Monetary transmission through the debt financing channel of Islamic banks: Does PSIA play a role?

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Abstract
This paper examines the monetary transmission mechanism through Islamic banks' debt financing channel. Its purpose is to test if this channel effectively works and to verify whether the reaction of Islamic banks to interest rates depends on their specific characteristics. The research main focus is on the possible mitigating effect that profit sharing investment accounts (PSIA) could exert on the debt financing channel, since that this source of funding, specific to Islamic banks, is expected to be more stable than deposit accounts for conventional banks. The study uses a quite representative sample composed of 50 Islamic banks and the estimation of a dynamic panel model observed between 2005 and 2014 using the system GMM estimator. Empirical findings confirm the presence of a debt financing channel of monetary policy since that interest rates variation affects Islamic bank financing. PSIA growth, capitalization, assets liquidity and size are among major determinants of Islamic banks' debt assets supply. Besides, using several robustness tests, we show that, in addition to asset liquidity and bank size, growth rate of PSIA significantly mitigate the negative effect of interest rates on debt financing growth, which highlights the importance of this specific category of deposits in monetary transmission especially for countries where Islamic and conventional banking systems coexist.
Keywords: monetary transmission, interest rate, Islamic banks, debt financing, PSIA.
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1. Introduction

The relationship between monetary policy and the real economy is identified through the influence of monetary transmission channels on macroeconomic variables especially economic growth, inflation and investment. The rule is simple, the more monetary policy affects the economy, the more effective it is. In other words, the effectiveness of monetary authorities' decisions supposes the existence of a relationship between a set of monetary policy instruments, especially the policy rate, and macroeconomic performances through different transmission channels. Main channels through which monetary policy could impact economic activities are interest rate; money supply; bank credit; exchange rate; asset price and expectation channel (Bernanke and Gertler, 1995; Taylor, 1995, Mishkin, 1996). Recent studies have focused on some topics related to transmission channels like the effect of the financial crisis, unconventional monetary policy and capital inflows in emerging economies (Mishkin, 2009; Borio and Zhu, 2008; Cevik and Teksoz, 2012; Chandra and Unsal, 2014; Kohlscheen and Miyajima, 2015). Besides, after the development of Islamic finance in the 2000th, largely through the rapid expansion of Islamic banks, the effectiveness of monetary transmission mechanism (MTM) was challenged for the countries where Islamic banks are present. In these countries, in which a dual monetary system is emerging, a growing number of empirical studies examined the monetary transmission through Islamic bank channels (Zaheer, Ongena and Van Wijnbergenc 2013; Ergeç and Arslan, 2013, Majid and Hasin, 2014; Akhatova, Zainal and Ibrahim, 2016; Zulkhibri and Sukmana, 2017).

In reference to *Sharia* rules, Islamic banks institutions are free interest rate and fundamentally different from conventional banks. The differences mostly well-known through the principles of *Sharia* are based mainly on profit and loss sharing (PLS) principle and asset backing principle. Applying both principles on banking intermediation make assets financing and their pricing close to real economy. Nonetheless, given that debt financing contract, being the main Islamic banking asset, is quite similar to conventional credit, the conduct of monetary policy through interest rate instrument is also expected to influence Islamic banks financing. In fact, in most countries where Islamic banks operate, monetary policy uses interest rate instrument of monetary market regulation as a benchmark of credit financing rate. Besides, in dual financial system, the presence of strongly competitive conventional banks, the inexistence of benchmark pricing of Islamic bank products and the underdevelopment of Islamic money markets (1), make Islamic banks behaviour, in term of debt financing, heavily influenced by monetary policy shocks and conventional bank activity.

On the other side, given this incompatible environment with their ethical background, the presence of Islamic banks is likely to limit the ability of monetary policy to influence their financing debt volume making Islamic banking channel less effective despite its dependence on interest rate. In fact, Islamic banks, mainly through the use of profit sharing investment accounts (PSIA), seek to maintain debt financing level outside the influence of conventional monetary policy and to mitigate the undesirable effect of interest rate changes. The *Sharia* compliance of PSIA as loss absorbent product based on PLS principle with different maturities and currencies explains its importance to play multiples roles (2). In fact, during the last years, the expansion and the stability of the PSIA reaching 40-45% of total assets, incited Islamic banks to optimally use this source of funding to enhance liquidity management, to satisfy debt financing demand and to improve their conformity to capital adequacy rules (3). Nonetheless, according to the literature (Bacha, 2004; Chong and Liu, 2009; Zainol and Kassim, 2010; Cevik and Charap, 2011; Ergeç and Arslan, 2013, Anuar, Mohamad and Shah, 2014; Hamza, 2016) PSIA seem to be influenced by interest rate changes in the presence of a displaced commercial risk, especially during tightening periods, that could reduce the volume investment deposit and affect by consequence the volume of debt financing (Sukmana and Kassim, 2010).

Despite the interest free as the cornerstone of Islamic banks, it is interesting to explain the potential responses of Islamic banks to interest rate changes in dualism environment characterizing several banking systems around the world and where Islamic and conventional banks share some features. Following this view, our research examines the relationship between monetary policy shocks and debt financing volume. Thereby, our interrogations are the following: Does monetary policy influences Islamic banking financing? Do PSIA exert any impact on the Islamic banks' debt financing channel? Are Islamic bank own characteristics affect the optimal level of debt financing supply in response to interest rate changes? To our knowledge this is a pioneer empirical study that focus on a quite representative sample of Islamic banks based in different countries. This is likely to provide us with more acute results concerning the general tendency of Islamic banks reaction to conventional monetary policies which seems to be negative in most cases (Yungucu and Saiti, 2016). The present research differs from previous ones focusing on the monetary transmission using single-country case studies, mainly East-Asian countries. Furthermore, the originality of this research is to focus on the role of PSIA as a major specificity of Islamic bank in the MTM.

The remainder of the paper is organized as follows. Section 2 examine the MTM in the context of Islamic banks and the role of PSIA with a focus on main theoretical and empirical studies. Section 3 presents the empirical methodology based on the estimation of a dynamic panel model

using system GMM estimators using a sample of 50 Islamic banks observed between 2005 and 2014. The interpretation and discussion of the empirical results are presented in Section 4. The final section concludes and suggests some recommendations.

2. Background and literature review

2.1 Interest rate versus debt financing

Monetary policy is designed to manage the supply of money with the aim to conduct the real economy to its objective in term of growth and price stability. Mostly, monetary authorities use interest rate as instrument for their monetary decisions to influence the supply of bank credits which in turn influences consumption and investment decisions. The transmission mechanisms of monetary policy are defined by the channels through which monetary policy decisions affect the real economy. This connexion of money supply to real economy which is illustrated by the MTM is largely examined in the conventional literature of monetary policy. Decisions taken by the central bank are transmitted on prices and activity through various channels such as the interest rate, bank credit (Bernanke and Gertler, 1995; Meltzer, 1995), asset prices and expectations. The credit channel which includes lending and balance sheet channels is examined in the literature through its role and efficiency compared to other channels.

Particularly, the lending channel explains that monetary policy decisions via interest rate changes influences credit supply which in turn impact economic activity under the hypothesis of imperfect substitutability of demand deposits with other sources of funding and the presence of credit multiplier mechanism (Mishkin, 1996). The process is based on the change of policy rates by central banks according to economic situation. During expansionary monetary policy, the policy rate is decreased when the monetary authorities aim at enhancing investment, there will be an increase in liquidity reserves and deposits which in turn boost credit supply through the multiplier mechanism (Boivin, Kiley and Mishkin, 2010). During monetary policy tightenings, the cost of credit is increased and credit supply is decreased in parallel of a reduction in funding sources. This situation leads to a decrease of bank deposits and a shrinking of bank liquidity. At the same time, market imperfections make more difficult for conventional banks to find other money market funding instruments to compensate for the decrease of demand deposits.

In other side, only a few literature examined the MTM in dual financial system with the presence of Islamic banks. Indeed, in order to reach their objectives, monetary authorities should be concerned by the transmission of the monetary decisions through Islamic banks since these institutions are becoming a major source of finding for economies around the world and are directly connected to the real sector as their financial activities often require buying and selling real assets. In fact, Islamic banking systems are based on interest-free financial instruments namely the PSIA instrument which is an investment deposit based on PLS principle and the debt financing instrument which is based on asset-backed principal. These specificities should make Islamic banks in difficult position with the monetary policy decisions for some reasons related mainly to the pricing of debt financing and PSIA in front of interest rate which is incompatible with Islamic banks background. In dual financial system, there is spillovers from interest rates to Islamic banks funding costs, to PSIA returns as well as to the cost of Islamic credit (El Hamiani Khatat,2016, Kader and Leong, 2009).

Thereby, it is interesting to ask why there could be a transmission of interest rate through debt financing although Islamic banks are theoretically interest free banking? Indeed, the interaction

between interest rate, debt financing and PSIA is a factual issue in dual financial systems and has implications on the MTM and the implementation of dual monetary policy. The impact of interest rate on debt financing is not separated from its impact on PSIA owing to the fact that relationship between PSIA and debt financing shapes the participative intermediation of Islamic banks. In addition, the pricing of debt financing is derived from the real economy conjecture which is reflected theoretically through the return on PSIA. All these elements reveal some issues to anticipate the nature and the intensity of the reaction of debt financing to market funding rates. The competition environment through the cohabitation with the conventional banks, the inexistent or underdevelopment of Islamic money markets and the quite similarities of debt financing contracts with conventional credits in financial terms, may involve the existence of a strong link between market interest rates Islamic banks financing. These conditions constrain Islamic banks to adapt their debt financing behaviour to the evolution of interest rates in order to manage their pricing in term of mark-up of debt financing and return on PSIA. These adjustments imposed by the predominance of conventional banks and the lack of a legal frameworks regulating Islamic monetary markets, encourage the emergence of *Sharia* compliance issues which could impede the realisation of monetary policy aims. By consequence, policy measures are actually taking place in some countries in order to impulse the emergence of dual monetary systems and to design a new monetary policy framework that encompasses Islamic and conventional models.

As a potential channel of MTM in dual systems, Islamic debt financing could react directly to expansionary or tightening monetary policies despite the existence (or not) of an Islamic policy rate. On the first hand, if Islamic banks react in accordance with monetary policy objective, this could indicate an effective MTM and the existence of debt financing channel. In expansionary (tightening) monetary policies, when a decrease (increase) of interest rates influences correctly the volume of Islamic debt financing, the latter will increase (decrease) proving the effectiveness of monetary policy even on Islamic banking system. However, from the Islamic perspective, this may indicate that Islamic banks' debt financing margins are disconnected from real transactions and that Islamic bank financing doesn't reflect asset-backing principal. Islamic banks are influenced by interest rate changes due to the inexistence of their own benchmark reference and that conventional banks still exert harsh competition inducing Islamic banks to align their margins to conventional ones.

On the other hand, the absence of reaction explains the deficiency of MTM through Islamic bank channel where the drivers of debt financing variation are mostly related to Islamic banks own characteristics such as reserve, liquidity, size, capitalisation. Furthermore, the reaction of debt financing could be less effective or the opposite of the direction desired by the monetary policy. In fact, following this hypothesis, the financing debt decreases (increases) in reaction to expansionary (tightening) monetary policies indicating a 'reverse transmission effect'. The ineffectiveness of monetary policy in this case and the incapacity of monetary authorities to influence Islamic banks financing may indicate a weak link between both institutions; and the absence of Islamic instruments forces banks to hold excessive reserves which curtails central banks' ability to conduct monetary policy operations. This situation requires a monetary policy review in term of Islamic monetary market and tools allowing central banks to be the principal provider of liquidity to Islamic banks.

2.2 Role of PSIA and Islamic banks characteristics in monetary transmission

The less or more effective MTM could be explained by the specific characteristics of Islamic banks. A large empirical literature highlights the factors of amplification or mitigation of the effects of a monetary policy shock, the most commonly used characteristics are size, liquidity and capitalization (Zaheer et al., 2013, Muhammad, Ab Rahman and Sulaiman, 2014; Zulkhibri and Sukmana, 2017). In addition to this literature, we focus especially on the role that PSIA could play in the mitigation or the amplification of MTM effect. The importance of this role is due to the structure of funding resources of Islamic banks which is becoming largely dominated by investment deposits and less dependent on equity capital (4). In fact, PSIA are loss-absorbent accounts and provide remunerations tied to the performance of Islamic bank tangible assets (Hamza and Saadaoui, 2013). Given the characteristics of PSIA, Islamic banks are constrained to put in place a quite complicate management system to face hard competition with conventional banks offering guaranteed term deposit with fixed interest rate.

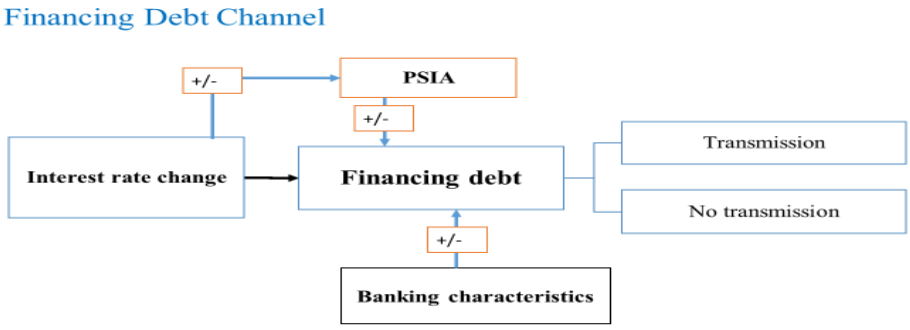

Figure1. Mechanism of monetary transmission in Islamic banks

In fact, Islamic banks could generate insufficient returns on PSIA when a positive shock on money market interest rates, related to tightening monetary policy. Moreover, Islamic banks are continuously facing the risk of a deviation of PSIA returns from expectations. This risk called Displaced commercial risk gives conventional banks a competitive advantage. In dual banking systems, it is shown that returns on Islamic banks' deposits are significantly correlated with interest rates on deposits of conventional banks (Hamza, 2016). Thereby, and due to a probable domination of a "profit motive" compared to "*Sharia* motive", the variation of interest rate can entail a deposit switching from Islamic banks to conventional banks leading to a decrease of the level of deposits and probably a shrinkage of debt financing volume (Kader and Leong, 2009; Sukmana and Kassim, 2010; Ergeç and Arslan, 2013; Arshad, Zakaria and Mohamed, 2015; Akhatova et al., 2016). Besides, the fact that Islamic banks' deposits are affected negatively by interest rate changes, this exposes them to negative fund gaps because they mostly depend on fixed-rate assets financing which may negatively affect their profitability (Rosly, 1999). Moreover, it is shown that the size and the benchmark pricing of PSIA depends on the level and the variation of conventional deposits interest rate (Bacha, 2004; Chong and Liu, 2009; Zainol and Kassim, 2010; Cevik and Charap, 2011; Anuar et al., 2014).

Given these points, we think that the level of PSIA and its stability is likely to play a major role in the effectiveness of Islamic debt financing channel in dual banking systems. During expansionary monetary policies, one may expect a positive effect of policy interest rate changes on PSIA due to a deposit switching from conventional banks to Islamic banks leading to an increase of debt financing and to a more effective monetary transmission. By contrast, Islamic banks with sizable PSIA could be less influenced by monetary policy tightening which affect mostly and negatively bank reserves and demand deposits through the multiplier mechanism

and by consequence the debt financing. In this situation, PSIA constitute a substitute for deposits able to compensate the liquidity gap for Islamic banks. In addition, when the *Sharia* motive is sufficiently strong, PSIA holders give support to either stability and growth of PSIA volume regardless of expected returns, which is likely to avoid the switching from Islamic banks to conventional banks (Arshad, Zakaria and Mohamed, 2015; Hamza, 2016). This means that the degree of Islamic bank compliance with *Sharia* rules is a key factor of resources stability and could allow the mitigation of negative effects of interest rates on debt financing. Furthermore, PSIA are preferred resources thanks to their loss-absorbent and non-guaranteed characteristics, permitting Islamic banks to maintain a stable level of debt financing supply. Since that unrestricted PSIA, are also used as a component of capital adequacy ratio, they can be considered as quasi-equity instruments. A stable growth of PSIA may reinforce Islamic bank capitalization and their capacity to resist to a negative impact of interest rate (Hamza and Saddaoui, 2013).

Finally, specific characteristics of Islamic banks like asset volume, liquidity and capitalization are shown to influence the effectiveness of the MTM. The reaction of Islamic banks to monetary policy could be effective in the presence of sizable Islamic banks leading to less variation of debt financing (El Hamiani Khatat, 2016). Even if being relatively small in size, Islamic banks may be more affected by monetary shocks (Akhatova et al., 2016). Assets liquidity is expected to be higher in Islamic banks liquidity compared to conventional banks. The liquidity excess is due to the prohibition of liquidity management instruments based on interest rates and the underdeveloped or not fully *Sharia* compliant Islamic instruments (Kahf and Hamadi, 2014). In addition, absence of a large and deep secondary market for Islamic financial instruments reduces the ability of Islamic banks to effectively manage their liquidities. The excess of liquidity allows the Islamic banks to maintain their debt financing supply in period of monetary policy tightening. Finally, higher capitalization of Islamic banks allows them to obtain resources easily in order to offset the decline in deposits and thus to maintain their debt financing supply even in the presence of a restrictive monetary policy. Theoretically, the more Islamic banks are capitalized, the more they have the ability to insulate their debt financing supply from monetary policy shocks and to get easier access to non-deposit funds.

2.3 Islamic debt financing channel : some empirical evidences

Several contributions emerged recently on the effectiveness of monetary policy decisions in presence of Islamic banks. Previous studies tried to verify if Islamic banks react differently to monetary market conditions, in which case Central banks should give more attention to the Islamic debt financing channel through which monetary policy decisions could affect the real economy.

The major part of this literature focused on single-country cases, mainly on Arabian Gulf and East-Asian countries. Studying the case of Saudi Arabian banking system, Ben Amar, Hachicha and Saddallah (2015), investigated the effectiveness of the lending channel of monetary policy transmission using data ranging from the fourth quarter of 1990 to the third quarter of 2013. Through estimations performed using Structural Vector Auto-Regressive models, the authors show that monetary policy shocks on Islamic banks' financing induce significant changes on non-oil private output.

Using monthly time series data on Indonesian Islamic Banks, observed from January 2009 to December 2012, Pratama (2014) compared the reaction of conventional and Islamic banks to monetary policy decisions through the interest rate channel and profit loss-sharing/margin

channel. Estimations through the Vector Auto Regressive (VAR) / Vector Error Correction Model (VECM) demonstrate that the effect of monetary policy decisions on the real economy (inflation and output) is more evident through the Islamic banking system than through the conventional system. Using Indonesian Islamic banking data from 2003 to 2014, Zulkhibri and Sukmana (2017) test the responses of Islamic banks to to changes in financing rates and monetary policy. The authors found that the transmission of monetary policy through the Islamic banking is weak which can be explained by the deposit growth and the high liquidity position.

For the case of Turkish banking system analysed through a VAR model and using monthly observations between May 2005 and July 2010, Ergeç and Arslan (2013) found that monetary conditions appear to exert a significant impact on both deposits and financing instruments of Islamic banks. This result is found for the case of Malaysian banks by Kassim, Majid and Yusof (2009) who asked whether the response of monetary policy shocks could differ between conventional banks and Islamic banks. The authors provide a special focus on Islamic banks by testing if their financing and deposit volumes are sensitive to interest rate changes. For this purpose, the authors conducted a variance decomposition analysis on the VAR methodology. They show that, unexpectedly, Islamic banks are more reactive to monetary policy decisions than conventional banks.

In addition to the study of Kassim et al. (2009), other empirical papers focused on the specific case of Malaysia, where a dual banking system is being experienced since few years. Empirical findings are almost converging toward the existence of a robust Islamic financing channel. The purpose of Sukmana and Kassim (2010) and Majid and Hasin (2014) proceeded respectively through a co-integration test, impulse response functions and variance decomposition analysis, using monthly observations between January 1994 and May 2007, and an autoregressive distributed lag (ARDL) using time series data from the first quarter of 1991 to the fourth quarter of 2010. Both studies show that in Malaysia, monetary policy significantly affects output through Islamic financing and that Islamic banks are not insensitive to monetary conditions and interest rates even under a dual banking system.

These results were confirmed by Akhatova et al. (2016) who studied the reaction of Malaysian conventional and Islamic banks using a SVAR specification. The authors found that Islamic banks respond significantly to a positive shock on interest rates by cutting their financing levels more quickly than conventional banks. Using the VAR methodology and monthly data observed from January 2000 to December 2012, the study of Husin (2013) gave similar results, confirming the existence of Islamic financing channel of monetary policy transmission in Malaysia. But, according to the author, the reaction of Islamic banks to conventional monetary conditions weakens as the Islamic banking system becomes more systematically important. A similar empirical approach was conducted by Muhammad et al. (2014) for the Malaysian case using bank-level data observed annually from 2005 to 2010. Findings suggest that Islamic banks are important in the monetary policy transmission since that these institutions respond significantly to policy interest rate changes and that this response depends mainly on bank size and liquidity for domestic banks and on bank capital for foreign banks.

Focusing on the case of Pakistan, the study of Zaheer et al. (2013) perform a different empirical approach than previous ones by using individual bank-specific data rather than aggregated banking data observed between the second quarter of 2002 and the first quarter of 2010. Their results are quite interesting since that they distinguish the reaction of banks according to their specific features like size and assets liquidity. Estimation results using fixed effects model and

first-stage generalized method of moments, show that, contrary to previous evidences for the case of Malaysia, the Islamic bank financing channel is less evident for Pakistan, since that Islamic banks despite their small size are less reactive to monetary policy change than conventional banks.

3. Model specification and estimation method

Our study builds on theoretical and empirical approaches introduced by Bernanke and Blinder (1988), Kashyap and Stein (1995, 2000) and Ehrmann, Gambacorta, Martinez-Pages, Sevestre, and Worms (2001) in order to produce a dynamic model for Islamic banks financing growth. The empirical strategy of the present paper is rather similar to those used by Zaheer et al. (2013) and Muhammad et al. (2014), as it uses dynamic panel data estimations based on bank-level data. The model specification is presented as follows:

$$\Delta IDF_{ijt} = \alpha_0 + \alpha_1 \Delta IDF_{ijt-1} + \alpha_2 \Delta MM_{jt} + \alpha_3 \sum_k X_{ijt}^k + \delta \left(\Delta MM_{jt} \times \sum_l X_{ijt}^l \right) + \alpha_5 \sum_m Y_{jt}^m + \alpha_6 \sum_t Year^t + \sum_j Country_j + \varepsilon_{ijt}$$

Indexes i, j and t refers respectively to the bank, the country in which it operates and the year of observation. The dependent variable is Islamic banks debt financing (ΔIDF), measured as the annual change of the natural logarithm of total debt financing. It is regressed on its lagged value, implying that α_1 is expected to assess the adjustment cost of debt financing growth. Our principal explanatory variable, the annual money market rate (MM), is measured by different monetary interest rates. The first indicator retained is the average one-month interbank rate, if this indicator is unavailable we replace it with the Central Bank discount rate. If any of these two indicators are unavailable then we use Central Bank's repo rates as a proxy for money market interest rate. Our principal hypothesis is that money market rates change exerts a negative impact on Islamic banks financing supply. This implies that the debt financing channel works effectively for various reasons explained previously.

3.1. Bank-specific variables

The vector X^k is composed of k bank-specific variables expected to influence the growth of debt financing. The main bank-specific variable, on which we focus, is the change of PSIA measured using the annual difference of the natural logarithm of the PSIA total volume. In addition to their important role as major financial resource, the PSIAs are unique liability instruments joining the characteristics of both debt and capital instruments and they are relatively more liquid than other interest bearing liabilities. In addition, as shown by Hamza and Saadaoui (2013), PSIA are likely to stimulate debt financing supply. Thus, PSIA levels are expected to exert a positive impact on (ΔIDF). We also introduce the liquidity level of assets (LIQ), measured by the ratio of cash assets (cash and balances with banks) on total assets. More liquid assets should make the financing volume of Islamic banks less sensitive to negative shocks on short term liabilities. Then, we expect that Islamic banks with more liquid assets are more able to increase their financing assets meaning a positive relationship between LIQ and ΔIDF. Bank capital level (CAP), measured using the ratio of equity capital on total assets, is considered also as an important indicator of bank robustness, since that adequately capitalized Islamic banks

are expected to be better insulated against unexpected debt financing losses. In other words, Islamic banks with higher capital levels are more prone to increase debt financing supply, inducing a positive correlation between CAP and ΔIDF.

Bank size (SIZE), measured by the natural logarithm of the total volume of assets is expected to exert a positive impact on ΔIDF since that large banks are more able to preserve arm's length relationships with their debt financing agents and enjoy better reputation which permits them to preserve their market shares and debt financing supply. At the other hand, large banks benefit from easier access to capital markets and are more able to propose debt financing at lower costs than small banks making them more able to increase financing supply. Finally, we introduce also the ratio of investment assets to total assets (RISK) as an indicator of Islamic banks' asset risk, since that investment assets (*Musharakah* instruments) are more risky than other financing instruments. A higher asset risk level may impede banks to originate new financing and to adjust debt financing more quickly because excessive risks make banks more prudent and more inclined to preserve their solvency and to avoid regulatory sanctions. By consequence, we should observe a negative relationship between RISK and ΔIDF.

3.2. Macroeconomic and market structure variables

The vector Y^m contains a number of *m* macroeconomic and market structure variables. Retained macroeconomic indicators that are likely to influence Islamic banks financing growth are the growth rates of real gross domestic product (GDP) and inflation (INFL). These two indicators aim at capturing the demand side effect on debt financing growth. During economic expansion, demand for investment is likely to improve bank financing. While greater inflation may decrease demand for debt financing. Thus, ΔIDF is expected to be positively correlated to GDP and negatively correlated with INFL. Besides, the Herfindahl-Hirschman index (HHI) is also introduced in the model to capture bank market structure effects on debt financing growth. This index is yearly computed for each country and defined as the sum of squared market shares of selected Islamic banks in term of total assets. The HHI ranges from zero and one, with higher HHI indicating a more concentrated banking system. The expected relationship between the HHI and ΔIDF may be ambiguous because, on one hand, a more concentrated and consolidated banking system is expected to be more robust against external shocks which translates into higher stability of debt financing supply. On the other hand, higher concentration probably leads to lower competition and higher debt financing costs charged by banks, which is likely to decrease financing demand.

Finally, in addition to the macroeconomic conditions, the time trend component could exert a significant influence on economic activity and a non-trivial impact on both demand and supply of bank debt financing. In order to take account for the influence of time on debt growth, we introduce « year dummies » variable in the model. We also introduce « country-specific dummies » in order to capture possible impacts of the institutional and regulatory environment on Islamic banks' debt financing growth.

3.3. Interaction terms and marginal effects

Panel data investigation is interesting since that it provides the opportunity to distinguish the effects of monetary policy on debt financing growth according to different bank characteristics. For this purpose, following Zaheer et al. (2013) and Muhammad et al. (2014), we introduce a vector X^l composed of *l* variables interacted with ΔMM. We expect that these interaction terms will give interesting results since they provide inferences on the impact of monetary rates

change on debt financing growth for the variation of bank characteristics volume. Our main innovation, is to extend this analysis to PSIA in order to test whether the change in the volume of this investment deposit could influence the reaction of Islamic banks to money market interest rates.

We focus on the interaction of ΔMM with five variables: PSIA growth, capital ratio, asset liquidity ratio, bank size and the HHI index. Our main hypothesis is that Islamic banks operating with higher growth levels of PSIA are less impacted by conventional monetary policy decisions for three main reasons. First, these deposits are supposed to be less sensitive to monetary interest rates than conventional deposits, which is likely to give a competitive advantage for Islamic banks (against conventional banks) when the supply of money is restricted. The second reason is tied to the principle of PLS making PSIA as equity-like instruments. Therefore, banks performing with higher growth rates of PSIA are expected to be less liquidity-constrained since that PSIA are more liquid than other cost-bearing liabilities (like *Sukuks*). Then, a high level of PSIA growth is expected to make Islamic banks less reactive to positive changes of interest rates since that these changes will not considerably influence their capability to extend new debt financing. Accordingly, if the debt financing channel effectively works through a negative impact of ΔMM on ΔIDF, we should observe that this channel will be less effective at high levels of PSIA growth. The third reason making Islamic banks with a high growth rate of PSIA less impacted by conventional monetary market rates is merely the fact that this high growth rate should provide them with a buffer against the displaced commercial risk in case of interest rates increasing.

Besides, we expect that the impact of ΔMM on ΔIDF will be less evident for Islamic banks with higher levels of equity capital and asset liquidity. In fact, equity and liquidity buffers bring immediate available resources to banks making them more able to extend debt financing in times of restrictive monetary policy. Moreover, larger Islamic banks should also be less reactive to interest rate change, since that they benefit from easier access to *Sharia* compliant capital markets and lower funding costs rendering them more immune against positive shocks on money market interest rates. Finally, the debt financing channel may be weaker in more concentrated Islamic banking systems. In fact, when few banks dominate Islamic banking market, they are expected to improve scale economies and to access more easily to alternative Islamic funding sources. By consequence, in a more concentrated Islamic banking markets, Islamic banks are likely to preserve market shares, making them less exposed to conventional banking system competition and to interest rate changes.

To summarize, interaction terms are used to assess the average impact of monetary market rates change (ΔMM) on ΔIDF by adding the direct impact of ΔMM on ΔIDF and the impact of ΔMM depending on the level of each interacted variable (PSIA, CAP, LIQ, SIZE and HHI). In other words, the total impact of interest rates change on Islamic debt financing is computed as follows:

$(\alpha_2 + \delta_1 PSIA)$ for the impact of ΔMM depending on the growth level of PSIA.
$(\alpha_2 + \delta_2 CAP)$ for the impact of ΔMM depending on the level of equity ratio.
$(\alpha_2 + \delta_3 LIQ)$ for the impact of ΔMM depending on the level of asset liquidity.
$(\alpha_2 + \delta_4 SIZE)$ for the impact of ΔMM depending on bank size.
$(\alpha_2 + \delta_5 HHI)$ for the impact of ΔMM depending on Islamic banking market structure.

Besides, we estimate marginal effects for each interaction term in order to infer the effect of monetary policy at different levels of each bank characteristics variable and its significance.

These marginal effects are expected to give interesting economic interpretation since that in a non-linear relationship the value and the significance of the incremental impact of ΔMM on ΔIDF are expected to vary at different levels of banks characteristics. Accordingly, using marginal effects, we will provide economic interpretation for the following coefficients:

$$\frac{\partial(\Delta IDF)}{\partial(\Delta MM)} = \left(\alpha_2 + \delta_1 \widetilde{PSIA}\right); \frac{\partial(\Delta IDF)}{\partial(\Delta MM)} = \left(\alpha_2 + \delta_2 \widetilde{CAP}\right); \frac{\partial(\Delta IDF)}{\partial(\Delta MM)} = \left(\alpha_2 + \delta_3 \widetilde{LIQ}\right);$$
$$\frac{\partial(\Delta IDF)}{\partial(\Delta MM)} = \left(\alpha_2 + \delta_4 \widetilde{SIZE}\right); \frac{\partial(\Delta IDF)}{\partial(\Delta MM)} = \left(\alpha_2 + \delta_5 \widetilde{HHI}\right)$$

With $\widetilde{PSIA}, \widetilde{CAP}, \widetilde{LIQ}, \widetilde{SIZE}$ and $\widetilde{HHI}$ being the specific levels of each variable for which we will study the impact of their interaction with ΔMM on ΔIDF (5). We should observe that marginal impact of monetary interest rate change is significant for different levels of the bank variables (especially high levels) in order to conclude that this variable is important for the debt financing channel of monetary policy.

3.4 Estimation method, sample and data

The econometric specification deserves some assumptions about the nature of our dependent variable and potential correlations between explanatory variables and error terms. We expect debt financing growth to show some persistence through time, by making the assumption that present levels debt financing depends, among other, on their lagged values. Besides, some explanatory variables, especially bank-specific ones, are expected to be endogenous which may give biases OLS estimates. Accordingly, we estimate a dynamic panel model using the system generalized method of moments developed by Arellano and Bover (1995) and Blundell and Bond (1998) using White-corrected standard errors to correct for the presence of heteroscedasticity.

TABLE 1. Number of Islamic banks by countries (6)

Saudi Arabia	4
Bahrain	6
Bangladesh	4
Indonesia	2
Jordan	2
Kuwait	4
Malaysia	14
Pakistan	5
Qatar	3
United Arab Emirates	6

Our sample is composed of 50 Islamic banks based in 10 countries observed between 2005 and 2014. Balance-sheet data are collected from Islamic banks annual reports, while macroeconomic variables are constructed using the World Development Indicators database provided by the World Bank. Besides, monetary interest rates come from different databases. We begin by collecting available monetary rates from Central Banks' annual reports and we complete them by those provided by the International Financial Statistics database of the International Monetary Fund. After dropping banks with insufficient observations, we obtain the final sample presented in Table 1.

4. Empirical study

4.1. Estimation results

We begin by commenting estimation results of the initial specification without interaction terms. As one can note from Table 2, the p-values associated with Hansen's statistic and Arrelano and Bond's statistics reject the assumptions of over-identifying restrictions and autocorrelation of second order. Besides, all coefficients related to the lagged value of debt financing growth are significant confirming the dynamic feature of this variable and its persistence in time. Results in column (1) show that monetary market rates change is negatively related to ΔIDF at a 95% significance level, confirming the fact that conventional monetary policy exert significant impact on Islamic banks through the debt financing channel.

TABLE 2. Effectiveness of the debt financing channel

	(1)	(2)	(3)	(4)
ΔIDF_{t-1}	-0.3594***	-0.3438***	-0.3520***	-0.3010***
	(0.000)	(0.000)	(0.000)	(0.000)
ΔPSIA	0.4086***	0.4844***	0.4136***	0.5316***
	(0.000)	(0.001)	(0.002)	(0.000)
LIQ	2.7113***	2.5506**	2.3039**	2.5960**
	(0.010)	(0.036)	(0.033)	(0.028)
CAP	2.8387	3.3077**	2.8337*	2.9948**
	(0.125)	(0.040)	(0.065)	(0.034)
RISK	-0.4713	1.6480	1.4371	0.6421
	(0.675)	(0.141)	(0.171)	(0.416)
SIZE	0.0122	-0.0136	-0.0390	0.0350
	(0.916)	(0.863)	(0.742)	(0.618)
GDPG	6.5587**	3.1726*	3.7760	0.1330
	(0.030)	(0.068)	(0.174)	(0.897)
INFL	4.1500	3.6451	5.2767*	0.9098
	(0.192)	(0.257)	(0.098)	(0.517)
HHI	-1.8981**	-2.2815*	-5.1144***	-1.1033
	(0.014)	(0.081)	(0.003)	(0.170)
ΔMM	-0.5546**			-3.7992***
	(0.049)			(0.009)
ΔMM+		-0.6094*		
		(0.059)		
ΔMM-			-0.8042**	
			(0.048)	
ΔMM×ΔPSIA				0.6589*
				(0.062)
ΔMM×CAP				1.3940
				(0.609)
ΔMM×LIQ				6.0692***
				(0.009)
ΔMM×SIZE				0.3203**
				(0.010)
ΔMM×HHI				0.3935
				(0.702)
Intercept	-0.3563	-0.1706	1.5020	-0.5778
	(0.756)	(0.845)	(0.260)	(0.580)
Observations	364	364	364	364
Number of bank	50	50	50	50

Hansen p-value	0.167	0.996	0.993	0.954
AR(2)	0.118	0.193	0.264	0.141

Note: System GMM with robust standard errors. The dependent variable is ΔIDF. The sample contains 50 Islamic banks based in 10 countries observed between 2005 and 2014. Country and year dummies are included in the regression but not reported. p- Values are given in parentheses. Hansen p-value: test for over-identifying restrictions. AR(2): test for first-order and second-order autocorrelation. ***Significance at 99%; **significance at 95%; *significance at 90%.

This result corroborates with those found for single-country cases especially in Malaysia (Kassim et al., 2009; Akhatova et al., 2016) but contradicts the findings of Zaheer et al. (2013) and Zulkhibri and Sukmana (2017) respectively for the case of Pakistanis and Indonesian banks. We further investigate this result by decomposing our monetary policy variable ΔMM into two dummy variables. The dummy ΔMM+ takes positive values of ΔMM and zero otherwise, while ΔMM- takes negative values of ΔMM and zero otherwise. In other words, ΔMM+ and ΔMM- are expected to reflect respectively periods of restrictive and expansionary monetary policies. From columns (2) and (3) we can observe that both ΔMM+ and ΔMM- are negatively and significantly correlated to ΔIDF which further supports the existence of a relatively strong debt financing channel of monetary policy when we restrict the analysis to Islamic banking system.

Regarding bank-specific variables, results in column (1), (2) and (3) confirm the existence of a positive and strongly significant relationship (at 99% confidence level) between the growth level of PSIA (ΔPSIA) and debt financing growth. The elasticity of debt financing growth with respect to ΔPSIA ranges approximately between 40% and 48% which is quite high and gives further support to the relevance of this deposit instrument as stable funding source for Islamic banks.

Besides, results from columns (1) to (3) show that the variable LIQ have a positive and significant impact on ΔIDF, confirming our expectations that the liquidity level of assets is also an important determinant of Islamic banks' financing growth. However, Islamic banks' capitalization, despite its significant impact on ΔIDF as shown in columns (2) and (3), doesn't have an impact on debt financing growth. We note also that Islamic banks' market concentration, captured through the HHI index, also exert a significant but negative impact on ΔIDF, which could be explained through the positive impact that might be exerted on debt financing costs when market concentration is high. Regarding macroeconomic variables, GDP growth is shown to have the most significant impact on debt financing growth. Finally, bank size does not indicate a direct and significant impact on ΔIDF. This result is probably because the scale effect, through its impact on the possibility for Islamic banks to access capital markets more easily, does not work for Islamic banks taken alone, since that Islamic capital markets are not yet sufficiently developed in selected countries. In all specifications the variable RISK, the proxy of assets risk, doesn't constitute a determinant of debt financing growth.

Let us now focus on the effectiveness of the debt financing channel for the variation of bank-specific and market structure variables. For this purpose, we add five interaction terms in the model in order to further investigate the effect of interest rate changes on debt financing growth. As can be seen from the column (4), the average impact of Δ*MM* on Δ*IDF* for the whole sample becomes stronger and statistically significant at 99% confidence level. Moreover, all coefficients related to bank-specific variables keep their sign and significance. The impact of ΔPSIA becomes even more important with an elasticity of ΔIDF in respect of ΔPSIA standing approximately at 53%. However, when Δ*MM* is interacted with ΔPSIA its impact becomes positive and significant at 90% confidence level, showing that for higher levels of ΔPSIA the

debt financing channel become weaker since that the overall impact of Δ*MM* is mitigated when Δ*PSIA* takes higher values. We think that this result is quite valuable since that to our knowledge the impact of PSIA growth level on the effectiveness of the Islamic debt financing channel was not studied previously despite its importance for Islamic banks' liabilities structure. The same result is observed for the other bank-specific variables (LIQ and SIZE) except bank capitalization (CAP).

At this stage of analysis, we must point out two important findings. The first is that the ratio LIQ appears to exert the most potent impact on debt financing channel, indicating that assets liquidity is more important than PSIA growth in explaining the reaction of Islamic banks to conventional monetary policy changes. But this result deserves more investigation since that the impact of PSIA growth on the debt financing channel could be different in strength and significance depending on the level of PSIA growth. The second finding is that bank capital and bank size show different impacts on Δ*IDF* depending on whether they are interacted or not with Δ*MM*. Bank capital has a direct positive and significant impact on debt financing growth but does not influence the reaction of banks to monetary policy decisions, proving the fact that the level of Islamic Bank capitalization is not important for the transmission of monetary policies. However, bank size has a non-significant direct impact on Δ*IDF* but become more important for the transmission of monetary policies. This result, corroborating the findings of Husin (2013) for the case of Malaysian banks, demonstrates the fact that for large Islamic banking system, transmission channel of conventional monetary policy becomes ineffective. Besides, from the column (4) we note that the HHI index loses the significance of its direct impact on Δ*IDF* and does not show any incidence on the debt financing channel effectiveness.

4.2. Additional investigation through marginal effects

In what follows, the debt financing channel will be further examined for different levels of bank-specific and market structure variable using marginal effects estimations. As can be seen from Table 3, the impact of Δ*MM* on Δ*IDF* becomes less important as we move toward higher levels of PSIA growth (i.e. the mean value plus one standard-deviation and the maximum value). But for low levels of Δ*PSIA* this impact becomes important and significant, meaning that the debt financing channel is weakened « only » for Islamic banks achieving high levels of PSIA growth. At a value of Δ*PSIA* equal to its mean plus one standard deviation (Δ*PSIA* ≅ 58%) the overall impact of Δ*MM* on Δ*IDF* (i.e. $\left(\alpha_2 + \delta_1 \widetilde{PSIA}\right)$) becomes even positive and standing at 0.3114. At the maximum value of Δ*PSIA* (≅220%), the overall impact of Δ*MM* on Δ*IDF* remains positive and increases at 1.38652. These two results are significant at 95% confidence level and show that the debt financing channel loses completely its strength at high levels of PSIA growth.

When we undertake the same analysis procedure for the other bank-specific and market structure variables, the results show that the liquidity ratio exerts significant impacts on debt financing channel at all selected specific values. For low values taken by the variable LIQ, the overall impact of Δ*MM* on Δ*IDF* stands at -0.6612924 and -0.6786078 for minimum and mean minus one standard deviation value of LIQ respectively with high degrees of significance. This result confirms the fact that the debt financing channel works for low levels of assets liquidity. That is, Islamic banks operating with a relative low level of liquidity buffers are expected to be more reactive to a tight monetary policy. However, for high values of LIQ, the overall impact of Δ*MM* on Δ*IDF* becomes positive and strongly significant, standing at 4.6023 and 0.8730 for maximum and mean plus one standard deviation value of LIQ respectively. This finding supports again the fact that the debt financing channel is weakened for banks operating with

high levels of asset liquidity. These results confirm to a certain extent our previous results obtained from Table 2. The fact that the impact on the debt financing channel exerted by asset liquidity was found to be more important than that exerted by PSIA growth is explained through their different marginal effects. Indeed, the debt financing channel become ineffective at high levels of Δ*PSIA* and LIQ.

Regarding the role of Islamic bank size in the transmission of conventional monetary policy, results from Table 3 suggest that the debt financing channel becomes more potent for small banks but less effective for large banks. The overall impact of Δ*MM* on Δ*IDF* is negative and significant standing at -1.286 and -0.4401 respectively for the minimum value and the mean value minus one standard deviation of SIZE. This result supports the fact that small banks eventually facing more difficulties in accessing capital market and less alike to benefit from scale economies, are more reactive to conventional monetary policy. By contrast, large banks seem to be less sensitive to changes in monetary conditions, since that the overall impact of Δ*MM* on Δ*IDF* is positive and stands at 0.9954 and 0.3899 at maximum value and the mean value plus one standard deviation of SIZE. This result is important since it shows that despite the absence of a direct effect on debt financing growth, bank size is found to be a significant factor influencing the monetary policy transmission through Islamic banking system.

TABLE 3. Marginal effects of monetary rates change (ΔMM):

	ΔPSIA	LIQ	CAP	SIZE	HHI
Min.	-0.8554	-0.6612**	-0.1471	-1.2861**	0.2623
	(0.5378)	(0.3048)	(0.4598)	(0.3664)	(0.5086)
Max.	1.3865**	4.6023***	1.1374	0.9954***	-0.0419
	(0.6837)	(1.7337)	(2.0667)	(0.5523)	(0.3158)
Mean-se	-0.1676	-0.6786**	-0.0666	-0.4401*	-0.0098
	(0.1931)	(0.3110)	(0.3085)	(0.2409)	(0.2386)
Mean+se	0.3114**	0.8730***	0.2131	0.3899**	0.1324
	(0.1488)	(0.3269)	(0.2766)	(0.1616)	(0.1910)
Mean	0.0718	0.0972	0.0732	-0.0250	0.0613
	(0.1151)	(0.1181)	(0.1048)	(0.1266)	(0.1106)

Notes : This table reports marginal effect coefficients of ΔMM on ΔIDF when interacted with specific values of bank-specific and market structure variables. The marginal effect of an independent variable x is the partial derivative (Specifying values for interacted variables and keeping other variables at their mean values) with respect to x calculated from predictions of an estimated model. Standard deviations are in parentheses. ***significance at 99%; **significance at 95%; *significance at 90%.

4.3. Robustness checks

In order to test the robustness of our results, we re-estimate our initial model by redefining the interaction terms. In fact, each of bank-specific and market structure variables are replaced by a dummy variable which takes the value of one when this variable reaches higher levels and we interact this dummy with Δ*MM* in order to verify if market interest rates exert different impact on debt financing growth when interacted variables become more important. In order to construct the dummies, we specify the median and the fourth quartile values of each interacted variable as a threshold, these dummies are noted Q2PSIA, Q2LIQ, Q2CAP, Q2SIZE and Q2HHI respectively. Accordingly, the interacted variables $\widehat{PSIA}, \widehat{LIQ}, \widehat{CAP}, \widehat{SIZE}$ *and* $\widehat{HHI}$ are replaced by the dummies above-mentioned. Besides, in order to get more efficient estimates

due to the usage of several dummies at once which may cause collinearities between explanatory variables, we introduce in each specification one dummy and its related interaction term.

The first five columns (1 to 5) report estimations results using the median (Q2) as threshold while results using the fourth quartile (Q4) are reported in the last five columns (6 to 10). We note that both thresholds provide almost the same output confirming the existence of debt financing adjustment costs for Islamic banks. Columns (2) and (7) corroborate our previous findings that the liquidity level of assets is likely to mitigate the impact of interest rate changes on the level of IDF. According to column (2) a 1 p.p increase of ΔMM is expected to decrease ΔIDF by 0,71 p.p for the whole sample, but this impact turns to be positive when we add the coefficient related to the interaction term (ΔMM×LIQQ2) which capture the impact of interest rate changes exclusively on Islamic banks with a level of asset liquidity higher than the sample median. The overall impact of ΔMM on ΔIDF for high liquid Islamic banks become positive and equal to (1.0716 - 0.7194 =) 0,3522 p.p. We found an additional result corroborating our previous findings related to bank size which appear to mitigate the negative impact of interest rate change on ΔIDF. As indicated by the column (9), a 1 p.p increase of ΔMM leads to an average decrease of ΔIDF by 0,60 p.p for the whole sample but this impact is very lower for large Islamic banks (with a SIZE higher than the fourth quartile) estimated at only -0,08 p.p. Column (3) indicates that bank capitalization is also expected to weaken monetary policy transmission through the debt financing as the coefficient tied to the interaction term ΔMM×CAPQ2 is positive and significant. But this result should be taken with caution as the level of significance of this coefficient is low and it loses its significance in the column (8). Finally, results in Tables 4 show that PSIA growth continue to exert a significant mitigation impact on the debt financing channel. It is interesting also to note that this channel becomes less evident for higher levels of Δ*PSIA*. The overall impact of market interest rates change is determined simply by adding the coefficient related to Δ*MM* to that related to the interaction term for each variable. Thus, the overall impact of Δ*MM* on Δ*IDF* for PSIA growth levels higher than its median value (≅17%) is positive and stands at 0.35 while it becomes more important for values of Δ*PSIA* higher than the fourth quarter (≅ 36%) reaching 0.71. Furthermore, it appears that higher levels of assets liquidity and bank size are associated with a less potent debt financing channel corroborating our previous findings.

5. Conclusion

The recent growth of Islamic banks in several countries around the world urged monetary authorities to put in place adequate monetary policy frameworks in order to improve the effectiveness of transmission channels through Islamic and conventional banks. In fact, these two competing banking systems operate in a unique environment but with different ethical background which may further complicates the conduct of monetary policy and hamper its effectiveness. The fact that Islamic banks assets and liability instruments are fundamentally different from those of conventional banks, this raise the question of how Islamic banks react effectively to conventional monetary policy instruments like monetary interest rates and what makes Islamic banks more or less reactive to interest rate? Is a dual monetary policy framework essential in order to optimize the conduct of monetary policy?

This study tries to give plausible answers to these questions by investigating the impact of monetary policy decisions through interest rate changes on Islamic banks debt financing. We focus mainly on the role of the growth level of PSIA as a major deposit in influencing the

reaction of Islamic banks to monetary rates change. For this purpose, the estimations indicate that interest rate significantly influences the growth level of Islamic bank debt financing and confirm the existence of a strong debt financing channel. In monetary tightening, this influence impedes seriously the Islamic banks leading to a decrease of financing level and a potential increase of displaced commercial risk. However, additional investigations show that not all Islamic banks react in the same way to monetary interest rates, this depends mainly on bank-specific characteristics. In fact, our empirical findings suggest the existence of a "reverse" debt financing transmission channel for large Islamic banks and for Islamic banks with high growth level of PSIA and with high level of asset liquidity. The finding concerning the impact of PSIA growth is quite interesting since that the role of this investment deposit in monetary policy transmission channel, despite its importance, was not studied previously. In fact, the PSIA is supposed to be less sensitive to monetary interest rates than conventional deposits. The PSIA is also expected to make Islamic banks less exposed to asset risks according to participative intermediation and to be less liquidity-constrained. A high growth level of PSIA should also provide Islamic banks with a buffer against the displaced commercial risk. All these reasons may explain why we found that Islamic banks operating with high growth level of PSIA at the liability side do not shrink debt financing levels in response to a restrictive monetary policy.
In view of these results, this study has main policy implications. In one hand, as Islamic banks' assets are growing significantly and regularly in many countries, PSIA are expected to exert a more potent impact on the effectiveness of monetary policy transmission through the debt financing channel. Consequently, the choice of the PSIA as a monetary stability indicator becomes a must where the follow-up of the PSIA should be based on its growth rate, PLS pricing, maturity structure and right protection of Investment accounts holders. In other hand, for an effective monetary "dual system", monetary policy approaches could be revisited by encompassing conventional and Islamic monetary transmission. Monetary authorities have to provide Islamic banks with required conditions (legislation, regulatory framework, *Sharia* compliant liquidity instruments) to operate in the same way as conventional banks, since the two systems shape the monetary-banking landscape. In particular, a monetary dual system requires new monetary instruments and a definition of Islamic policy rate reflecting PLS principle in addition to interest rate policy. Following this view, the new monetary policy based on both conventional and Islamic policy rates is expected to better transmit monetary policy decisions to the real economy through Islamic and conventional banks. Islamic monetary transmission is effective since the debt financing connects the Islamic policy rate to the real economy.

Endnotes

1. Except in Malaysia and Sudan.
2.These investment-deposits have been created as an alternative to interest earning term-deposits.
3. In the Middle East and North Africa (MENA) region Islamic banking assets represent 14 percent of total banking assets. In the GCC the market share of Islamic banking has crossed the 25 percent threshold, which suggests that Islamic banks have become systemically important in these countries (Basu, Prasad, and Rodriguez, 2015).
4. In our statistics, the PSIA represents a large share of Islamic banks resources about 40-45%. In addition, we found that between 2005 and 2014 the Islamic banks equity is decreased from 24% to 13% in the GCC and from 13.5% to 8.5% in the south-east Asia. This regression was accelerated after the US crisis in 2008.
5. Specific levels are standard statistics: Maximum, minimum, mean value plus and minus standard deviation.

6. List of Islamic banks (IB):

Country	**Number of Islamic banks**	**Bank Name**
King Saudi Arabia	4	Rajhi IB, Al Bilad IB, Bank al Jazira, Bank AlInma
Bahreïn	6	Bahrain IB, Khaleeji Commercial Bank, Albaraka group, Kuwait Finance House Bahrain, Al Salam Bank, Ithmar Bank
Bangladesh	4	Al-arafah islami bank Ltd, EXIM Bank Of Bangla Limited, Shahjalal bank, Islami Bank Bangla limited
Indonesia	2	Bank syariah Mandiri, Bank Muaamalat
Jordan	2	IIA Bank, Al Baraka IB of Jordan
Kuwait	4	kuwait International bank, Kuwait finance house, Boubyane, Bank Al Ahli United
Malaysia	14	Affin IB berhad, AmIB berhad, Asian finance bank berhad, CIMB IB berhad, Bank islam Malysia berhad, Bank Muaamalat Malaysia berhad, Alliance IB, Kuwait Finance House Malaysia, RHB IB berhad, Rajhi IB Malaysia, Hong leong IB berhad, HSBC Amanah, MayBank Islamic, Public Islamic bank
Pakistan	5	Al baraka pakistan, Burj bank, Bankislami pakistan, Dubai IB Pakistan Limited, Al meezan bank limited
Qatar	3	Qatar international IB, Qatar IB, Rayan IB
United Arabe Emirates	6	Sharjah IB, Emirates IB, Dubai IB, ADIB, Ajman IB, Al Hilal IB
Total : 10 countries	Total : 50 Banks	

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TABLE 4. Robustness check

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ΔIDF_{t-1}	-0.1708***	-0.3016***	-0.1599***	-0.3370***	-0.1977***	-0.1504**	-0.3499***	-0.1756***	-0.3534***	-0.1957***
	(0.002)	(0.000)	(0.005)	(0.000)	(0.002)	(0.034)	(0.000)	(0.007)	(0.000)	(0.004)
ΔPSIAQ2/Q4	0.3607***					0.4061***				
	(0.000)					(0.000)				
LIQQ2/Q4		0.2823*					0.4457**			
		(0.078)					(0.023)			
CAPQ2/Q4			0.2527					0.1664		
			(0.235)					(0.259)		
SIZEQ2/Q4				-0.2369					0.1182	
				(0.190)					(0.558)	
HHIQ2/Q4					0.2657					-0.2988*
					(0.183)					(0.098)
ΔMM	-0.3998**	-0.7194*	-0.5654**	-0.8090***	-0.5020*	-0.3097*	-0.6055**	-0.3024*	-0.6582***	-0.2767*
	(0.046)	(0.069)	(0.027)	(0.008)	(0.094)	(0.053)	(0.032)	(0.066)	(0.008)	(0.072)
ΔMM×ΔPSIAQ2/Q4	0.7500**					1.0250***				
	(0.010)					(0.009)				
ΔMM×LIQQ2/Q4		1.0716*					0.9567*			
		(0.054)					(0.071)			
ΔMM×CAPQ2/Q4			0.6590*					0.4382		
			(0.055)					(0.170)		
ΔMM×SIZEQ2/Q4				0.3248					0.5741**	
				(0.271)					(0.048)	
ΔMM×HHIQ2/Q4					0.3760					0.7017
					(0.238)					(0.297)
ΔPSIA		0.4648***	0.3056**	0.4052***	0.3241**		0.4546***	0.2986**	0.4310***	0.2636**
		(0.007)	(0.024)	(0.001)	(0.022)		(0.000)	(0.032)	(0.000)	(0.023)
LIQ	1.4605*		1.0128*	1.9460**	1.4153**	1.4969*		1.1927*	2.0008*	1.2818*
	(0.062)		(0.059)	(0.047)	(0.031)	(0.066)		(0.062)	(0.055)	(0.085)
CAP	1.7509**	2.2548		2.0790**	2.4697**	1.6283**	1.2060		1.7431	1.8497*
	(0.020)	(0.128)		(0.041)	(0.024)	(0.043)	(0.271)		(0.118)	(0.060)
RISK	0.6184	-0.4996	0.6107	0.5747	1.3315**	0.3749	-0.4982	0.4526	0.4926	0.7902
	(0.196)	(0.459)	(0.300)	(0.539)	(0.045)	(0.461)	(0.349)	(0.344)	(0.597)	(0.196)
SIZE	-0.0087	0.1452	-0.0990**		-0.0777	0.0232	-0.0184	-0.1053		-0.0591
	(0.857)	(0.149)	(0.045)		(0.143)	(0.718)	(0.738)	(0.115)		(0.281)

TABLE 4. (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDPG	0.9554	-2.8352	3.8827**	3.2547	2.4878	2.1233	3.1355	3.3870**	4.0098*	1.9061
	(0.390)	(0.258)	(0.015)	(0.150)	(0.169)	(0.211)	(0.106)	(0.031)	(0.069)	(0.275)
INFL	-2.2956	-0.9619	-2.2596	3.4768	-2.7498	-3.5664	3.2452	-1.7690	3.6050	-2.4111
	(0.297)	(0.694)	(0.234)	(0.235)	(0.146)	(0.138)	(0.146)	(0.399)	(0.167)	(0.199)
HHI	-0.2627	-3.1741***	-0.3955	-1.2022**		-0.5821	-1.3008**	-0.5757	-1.4167***	
	(0.517)	(0.009)	(0.358)	(0.033)		(0.117)	(0.021)	(0.188)	(0.006)	
Constant	-0.2276	-0.2894	0.6920	-0.0643	0.1352	-0.3787	0.3625	0.8731*	-0.2472	0.2372
	(0.632)	(0.808)	(0.109)	(0.870)	(0.777)	(0.575)	(0.468)	(0.085)	(0.583)	(0.612)
Observations	364	364	364	364	364	364	364	364	364	364
Number of bank	50	50	50	50	50	50	50	50	50	50
Hansen p-value	0.996	0.976	0.978	0.995	0.963	0.963	0.971	0.994	0.961	0.989
AR(2)	0.201	0.144	0.174	0.498	0.125	0.171	0.393	0.123	0.379	0.111

Note: System GMM with robust standard errors. The dependent variable is ΔIDF. The sample contains 50 Islamic banks based in 10 countries observed between 2005 and 2014. Country and year dummies are included in the regression but not reported. p-values are given in parentheses. Hansen p-value: test for over-identifying restrictions. AR(2): test for first-order and second-order autocorrelation. ***Significance at 99%; **significance at 95%; *significance at 90%.