

Institutional Quality, Financial Factors and Shadow Banking

(Kualiti Institusi, Faktor Kewangan dan Perbankan Bayangan)

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ABSTRACT

This paper aims to examine the relationship between the traditional banking, financial factors, and shadow banking. The financial factors are traditional bank size, household debt and non-performing loan. Using panel data from 2009 to 2019 for 26 countries, the study applied quantile regression to analyze the relationship nexuses across different levels of shadow banking. Findings revealed positive relationships between traditional and shadow banking in all quantiles, implying the Originate-to-Distribute (OTD) model. Household debt and shadow banking produced positive relationships at lower levels of shadow banking but turned negative at higher levels, implying greater agency problem and securitization practice at lower quantiles. We further found positive relationship between non-performing loan and shadow banking. This implies that banks tend to practice reactive risk management. Political governance has positive relationship with shadow banking at all quantiles. Relationship between economic governance and shadow banking was negative at lower quantiles but turned positive at higher quantiles. Of serious concern are the negative findings for institutional governance that imply lower quality of rule of law and higher corruption that play the invisible hand to the growth of shadow banking. This paper calls for targeted regulations on risk transferring and sharing between shadow banking and traditional banking and higher transparency on institutional governance.

Keywords: Shadow banking; securitization; traditional banks; institutional quality; quantile regression; Originate-to-Distribute (OTD) model

ABSTRAK

Kertas kerja ini bertujuan untuk mengkaji hubungan antara kualiti institusi, faktor-faktor kewangan dan pertumbuhan perbankan bayangan. Faktor-faktor kewangan ialah saiz perbankan tradisional, hutang isirumah dan pinjaman tidak berbayar. Menggunakan data panel dari 2009 hingga 2019 untuk 26 negara, kertas kerja ini menggunakan regresi kuantil untuk menganalisis perhubungan merentas peringkat perbankan bayangan yang berbeza. Penemuan hubungan positif antara perbankan tradisional dan perbankan bayangan untuk semua kuantil, mengimplikasikan model Asal-kepada-Agihan (OTD). Hutang isi rumah dan perbankan bayangan mempunyai hubungan positif pada tahap perbankan bayangan yang lebih rendah tetapi bertukar negatif pada tahap yang lebih tinggi, mengimplikasikan masalah agensi yang lebih besar dan amalan pensukuritan pada kuantil yang lebih rendah. Kami mendapati penemuan hubungan positif antara pinjaman tidak berbayar dan perbankan bayangan. Ini mengimplikasikan bank cenderung untuk mengamalkan pengurusan risiko reaktif. Tadbir urus politik mempunyai hubungan positif dengan perbankan bayangan pada semua kuantil. Hubungan antara tadbir urus ekonomi dan perbankan bayangan adalah negatif pada kuantil yang lebih rendah tetapi bertukar positif pada kuantil yang lebih tinggi. Penemuan negatif untuk tadbir urus institusi membayangkan kualiti kedaulatan undang-undang yang lebih rendah dan tahap rasuah yang lebih tinggi membantu pertumbuhan perbankan. Ini adalah suatu kebimbangan besar. Kertas kerja ini menyarankan regulasi disasarkan kepada pemindahan dan perkongsian risiko antara perbankan bayangan dan perbankan tradisional serta ketelusan yang lebih tinggi mengenai tadbir urus institusi.

Kata Kunci: Perbankan bayangan; pensukuritan; bank tradisional; kualiti institusi; regresi kuantil.

JEL: G230, G210, C230, C132

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INTRODUCTION

Shadow banking is the pool of non-bank financial intermediaries (NBFIs) that provides comparable services to the traditional banks but without traditional banking regulations. The 21st century has witnessed its rapid development as a credible alternative banking system, also viewed as a financial innovation to compose money supply (Gorton et al. 2011). According to World Bank, shadow banking does not have a full banking license, but they can provide financial services that are like banks such as investment, brokering, risk pooling, money transmission, and check to cash. The Financial Stability Board (FSB) categorizes pension funds, insurance corporations, financial auxiliaries, and other financial institutions (OFIs) as NBFIs. This is because pension funds and insurance corporations sometimes participate as intermediaries by purchasing credit assets and lending. Financial auxiliaries refer to all the financial corporations that engage in serving the financial markets but do not take ownership of the assets or liabilities that they handle (European Commission et al. 2009). Lastly, OFIs consist of captive financial institutions and money lenders, investment funds, money market funds, hedge funds, structured finance vehicles, and real-estate trusts. All the activities mentioned above are related to credit intermediation, liquidity, and maturity transformation (Bakk-Simon et al. 2012).

The influence of shadow banking on economic growth and financial stability has been acknowledged. It is believed that they create secure instruments to lessen counterparty risk and fulfill market liquidity (Lysandrou 2021). The 2008 subprime mortgage crisis has pushed the financial sector towards increasing regulations to avoid the same mistakes repeating themselves. The regulatory proposals in the past have addressed the capital requirements of financial institutions. As Admati et al. (2010) argued, banks should have greater capital requirements to alleviate risk-shifting needs and foster stronger financial position. This measure may have pushed intermediations to move into unregulated financial institutions, which today we call the shadow banking system (Irani et al. 2021). Therefore, it is unsure whether shadow banking plays complementary or substitution roles to traditional banking. Nonetheless, the shadow banking sector has been increasing steadily. At the end of 2019, the total global financial assets were recorded at \$404.1 trillion, with the shadow banking sector at \$200.2 trillion and traditional banks at \$155.4 trillion. The increase in the innovation of private intermediaries and regulation changes have led to the decline of the traditional banking system. Since shadow banking contributes to 49.54% of the international financial assets in 2019, more than traditional banks (FSB 2020), it is thus worthy of policy decision and research attention.

It is worthy to note that banks have been managing their liquidity, risk, and profit by carefully balancing their deposits and loans of different maturities, engaging in

off-balance-sheet activities, and creative accounting such as discretionary provision for non-performing loans (Haq et al 2019). Shadow banking provides a good alternative channel to enhance the banking sector through risk transfer, liquid and maturity transformation, and their contribution to the improvement of efficiency in the financial markets and enhancement of credit availability in the real sector has been proven in the past literature. According to Agirman et al. (2013), even though shadow banking's growth rate that peaked from 2006 to 2008 slowed down after the crisis, they were growing much more than traditional banks. Shadow banking gained rising momentum at the end of 2011 and is still growing significantly to this day, yet the empirical studies in this area are still lacking and four interrelated issues remain unanswered. Firstly, what is the relationship between shadow banking and traditional bank? Bord and Santos (2012) showed that banks changed the conventional "Originate-to-Hold" (OTH) model to a new "Originate-to-Distribute" (OTD). That explained the securitization activities because banks are making loans with intention to sell to shadow banking institutions for investment purposes. It also implies that shadow banking is a complementary rather than a substitute to the traditional banking system. How true is this thesis?

Secondly, the impacts of loan generations may now include shadow banking, either directly or through the OTD model practiced by banks. This may imply that the increase of household debt through higher loan generation, drives the growth of shadow banking. Thirdly, does a loan's default rate have anything to do with the growth of shadow banking? Another way to look at how non-performing loans (NPL) may impact shadow banking is that, when the rate of NPL increases, commercial banks will impose stricter credit rating requirements for loans, hence forcing those who have lower creditworthiness to turn to shadow banking. Agency theory will point to traditional banks managers who may have taken excessive risks to try to boost profit but when conditions turn bad and into NPL, the bank may either increase tighter credit requirements or rechanneled these excessive risks into shadow banking. However, if securitization of shadow banking is part of the banks' risk management strategy before the build-up of NPL, a decrease in NPL in the banking sector may be related to increasing shadow banking growth, due to the securitization of ex-ante (forecasted) riskier loans by traditional banking to shadow banking (Marques-Ibanez 2017). Hence, the hypothesis between NPL and shadow banking remains inconclusive.

Lastly, higher institutional quality generates growth in the financial sector, and is commonly viewed as a contextual variable allowing for financial development, yet quiet unsure of the impact from shadow banking. The need for higher transparency and better regulation may prompt the government to encourage shadow banking activities. In contrast, higher regulation may constrain the supposedly loosely regulated shadow banking and

therefore adversely impact its growth. In addition, different levels of development in shadow banking may pose different relationships between itself, traditional banking, NPL, and institution quality.

Based on these foregoing issues, this paper generally aimed at examining the relationship between the banking sector and shadow banking. It specifically aimed to analyse the effect of household debts, traditional bank lending and NPL on shadow banking. It further examined the impact of institutional quality on this facility. This study used quantile regression and discovered that shadow banking formed positive relationship with traditional banks, household debt (at lower quantile levels), NPL, political governance, and economic governance (at higher quantile levels). Bord and Santos (2012) had identified the Originate-to-Distribute (OTD) trend in the United States and supported their claims using descriptive analysis. The current study further analyzed this OTD model and made two new contributions; namely the application of the statistical regression analysis and in incorporating the role of institutional quality.

LITERATURE REVIEW

The word 'shadow banking' was believed to have originated from a discussion on the subprime mortgage crisis in 2007. Accordingly, ample extant literature on shadow banking exists in the forms of staff reports, policy papers, and working papers issued by regulatory institutions such as the Federal Reserve Bank, International Monetary Finance (IMF), World Bank, and Financial Stability Board (FSB). The focus of research in shadow banking encompassed characteristics of financial innovation, its impacts on the banks, and concerns of systemic risk, regulatory arbitrage, and financial distress (FSB 2012; Adrian & Ashcraft 2012; Adrian 2014). In a market-based financing system, misaligned incentive problems are magnified in the shadow banking system due to its lack of transparency and asymmetric information between the creditors and debtors (Adrian & Jones 2018). Since shadow banking employs balance sheets of traditional banks in offering similar loans, they convert the terms to avert bankruptcy risk which in turn causes systemic risk (Bernanke et al. 2011). The incentive problem created by the separation of issuer and investor was a contributing factor to the 2008 crisis (Purnanandam 2010). There is also literature on the virtues of shadow banking. Fuster et al. (2019) claimed that fintech lenders have larger flexibility in adjusting supply to react to mortgage demand shocks, thus implying that technology advancement can improve the effectiveness of shadow banking in the mortgage market.

The microfinance companies and money lenders under the shadow banking system play an important role for the credit-excluded population. These shadow banking institutions aim to counteract the development of over-indebtedness by offering borrowers with lower creditworthiness affordable loans (Solarz 2013).

Motivating shadow banking entry into loan markets can lead to better allocation of risk, greater cost efficiency, and lower borrowing costs for households and corporations (Irani et al. 2021). The relationship between shadow banking and traditional banking can be analyzed through the two models the traditional banks are currently practicing; namely the Originate-to-Hold (OTH) model and the Originate-to-Distribute (OTD) model. Banks used to hold on to the deposits to fund the loan on their account until maturity, which is the Originate-to-Hold (OTH) model. Under this model, banks do not sell these loans to third parties or investors in the secondary market. This model is reshaped due to the competition, regulation, and innovation faced by the banking sector. Over time, banks felt the necessity of funding diversification, and consequently shifted from OTH to the Originate-to-Distribute (OTD) model (Bord & Santos 2012). Traditional banks began expanding through commercial paper and bond financing, as well as repurchase agreement (repo) funding.

With the OTD model, banks can distribute more corporate loans through syndication and selling these in the secondary market thus achieving higher profits. The increasing use of this model by banks has contributed to the growth of the syndicated loan market, secondary loan market, and the collateralized loan obligations (CLOs) market (Bord & Santos 2012). The authors also revealed that banks have increasingly used the OTD model since the beginning of the 1990s. The loan trading volume increased from USD8 billion in 1991 to USD176 billion in 2005. Following the subprime mortgage crisis, Purnanandam's (2010) proved that banks that engage more in OTD have higher mortgage default rates. These began to concentrate in banks that struggled to sell their OTD loans after the mortgage market disruption. In addition, banks that insist on holding a fraction of the loan will be subjected to lesser incentives to monitor the borrowers (Bord & Santos 2012). The OTD model has been a part of the financial system since the 1970s when the MBSs were first issued. The model however has grown increasingly complex since securitization was extended to riskier loans with lesser transparency (Pozsar 2008). However, these alternative financial service providers have since become a crucial part of the financial market structure through credit granting to the population affected by credit exclusion. The micro-loans thus serve as a complementary to banks rather than as a substitute (Solarz 2013).

The agency theory linked the excessive risk-taking behavior of the management of traditional banks and the subsequent transfer of risks to shadow banking. Banks face an underinvestment problem when they are unable to fund profitable investments due to the lack of adequate financing and existing high debt relationships (Harford 1999), thus prompting the asset substitution and risk shifting to shadow banking, either in the interest of the shareholders or the managers (Barrese & Scordis 2003). Agency problem was proposed by Alchian and Demsetz

(1972) in the 1970's and yet is presently still widely applied, leading to bank managers to focus on credit growth rather than profitability. The fall in profitability led to managers to further increase loan growth at the expense of the quality of their future loan portfolios. Therefore, the rapid growth in loan portfolios was found to be positively associated with the increase in NPL loans (Jimenez & Saurina 2006), as growth is seen only as a short-term objective that will not survive in the long run. Ever since banks have abandoned the Originate-to-Hold (OTH) model, securitization has allowed banks to take on more risk and generate more profits (Lui 2011). Under the OTH model, banks remove the loans from their balance sheet after initiating them, so the incentive to collect information on the borrowers will be reduced since they are partially removed from the risk of defaulting by borrowers.

From 2000 to 2007 prior to the subprime crisis, Mishkin (2008) stated that securitization had weakened banks' motivation to screen their borrowers, thus resulting in a high percentage of bad-quality loans entering the credit market. However, Shin (2009) argued that the lack of screening incentives does not necessarily lead to the growth of securitization and shadow banking as there are other factors influencing such as the supply of credit. It is the excessive availability of funds, instead of the insufficient lending standards, that result in an increase in credit supply to risky borrowers. Institutional quality is a broad concept with dimensions that vary according to different proxy indicators; including the World Governance Indicators (WGI) measure institutional quality in six dimensions, which are "voice and accountability (VA)", "political stability (PS)", "government effectiveness (GE)", "regulatory quality (RQ)", "rule of law (ROL)", and "control of corruption (COC)" (Kandil 2009). Asongu et al. (2023) divided the six WGI components into three different governances in their study, namely "Political Governance" which consists of VA and PS, "Economic Governance" which consist of RQ and GE, and "Institutional Governance" which consist of ROL and COC, and the results showed different significance and effects among the different categories of governances. Impacts of good institutional quality on the economy have been documented in many works of literature. Most common are the relationships between institutional quality and economic growth or development, such as Wang et al. (2014) and Oanh et al. (2016).

Institutional economics convey the roles of social institutions, its purpose, and how they improve economic efficiencies (Hodgson 2001). Institutional quality is applied in various fields of study. Past literature has associated it with financial markets (including banking and equity market) due to the characteristics of financial contracts (Law & Azman-Saini 2012), political-linked

roles, government's power or state-ownership (Tee et al. 2022; Lee & Hooy 2020), political stability-financial development nexus (Caliskan 2019) and roles as a moderator between financial development and growth (Law et al. 2018). Khan et al. (2019) showed that institutional quality positively and significantly influenced financial development. Following the subprime crisis, there have been mounting pressures for banks to tighten their regulations, and Schneider (2002) mentioned that the increase in the intensity of regulations had encouraged shadow banking growth. Due to increased capital requirements, weakly capitalized banks will reduce loan exposure by selling the loans in the secondary market, hence prompting the growth of the shadow banking sector (Irani et al. 2021). La Porta et al. (2013) debated that a good law environment drives up shadow banking due of the presence of investor protection and financial innovation. However, Dandapani et al. (2020) found that shadow banking entities tended to develop better with less financial regulation. Further, Davidescu and Schneider (2017) stated that other institutional quality indicators such as tax laws and corruption are drivers of the shadow banking system. The literature has provided the foundation to examine the possible impact of institutional quality on shadow banking, still a basically niche research area in the financial sector.

Quantile regression is not a common method in research on the finance market, yet it can analyze different relationship nexuses in different levels of shadow banking. Hou et al. (2017) evaluated how shadow banking activities affect cost efficiency of Chinese commercial banks with quantile regression and found that the average value changes across the growth quantiles. Tran (2020) found that extending into non-traditional banking can decrease the cost of funding for banks in the United States through quantile regression. Rottner (2021) also used the same approach to observe the effect of shadow banking leverages on lower quantiles of gross domestic product (GDP) distribution. The method provided a better understanding of how such leverages can affect the probability of a financial crisis occurring. Results showed that downside risk varies across different GDP growth. The OTH model is gaining attention lately, but research focus is mainly on the audit aspect (Aobdia et al. 2021), and on linkages between securitization, credit rating, supply, and safe asset (Daley et al. 2019, Segura & Villacorta 2023). Literature linking OTH model to shadow banking such as Bord and Santos (2012) is not empirically based. Household and NPL are common financial determinants while institutional quality is widely used in economic research, yet they are rarely applied to shadow banking research. These shortcomings have created literature gaps on the quantile impact of institutional quality and on financial factors influential on the growth of shadow banking.

METHODOLOGY

The study interval ranged from 2009 to 2019, involving 26 countries. Data availability was very limited, especially those on “Non-Bank Financial Intermediation” (NBFi), thus limiting the countries selected to Argentina, Australia, Belgium, Brazil, Chile, China, France, Germany, Hong Kong, India, Indonesia, Ireland, Italy, Luxembourg, Mexico, Netherlands, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Switzerland, Turkey, United Kingdom, and United States. Complete data were not available before 2009 while data in 2020 and beyond may be tainted by shocks due to the impact of the Covid-19 pandemic, and were thus omitted in this study. The dependent variable was shadow banking, proxied by NBFi which was a broad measure of all non-bank financial entities comprising all financial institutions that were not central banks, conventional banks, or public financial institutions (FSB 2020). The selected independent variables constituted the size (value) of traditional banks (BANKS), household debt (DEBT) as

a percentage of the GDP, NPL as a percentage of GDP, and the aggregated (average) index of World Governance Indicators (WGIAVE). We further reconstructed WGIAVE into three categories as suggested by Asongu et al. (2023) to strengthen our findings. These were “political governance” (WGIA), “economic governance” (WGIB), and “institutional governance” (WGIC). WGIA comprised “voice and accountability” and “political stability”, WGIB comprised “regulatory quality” and “government effectiveness”, and WGIC comprised “rule of law” and “control of corruption.” Both the data for NBFi and BANKS were sourced from the Financial Stability Board (FSB), in USD trillions value of total assets. NPL and WGIAVE were retrieved from World Bank databank while DEBT was sourced from International Monetary Fund (IMF). Model selection was based on past literature, which provided some direct or indirect links between the dependent and independent variables as shown in the research framework, which together with the theoretical framework are summarized in Figure 1 and Table 1, respectively.

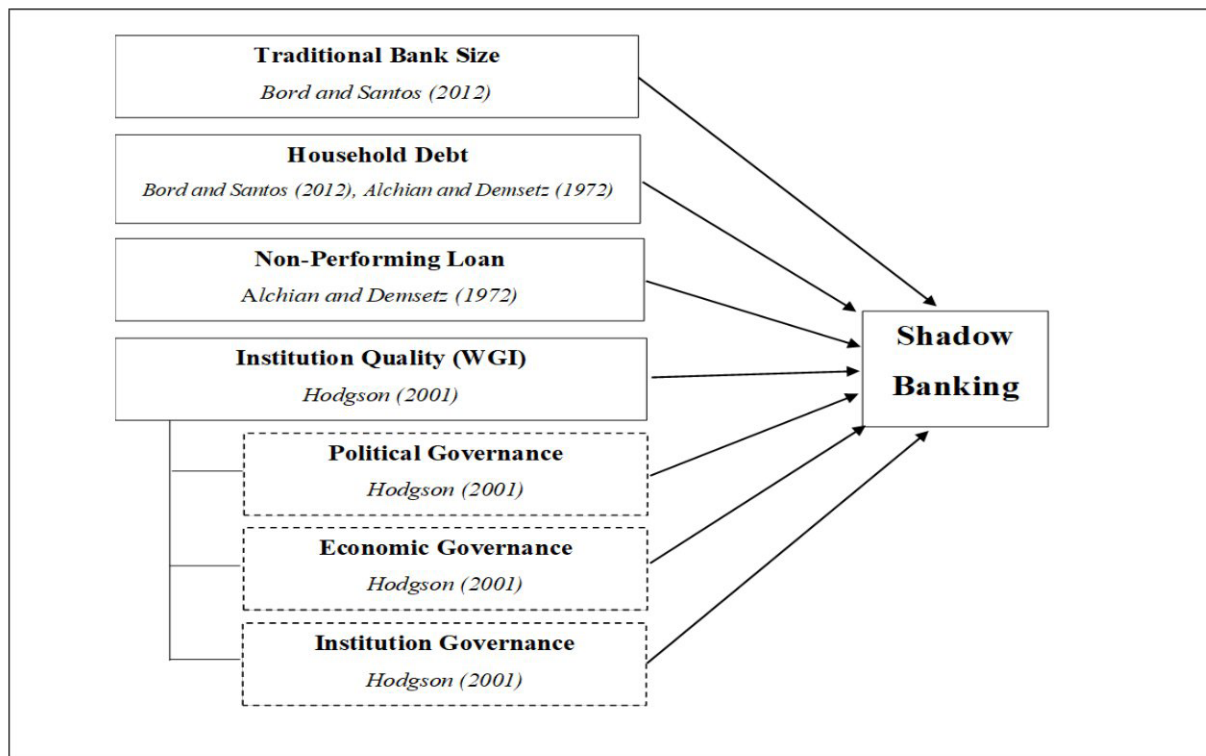


FIGURE 1. Research framework

TABLE 1. Variables, descriptions, theories, and expected relationships

Abbreviation	Variable Name	Theory	Expected Sign	Source
NBFI	Shadow Banking	Dependent variable		FSB
BANKS	Traditional Bank Size	Originate-to-Distribute	+	FSB
DEBT	Household Debts	Originate-to-Distribute Agency Theory	+	IMF
NPL	Non-Performing Loan	Agency Theory	+	World Bank
WGIAVE	Institutional Quality	Institutional Economics	+	World Bank
WGIA	Political Governance	Institutional Economics	+	World Bank
WGIB	Economic Governance	Institutional Economics	+	World Bank
WGIC	Institutional Governance	Institutional Economics	+	World Bank

Scatter plots were used to observe data clustering and potential relationship trends. The Shapiro-Wilk Test conducted was a statistical test that evaluates the normality of a population, a rather common method used to ensure data normality (Ghasemi & Zahediasl 2012). This paper applied quantile regression developed by Koenker and Bassett (1978) to analyze relationships based on different quantile levels of shadow banking. There are two justifications of using the quantile regression. Firstly, the relationship nexuses between shadow banking and its determinants can vary at different levels of the dependent variable (shadow banking). Such findings cannot be captured by other regression methods that give only one overall coefficient to represent an overall relationship. Secondly, quantile regression is among the very few methods that can be applied without assumption of normality, especially in small sample

sizes, and with the presence of data clustering. This quantile regression model quantifies the heterogeneous effect of covariates through the conditional quantiles of the outcome variable, and it provides a comprehensive examination of the whole distribution of the outcome (Huang et al 2017). The risks of data clustering, data normality, and outliers increasingly justify the use the quantile regression method (Buchinsky 1988; Nikitina et al. 2019). There are two models. “Model 1” is based on the average institutional quality (WGIAVE). “Model 2” is based on the reconstructed institutional quality (WGIA, WGIB, and WGIC) as adopted by Asongu et al. (2023). The reason for reconstructing WGI was the possibility of incongruent relationships between the six components of the WGIAVE with the dependent variable as found in Har et al. (2022). Their respective equations for quantile regression are as follows:

$$\ln(NBFI)_{i,t}(\tau|X_{i,t}) = \alpha_{1,t} + \beta_{1,\tau} \ln(BANKS_{i,t}) + \beta_{2,\tau}(DEBT_{i,t}) + \beta_{3,\tau} \ln(NPL_{i,t}) + \beta_{4,\tau} \ln(WGIAVE_{i,t}) + \varepsilon_i \quad (1)$$

$$\begin{aligned} \ln(NBFI)_{i,t}(\tau|X_{i,t}) &= \alpha_{1,t} + \beta_{1,\tau} \ln(BANKS_{i,t}) + \beta_{2,\tau}(DEBT_{i,t}) + \beta_{3,\tau} \ln(NPL_{i,t}) + \beta_{4,\tau} \ln(WGIA_{i,t}) + \beta_{5,\tau} \ln(WGIB_{i,t}) \\ &+ \beta_{6,\tau} \ln(WGIC_{i,t}) + \varepsilon_i \end{aligned} \quad (2)$$

In both Equation (1) and Equation (2), $\beta(\tau)$ represents the coefficient at the respective quantile τ level of shadow banking and ε_i is the unobserved individual effects. NBFI and BANKS are in natural logarithm form. All determinants are expected to have a positive relationship with shadow banking but there may be anomalies in the findings. A positive relationship between the size of traditional banking and shadow banking implies that these two types of banking are complemented through the originate-to-distribute theory while the negative relationship implies the traditional banks keep to the old banking practice of the originate-to-hold model, which is the aim of the first study objective. A positive relationship between debt, non-performing loans, and shadow banking may have further validated the originate-to-distribute as the new banking model (Bord & Santos 2012). However, the proactive or reactive approach of the banks mitigates their risks of debt and NPL will indicate the direction of the relationship with shadow banking (Alchian &

Demsetz 1972; Paligorova 2009). Higher institutional quality is expected to produce a positive impact to the financial sector including shadow banking, as consistent with findings of recent studies such as Rostami et al. (2016) and Law and Azman-Saini (2012). However, anomalies in the results are very much anticipated due to the loose regulatory structure in which shadow banking operates.

RESULTS

Scatter plots of shadow banking (NBFI) in Y-axis as dependent variable against independent variables (X-axis) are shown in Figure 2. Generally, the variables are distributed in minor clusters with more than one trendline needed to reflect the relationship nexus in a variety of quantiles of shadow banking. For instance, there are two or more data clusters in the scatter plots, especially for NPL, WGIAVE, WGIB and WGIC, where

at least two different trend lines can be drawn for each cluster. Thus, different trend lines (coefficients) through quantile regressions, due to data clustering, serve as better representatives for the different relationship nexuses.

Shapiro-Wilk test results in Table 2 suggest doubt that data were normally distributed. Every variable in Table 1 is statistically significant at the 1% level.

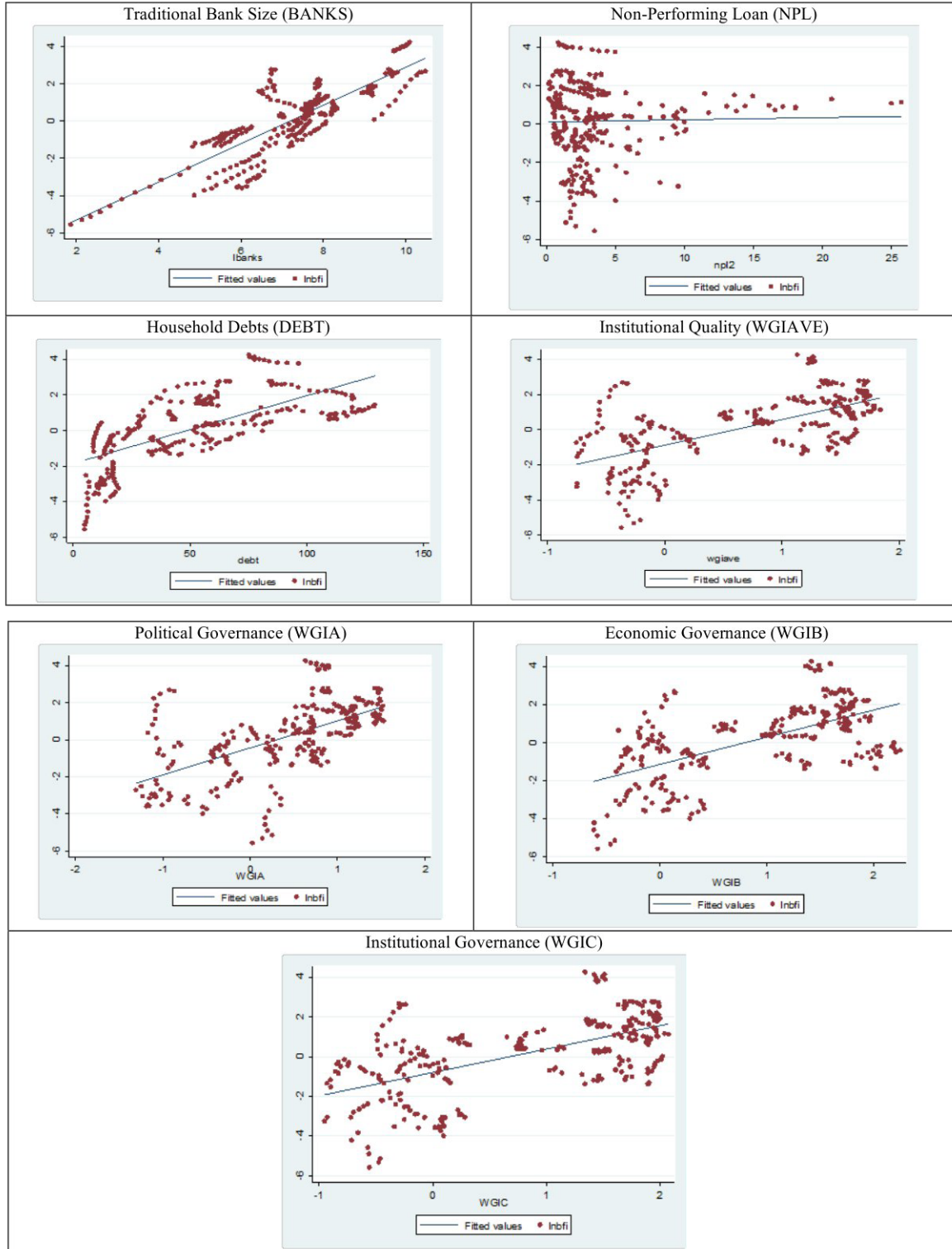


FIGURE 2. Scatter plot for shadow banking (NBFI)

TABLE 2. Shapiro-Wilk test results

Variable	Test statistic W
LNBF1	0.9769
(z-value)	(3.632)***
LNBNKS	0.9697
	(4.270)***
NPL	0.6841
	(9.758)***
DEBT	0.9371
	(5.977)***
WGIAVE	0.9222
	(6.477)***
WGIA	0.9084
	(6.860)***
WGIB	0.8760
	(7.568)***
WGIC	0.8811
	(7.471)***
Observation	286

Note: *, ** and *** indicate significant at 10%, 5% and 1% level respectively.

Figure 3 and Figure 4 show quantile regression results for all countries in graphical format, indicating continuous changing pattern from lower quantiles to higher ones. The same results are also presented in numerical format in Table 3, where Figure 3 is aligned to Model 1, and Figure 4 is aligned to Model 2. The X-axis

in both Figure 3 and Figure 4 shows the quantiles or level of shadow banking, which is indicated by NBF1. The Y-axis in Figure 3 shows the coefficient values of the independent variable corresponding to the respective quantiles for Model 1, where institutional quality is represented by the aggregate (average) value of all six components of World Governance Indicators (WGIAVE). Shaded areas covering the coefficient line represent a 95% confidence level, and as such should not have zero value to be considered statistically significant. Household debt has a significant and positive relationship with shadow banking at lower levels (10th to 40th quantiles) but declines accordingly until a negative relationship is reached at the highest (90th quantile) level. Based on Table 3, household debt shows coefficients of 0.0191 and 0.0163 at the 15% quantile (Q15) and the 25% quantile (Q25) level respectively. The coefficients continue to drop to -0.0199 at Q95. These results are consistent with findings from Pozsar (2008) and Purnanandam (2010). A similar trend is observed in the relationship between NPLs and shadow banking. Their relationship is significant and positive at lower to middle levels of shadow banking but declines gradually to non-significance at higher (70th to 90th quantiles) levels. The size of traditional banks shows significant and positive relationship with shadow banking at all levels but assumes a similarly peculiar U-shaped trend. Aggregated (average) institutional quality displays an increasing trend of positive relationship with shadow banking after the 30th quantile.

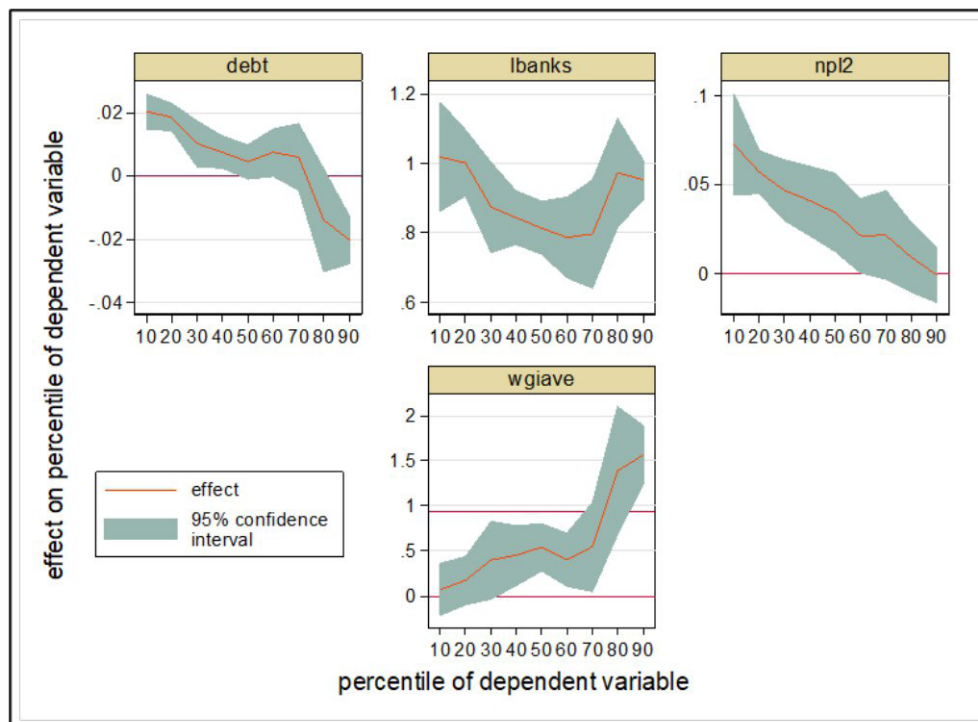


FIGURE 3. Quantile regression coefficient graphs for Model 1

TABLE 3. Quantile regression results for Model 1 and Model 2

	(Q15)	(Q25)	(Q50)	(Q75)	(Q95)
Variables	Model 1	Model 1	Model 1	Model 1	Model 1
LBANKS	0.9844***	0.9791***	0.8212***	0.8674***	0.9636***
(S.D.)	(0.0537)	(0.0768)	(0.0400)	(0.1081)	(0.0613)
DEBT	0.0191***	0.0163***	0.0050	0.0034	-0.0199***
	(0.0026)	(0.0033)	(0.0031)	(0.0090)	(0.0072)
NPL	0.0595***	0.0545***	0.0349***	0.0164	-0.0003
	(0.0072)	(0.0076)	(0.0112)	(0.0129)	(0.0108)
WGIAVE	0.1884	0.2209	0.5068***	0.6656	1.5671***
	(0.1654)	(0.1901)	(0.1466)	(0.4189)	(0.2797)
Constant	-2.5243***	-2.1828***	-0.9806***	-0.3906	0.9335***
	(0.1361)	(0.2580)	(0.1494)	(0.3153)	(0.2426)
Observations	279	279	279	279	279
Pseudo R2	0.6546	0.6052	0.5598	0.5150	0.5853
	Model 2	Model 2	Model 2	Model 2	Model 2
LBANKS	0.9978***	1.0307***	1.0370***	1.1270***	1.2101***
	(0.0398)	(0.0395)	(0.0502)	(0.0645)	(0.0590)
DEBT	0.0100***	0.0081***	0.0059**	-0.0100*	-0.0190***
	(0.0022)	(0.0022)	(0.0028)	(0.0056)	(0.0052)
NPL	-0.0168	-0.0227	0.0425	0.0217*	0.0091
	(0.0135)	(0.0202)	(0.0324)	(0.0122)	(0.0102)
WGIA	1.1651***	1.2295***	1.3390***	1.8726***	1.8443***
	(0.0794)	(0.1011)	(0.1436)	(0.1985)	(0.2000)
WGIB	-0.6527**	-0.6899**	0.1753	1.2144***	1.0292***
	(0.2527)	(0.3000)	(0.3838)	(0.2702)	(0.2404)
WGIC	-0.0789	-0.0617	-0.8453**	-1.3541***	-0.8890***
	(0.1761)	(0.2894)	(0.3545)	(0.1464)	(0.2713)
Constant	-1.2537***	-1.0393***	-0.9244***	-0.0143	0.7214**
	(0.1142)	(0.1464)	(0.1591)	(0.1973)	(0.2965)
Observations	279	279	279	279	279
Pseudo R2	0.7506	0.7039	0.6213	0.5893	0.6302

Note: *, ** and *** indicate significant at 10%, 5% and 1% level respectively. S.D. is standard deviation.

In Model 2, as shown in Figure 4, aggregated institutional quality (WGIAVE) is recomposed into three categories of governance as independent variables. They are “Political Governance” (WGIA), “Economic Governance” (WGIB), and “Institutional Governance” (WGIC). Other variables remained unchanged in the model. As shown in Figure 4, coefficients of traditional banks (BANKS) are positive and significant at 5% at all quantiles. The trend is almost constant from the 10th to 50th quantile, even though there is a slight dip in the 60th quantile, we can see an increasing trend in the 70th quantile. Coefficients of household debt (DEBT) are positive in the lower quantiles (10th, 20th, 30th, 40th) and negative in the upper quantiles (80th and 90th). The graph illustrates a decreasing trend for household debt and shadow banking. Next, unlike Model 1, non-performing loan (NPL2) is not significant at all quantiles in Model 2. Political governance (WGIA) is positive and significant

at all quantiles with an increasing trend after the 40th quantile. Its coefficients values increase from 1.1651 at the lowest quantile to 1.8726 at Q75 and 1.8443 at the highest quantile level. The positive relationships imply higher levels of political governance are beneficial to the growth of shadow banking. Despite different focus of study, higher levels of political governance are also useful in increasing education inclusiveness in Asongu et al. (2023). Economic governance (WGIB) has a negative relationship with shadow banking in the 10th and 20th quantiles and a positive relationship in the upper quantiles (70th, 80th, and 90th). Both political and economic governance have an increasing trend. Lastly, institutional governance (WGIC) is negative from the 60th quantile onwards. Figure 4 shows a decreasing trend from the 10th to 60th quantile and increased slightly in the 80th quantile. Table 4 shows the summary of the results.

In summary, political governance (WGIA) has positive relationship with shadow banking at all quantiles. In contrast, institutional governance (WGIC) has negative and significant relationship with shadow banking after the 50th quantile. Relationship between

economic governance (WGIB) and shadow banking is negative at lower quantiles (below Q20), not significant at middle quantiles and positive at higher quantiles (after Q70).

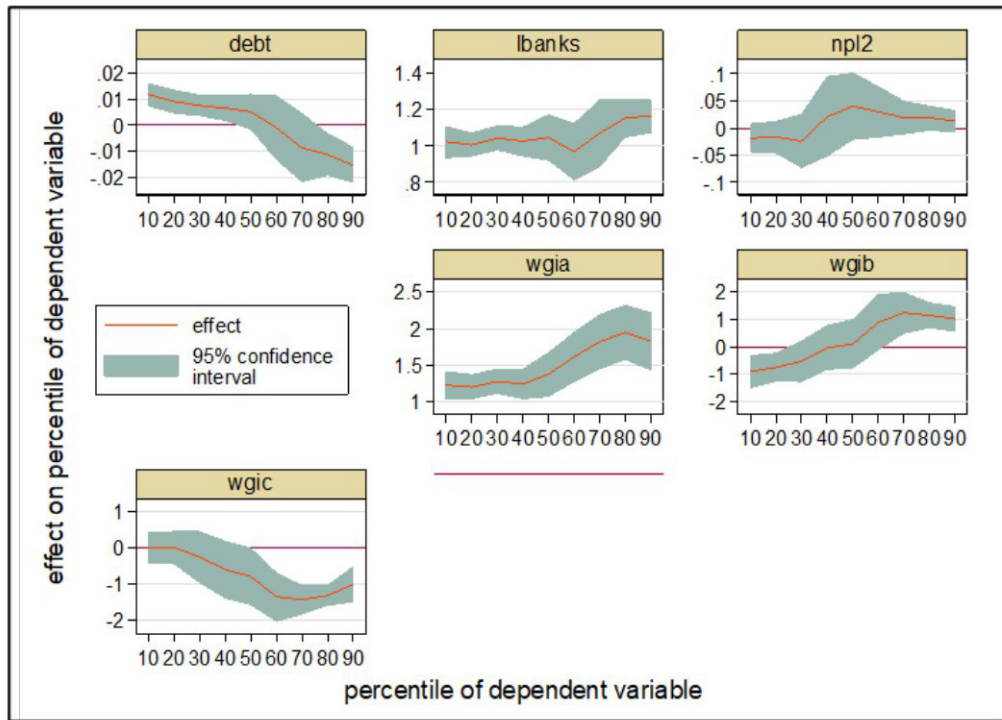


FIGURE 4. Quantile regression coefficient graphs for Model 2

TABLE 4. Summary of results

Objectives (Relationship nexus)	Theory (Expected sign)	Model 1	Model 2
1 Traditional banks (BANKS) and shadow banking.	Originate-to-Distribute (positive)	Positive at all quantiles	Positive at all quantiles
2 Household debts (DEBT) and shadow banking.	Originate-to-Distribute Agency theory (positive)	Positive at all quantiles except q90	Positive (q10-q40) Negative (q80, q90)
3 Non-performing loans (NPL) and shadow banking.	Agency theory (positive)	Positive (q10 – q50)	NS at all quantiles.
4 Institutional quality (WGI) and shadow banking	Institution Economics (positive)	Positive (q40 – q90; increasing trend after q60)	WGIA is positive at all quantiles, with an increasing trend after q40 WGIB negative (q10 – q20) and positive (q70 – q90) WGIC negative (q50 – q90)

Notes: Model 1 uses aggregates of all six components of WGI; Model 2 divided WGI into “Political governance” (WGIA), “Economic governance” (WGIB), and “Institutional governance” (WGIC), NS is “not significant”.

DISCUSSION

SHADOW BANKING AND TRADITIONAL BANKS

The traditional bank size has a positive and significant relationship with shadow banking at all quantiles in both Model 1 (using aggregated WGI as a proxy for institutional quality) and Model 2 (recomposed WGI into “political governance”, “economic governance” and “institutional governance”). These results are aligned with Bord and Santos (2012) and the Originate-to-Distribute (OTD) model. This model suggests that instead of loan retention, banks will expand their sources of funding through debt instruments which will contribute to the syndicated loan market. This implies that as traditional bank grows, the shadow banking will also grow. The positive relationships between traditional banking and shadow banking become bigger after the 70th quantile of shadow banking in both Model 1 and Model 2. This is opposed to Dandapani et al. (2020) who found a negative significant relationship between the two variables. A negative significant relationship would have implied that traditional banks and shadow banking are competitors or substitutions of each other. However, the positive relationship findings in this paper imply that shadow banking is complementary to traditional banks. The growth of traditional banks will contribute to the growth of shadow banking entities due to its nature and purpose, which is to fulfill the demand of the credit markets and help banks with risk allocation. Although shadow banking plays a crucial role in the financial sector, concerns have been raised about the systemic risks they induce. Knowing that traditional banks and shadow banks are interconnected in the future, and if policymakers wish to regulate the shadow banking system, they should start the process from the banks. Tightening regulations does not necessarily mean reducing shadow banking activities but it can be increasing the screening of borrowers so that bad quality loans will not enter the securitized pool or retaining an appropriate amount of loans to remove from the balance sheets.

SHADOW BANKING AND HOUSEHOLD DEBTS

Household debt and shadow banking have a positive relationship in the lower levels (approximately below the 50th quantile) of shadow banking. This is consistent with the expectation from the OTD model and agency theory. Their relationship turns negative at the higher levels. The non-significant finding in the middle level of shadow banking between the 50th and 70th quantiles may imply an “optimal risk transfer” level between traditional and shadow banking. Agency theory can explain the intention of bank managers to increase the social presence of the bank and their incentives, and engage in activities that will promote credit growth in a short period. As such, as many available household debts as possible will be securitized prior to selling in the secondary market so

that the banks could continue to generate more loans. Based on the OTD model, securitization activities will increase as household debt increases since debts are being securitized and removed from banks’ balance sheets as credit reallocating and credit risk transfer instead of being retained. Shadow banking cannot endlessly be taking household debts directly or through these securitizations and risk transfers. Thus, the optimum level is indicated by the levels (quantiles) between the positive and negative relationship nexuses. Indeed, Purnanamdam (2010) found that such risk-taking behavior of the traditional banks, made possible through OTD model, not only transferred household debt to shadow banking but also trapped themselves with untransferable high-risk loan during the subprime mortgage crisis. The decreasing trends in the relationship between household debts and shadow banking are shown in Figure 3 and Figure 4, approximately after the 50th quantile. These trends may imply that as the size of shadow banking and the securitized assets pool increase, the risks that both traditional and shadow banks are being exposed to shall also increase. Therefore, shadow banks will tend to restrict their acceptance of risk transfer through securitization of household debts to avoid financial distress as indicated by the negative relationship after the 50th quantile level in both Figure 3 and Figure 4.

SHADOW BANKING AND NON-PERFORMING LOAN

The positive relationship between non-performing loans (NPL) and shadow banking in lower quantiles in Figure 3 (Model 1) is consistent with the expectation from agency theory and literature such as Paligorova (2009) and Krainer and Laderman (2014). It also implies that banks tend to practice a reactive approach to NPL by securitizing potentially high-risk loans and tightening requirements for new loan applications only after NPL has attained higher volume. When NPL becomes larger, traditional banks will securitize (transfer) them to shadow banks. This is indicated by a positive relationship between shadow banking and NPL. This practice is a reactive approach since NPL is only transferred to shadow banks after becoming excessively large. In contrast, NPL level at traditional banks will become lower if traditional banks practice proactive approach, instead of being reactive, to correctly identify and securitize loans that will potentially turn bad/NPL. The more effective the proactive approach taken by traditional banks, the lesser the actual NPL will become and the higher the securitization necessary for shadow banking. This is thus manifested in a negative relationship between shadow banking and NPL. The reactive approach will then motivate the borrowers with lower creditworthiness to resort to money lenders in shadow banking. Governments should take preventive measures on possible agency problems between managers, bank shareholders, and borrowers to ensure a healthy financial industry. The ultimate solution is to increase transparency, place restrictions on the manager’s

roles, and regulate securitization activities to minimize asymmetric information and moral hazard.

Besides the positive relationship between shadow banking and NPL, another two related findings deserve further discussion. Firstly, the declining trend within the positive relationship between shadow banking and NPL in Model 1 mirrors the relationship nexus between shadow banking, traditional bank size (in lower quantiles), and household debt. These findings show that the growth of traditional banking, household debt, and NPL will exert diminishing impacts on shadow banking. Thus, the increasing magnitude of coefficient between the size of the traditional bank and shadow banking after the 70th quantile may provide another possibility for the latter to grow side-by-side with traditional banking, not as a complement nor substitute to each other. Perhaps, other confounding macroeconomic factors may equally affect both traditional and shadow banking, such as economic growth, credit market, and liquidity condition. Secondly, the relationship between shadow banking and NPL becomes not significant in Model 2 when the aggregated institutional factor is recomposed into “political governance”, “economic governance”, and “institutional governance”. It is probable that shadow banking and NPL relationship may also capture the incongruent problem in the aggregated institutional factor.

SHADOW BANKING AND INSTITUTIONAL QUALITY

The positive relationship between shadow banking and aggregated institutional quality is consistent with the expectation that higher institutional quality enhances the growth of shadow banking, as it has been reported in the literature to improve the financial sector (Rostami et al. 2016; Law & Azman-Saini 2012; Le et al. 2016). However, findings from the aggregated perspective may be misleading since findings from the recomposed political governance (WGIA), economic governance (WGIB), and institutional governance (WGIC) showed the incongruent outcome. The increasing importance of political governance in the increasing growth of shadow banking justifies the need for freedom of speech and political stability. The positive relationship shown in the study is also consistent with Caliskan (2019) who found a long-term relationship between political stability and financial stability. Economic governance impairs shadow banking in the lower quantiles, suggesting that its entities, when small, will only develop better when there are fewer financial regulations (La Dandapani 2020). The lack of a fully integrated regulatory framework may also allow NBFIs to tap the implicit guarantees from banks and borrowers to service debts obtained through the shadow banking channels (Elliott 2015).

Once the shadow banking market grows bigger (moving towards the higher quantiles) and more financial activities are being conducted, there will be pressure exerted on policymakers to establish stabilized reforms to address uncertainties (Cherif & Gazdar 2010). The

positive relationship above the 70th quantiles suggests that better economic governance can promote the growth of shadow banking activities through better regulations in the banks. Lastly, institutional governance’s negative relationship (as shown by the WGIC graph in Figure 4) with shadow banking implies that its growth is driven by corruption at higher levels. This is aligned with Davidescu and Schneider’s (2017) theory, which suggested that tax laws and corruptions are the drivers of shadow banking. In China, there have been reported cases where credit guarantee companies are making direct loans and leasing companies would make loans instead of leases. Elliott (2015) suspected that this could be due to local authorities secretly allowing these institutions to act accordingly in order to maintain higher credit levels. Nonetheless, policymakers should not rely on or allow corruption as an ‘invisible hand’ to promote shadow banking. Indeed, findings from this study should provoke critical review of policy, laws, and groundworks on the issue of corruption and enforcement irregularities.

CONCLUSION

Traditional banks, household debts, non-performing loans (NPL), and institutional quality, either in aggregated or recomposed forms, are important determinants of shadow banking growth. Findings of the study revealed that traditional banks operate with the Originate-to-Distribute (OTD) model rather than the common loan retention practice. Household debt relationships with shadow banking changed from positive at lower levels (below the 50th quantile) to negative at higher levels (the 70th quantile) and revealed an “optimal risk transfer” level between the 50th and 70th quantiles. The positive relationship between NPL and shadow banking implied that banks tended to practice reactive risk management. The declining positive coefficients of the relationship between shadow banking, traditional banks, household debt, and NPL indicated diminishing impacts of the determinants on shadow banking. Increasing the aggregated institutional quality did help to increase shadow banking growth. However, there were incongruent findings of the recomposed institutional quality, namely “political governance”, “economic governance” and “institutional governance”. Their respective findings were mutually different and also with the aggregated institutional quality. Such incongruent findings call for the application of the recomposed institutional quality indicators and cast doubt on the use of institutional quality as an aggregated variable. Therefore, the findings triggered the need for further research and policy review in each of the aspect of institutional quality, and not confined to the aggregate aspect. This was especially due to the institutional governance showing a negative relationship with shadow banking, thus implying a higher level of corruption is driving the increased growth in shadow banking. This paper recommends increasing institutional quality and regulations specifically on the aspects of risk transferring

and sharing between shadow banking and traditional banking. The reason is to ensure that the practice of OTD model, reactive risk management and agency problem, as established in this study, will not amount to a burgeoning risk bubble that may trigger a systemic collapse of the financial markets.

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