1732897	4.1777	0.2258	0.3981608	0.433295	0.5667
p50	0.1224	7907067	15.8833	0.59075	0.1994	0.13055	0.0799	0.2951	0.1055	0.8107	0.1632	0.43285	0.36755	0.63245
max	30.4796	7.79E+07	18.1705	7.7064	6.4602	1.7653	0.8592	0.9946	0.6687	1534.8830	1	0.5	1	0.9863
min	−0.6855	63736	11.0625	0.0377	−8.2137	−6.0067	0	0	0	0	0	0	0.0137	0
sd	1.67419	1.45E+07	1.6290	0.4198	0.57781	0.39837	0.14992	0.23498	0.1775049	72.16020	0.2395	0.1097114	0.215805	0.21581
cv	5.77579	1.156376	0.1054	0.69137	2.71323	2.21492	1.151604	0.76359	1.024324	17.27291	1.0604	0.2755453	0.498056	0.38081

Islamic Banks

Statistics	quaobs	roe	roa	RAR ROE	RAR ROA	Mean ROE	Mea ROA	SD ROE	SD ROA	CV ROE	CV ROA	Z-Score	eqyass	finass
N	239	239	239	239	239	239	239	239	239	239	239	238	238	238
mean	8.2636	0.112621	0.02596	0.45994	0.31487	0.11262	0.025965	0.24486	0.0824619	3.469668	9.2298	2.96089	0.218109	0.47187
p50	9	0.0984	0.0132	0.40186	0.16007	0.0984	0.0132	0.24486	0.0824619	2.00707	4.50611	1.979096	0.15555	0.5183
max	21	4.6674	0.2858	19.0613	3.46584	4.6674	0.2858	0.24486	0.0824619	244.8625	164.92	13.88521	0.9995	1.1588
min	0	−1.6809	−0.4435	−6.86467	−5.37824	−1.6809	−0.4435	0.24486	0.0824619	−111.3011	−164.92	−2.179189	−0.019	0
sd	8.04201	0.344011	0.06438	1.40491	0.78076	0.34401	0.064383	0	0	18.56446	24.135	2.823266	0.210833	0.26037
cv	0.97319	3.054588	2.4796	3.05459	2.4796	3.05459	2.479603	0	0			0.9535196	0.96664	0.55177

Statistics	totassgrw	totassusd	LnAssets	sernonint	trdnonint	othnonint	consfin	cindfin	refin	findep	othfin	div	shnon	shnet
N	197	238	238	238	238	238	238	238	238	238	238	238	238	238
mean	1.09131	4427345	14.5097	0.4819	0.06363	0.44607	0.126271	0.18946	0.1483794	2.376401	0.1876	0.2898466	0.360748	0.63925
p50	0.2762	2266987	14.6339	0.4076	0.0447	0.4166	0.01705	0.1416	0.10125	0.809	0.1348	0.3281	0.28315	0.71685
max	124.077	4.55E+07	17.6338	4.2194	1.0347	3.6505	0.9032	0.954	0.9967	100.1217	0.8908	0.5	1	1
min	−0.5287	39795	10.5915	0	−6.8699	−0.8803	0	0	0	0	0	0	0	0
sd	8.85164	7159094	1.31993	0.44831	0.54037	0.4247	0.181085	0.20731	0.1690022	7.872618	0.2072	0.1619144	0.293338	0.29334
cv	8.11105	1.617017	0.09097	0.9303	8.49253	0.95209	1.434099	1.09424	1.138987	3.312833	1.1043	0.558621	0.81314	0.45888

Appendix 2 Correlation Coefficients

	div	shnon	netint	nnonint	eqyass	finass	findep	LnAssets	totassgrw	sernonint	trdnonint	cindfin	consfin	refin
div	1.0000													
shnon	−0.0792	1.0000												
netint	0.1794*	−0.2243*	1.0000											
nnonint	0.2793*	0.0094	0.8388*	1.0000										
eqyass	−0.3117*	0.4450*	−0.2318*	−0.1937*	1.0000									
finass	0.2784*	−0.5854*	0.3536*	0.2689*	−0.3859*	1.0000								
findep	0.0327	0.0327	−0.0259	−0.0256	0.0387	0.058	1.0000							
LnAssets	0.4361*	−0.3513*	0.6318*	0.6049*	−0.6112*	0.5121*	−0.0879	1.0000						
totassgrw	−0.0979	−0.0427	−0.0411	−0.0419	−0.0242	0.0541	−0.0078	−0.0219	1.0000					
sernonint	−0.1273	−0.1249	0.0494	−0.0060	0.0333	−0.0042	−0.0152	−0.0248	0.0241	1.0000				
trdnonint	0.1104	0.0306	0.0342	0.0314	−0.0294	0.0143	0.0229	0.0294	−0.0032	−0.6661*	1.0000			
cindfin	0.2699*	−0.2510*	0.2036*	0.2180*	−0.3063*	0.2272*	0.0866	0.2531*	−0.0032	−0.0059	0.1053	1.0000		
consfin	0.1665	−0.2734*	0.2313*	0.1627	−0.1013	0.3314*	−0.0358	0.2340*	−0.0024	0.0387	−0.0030	0.0748	1.0000	
refin	0.1050	−0.2928*	0.0711	0.0341	−0.3046*	0.2404*	−0.0370	0.2146*	−0.0230	−0.0494	0.0928	0.1462	0.0653	1.0000
type	−0.3684*	−0.1394	−0.1530	−0.2576*	0.0505	0.0260	−0.0146	−0.2820*	0.0712	0.1374	−0.1247	−0.2423*	−0.0116	−0.0679

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