

# AGGREGATE LIQUIDITY CREATION OF ISLAMIC BANKS IN TURKEY

## TÜRK KATILIM BANKALARININ LİKİDİTE YARATIMI

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### Abstract

This paper provides a detailed analysis of aggregate liquidity created by Islamic (participation) banks in Turkey. Using quarterly regulatory dataset for the period of 2010–2017 and applying Berger and Bouwman<sup>1</sup> framework to measure liquidity creation, we document that the liquidity created by Turkish Islamic (participation) banks has tripled (in inflation adjusted terms) in our sample period. Furthermore, we find that Islamic banks have created liquidity both on and off their balance sheets. Finally, we observe that Turkish Islamic banks have been creating more liquidity with their liabilities than their assets. Despite the continuous upward trend in aggregate liquidity created by Turkish Islamic banks, their loan-to-asset and deposit-to-asset ratios have been declining in our sample period, which suggests that the observed trend has been driven by extensive margin (i.e., bank sizes growing in real terms) rather than the intensive margin (banks creating liquidity more effectively).

**Keywords:** Islamic Banks, Liquidity Creation, Turkey

**JEL Classification:** G21, G28

### Öz

Bu makale Türkiye'deki İslami (Katılım) bankalarının yarattığı toplam likiditenin ayrıntılı bir analizini sunmaktadır. 2010-2017 dönemine ait üçer aylık Bankacılık Düzenleme ve Denetleme Kurulu (BDDK) verileri kullanılarak ve Berger ve Bouwman (2009) likidite yaratımı ölçüm yöntemi uygulanarak Türk İslami (Kalkınma) Bankalarının yarattığı likiditenin incelenen dönemde üçe katlandığı (enflasyondan arındırılmış olarak) sonucuna ulaşılmıştır. Bunun yanında, Türk İslami bankaların hem bilanço hem de nazım hesaplar ile likidite yarattığı görülmektedir. Son olarak, Türk İslami bankalarının yükümlülükleri ile varlıklarından daha fazla likidite yarattığı gözlemlenmiştir. Toplam likiditede gözükten yukarı yönlü eğilime rağmen incelenen dönemde kredi/varlık ve mevduat/varlık oranlarının düşüş eğiliminde olması

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1 Berger, A. N., Bouwman, C. H. (2009). Bank liquidity creation, *Review of Financial Studies*, 22(9): 3779-3837.

gözlemlenen yükseliş eğiliminin bankaların daha etkin likidite yaratması sebebi ile değil de banka büyüklüklerinin reel olarak artmasından kaynaklandığına işaret etmektedir.

**Anahtar Kelimeler:** İslami (Katılım) Bankalar, Likidite Yaratımı, Türkiye

**JEL Sınıflandırması:** G21, G28

## 1. Introduction

After the 2007-2008 financial crisis, interest in Islamic banking have expanded beyond the Muslim majority countries. The acceptability of Islamic finance has penetrated not only the Middle East and Asian countries, but also the rest of the world<sup>2</sup>. Given the increasing interest in Islamic banking, recent empirical literature discusses their role in the economy and their performance in several aspects. Recent studies on the role and relative importance of Islamic banks show that development of Islamic banking leads to a higher banking sector development<sup>3</sup>, increases macroeconomic efficiency<sup>4</sup> and improve economic welfare<sup>5</sup>. We contribute to this recently growing literature by focusing on Islamic (participation) banks' performance in terms of liquidity creation<sup>6</sup>. Following Berger and Bouwman<sup>7</sup> liquidity created on – and off-balance sheet are computed for Islamic banks operating in Turkey. Furthermore, Berger and Bouwman<sup>8</sup> methodology allows us to disentangle contribution to the liquidity creation from the asset and liability sides. Comparing these liquidity creation measures, we document the aggregate liquidity created by Islamic banks and further we elaborate how it changed over time.

We study the liquidity creation performance of Islamic banks in Turkey. Our sample contains 5 Islamic (participation) banks operating during the period of 2010 – 2017. We obtained quarterly detailed regulatory dataset from The Banks Association of Turkey which provides free access to financial statements of banks. Our main variable of interest is the aggregate liquidity created by Turkish Islamic banks. To this end, first we calculate liquidity creation for individual banks a-la Berger and Bouwman<sup>9</sup> on a quarterly basis, following the methodology described in Akin and Ozsoy<sup>10</sup> and then aggregate them for each quarter.

First aim of the paper is to document the aggregate liquidity created by Turkish Islamic banks. We find that during our sample period the liquidity created by Turkish Islamic (participation) banks has

2 Hassan, M. K., Aliyu, S. (2018). A Contemporary Survey of Islamic Banking Literature, *Journal of Financial Stability*, 34: 12-43.

3 Gheeraert, L. (2014). Does Islamic Finance Spur Banking Sector Development?, *Journal of Economic Behavior and Organization*, 103: 4-S20.

4 Gheeraert, L., Weill, L. (2015). Does Islamic Banking Development Favor Macroeconomic Efficiency? Evidence on the Islamic Finance-Growth Nexus, *Economic Modelling*, 47: 32-39.

5 Abedifar, P., Hasan, I., Tarazi, A. (2016). Finance-Growth Nexus and Dual-Banking Systems: Relative Importance of Islamic Banks, *Journal of Economic Behavior and Organization*, 132: 198-215.

6 In this study, we use the terms Islamic and Participation interchangeably. In 2005, Turkey renamed interest-free banks as participation banks which are named as Islamic banks in global banking system.

7 Berger, Bouwman, 2009.

8 Berger, Bouwman, 2009.

9 Berger, Bouwman, 2009.

10 Akin, O., Ozsoy, M. (2020). Political Liquidity Creation: Electoral Cycles and State-owned Banks, Working Paper.

tripled, in inflation-adjusted terms. We further show that Islamic banks have created liquidity both on and off their balance sheets. The liquidity created off-balance sheets varies more over time and equals, on average, to 75 percent of liquidity creation on balance sheets. Finally, we disentangle the source of liquidity creation by computing liquidity created from asset and from liabilities side separately. Banks can create liquidity for their customers with their assets, such as illiquid loans and with their liabilities, such as by offering demandable deposits. When we compare the liquidity created on the asset and liability sides, we observe that Turkish Islamic Banks have been creating more liquidity with their liabilities than their assets. In some quarters the amount of liquidity created via liabilities is double of liquidity created via assets. Despite the upward trend in aggregate liquidity created by Turkish Islamic banks, their loan-to-asset and deposit-to-asset ratios have been declining in our sample period, which suggests that the observed upward trend has been driven by extensive margin (i.e. bank sizes growing in real terms) rather than the intensive margin (banks creating liquidity more effectively).

We contribute to the literature in several ways. First, the literature on Islamic banking has mostly been theoretical and the empirical results are limited. Recently growing empirical literature investigates the several aspects of Islamic banking including their profitability, efficiency, survival rate and stock market liquidity. By analysing the most recent data from Turkey, we extend the earlier work on Islamic banks (e.g., Field, et al<sup>11</sup>; Abdelsalam et al<sup>12</sup>; Elnahass et al<sup>13</sup>) in general. More specifically, we contribute to this recently growing empirical literature by analysing their performance in terms of liquidity creation. As Berger et al<sup>14</sup>. argues that despite the growth of Islamic banks little is known about their liquidity creation performance which is one of the fundamental roles of financial intermediaries. Berger et al.<sup>15</sup> address this issue at bank level in a multi-country setting using data from 24 countries including Turkey over 2000 – 2014. Akin and Ozsoy<sup>16</sup> study the liquidity creation performance of Islamic banks in a single-country context using data from Turkey in post-crisis period (2010 – 2017). It is crucial to provide evidence from a single country setting as the literature documents that performance of Islamic banks across Muslim countries varies significantly due to differences in institutional environments (see e.g., Bitar et al<sup>17</sup>). Unlike Akin and Ozsoy<sup>18</sup>, this paper analyse it at the aggregate level. We also extend the limited literature on the performance of Turkish Islamic banks. Aysan et al<sup>19</sup> provides an overview of the developments in the Turkish

- 11 Field, L., Lowry, M., Mkrtchyan, A. (2013). Are Busy Boards Detrimental?, *Journal of Financial Economics*, 109(1): 63-82.
- 12 Abdelsalam, O., El-Komi, M. (2016). Islamic Finance: Introduction and Implications for Future Research and Practice, *Journal of Economic Behavior and Organization.*, 132: 1-3.
- 13 Elnahass, M., Izzeldin, M., Steele, G. (2018). Capital and Earnings Management: Evidence from Alternative Banking Business Models, *The International Journal of Accounting*, 53(1): 20-32.
- 14 Berger, A. N., Boubakri, N., Guedhami, O., Li, X. (2019). Liquidity Creation Performance and Financial Stability Consequences of Islamic Banking: Evidence from A Multinational Study, *Journal of Financial Stability*, 44: 100692.
- 15 Berger et. al. 2019.
- 16 Akin, O., Ozsoy, M. (2021). Bank Liquidity Creation in Turkey: Conventional vs. Islamic Banks, Working Paper.
- 17 Bitar, M., Hassan, M. K., Walker, T. (2017). Political Systems and The Financial Soundness of Islamic banks. *Journal of Financial Stability*, 31: 18-44.
- 18 Akin, Ozsoy, 2021.
- 19 Aysan, A. F., Dolgun, M. H., Turhan, M. I. (2013). Assessment of the Participation Banks and Their Role in Financial Inclusion in Turkey, *Emerging Markets Finance and Trade*, 49: 99-111.

Islamic banking sector. Earlier studies on Islamic banking in Turkey focused on their performance mostly in terms of profitability measured by various financial ratios. Previous studies that conduct comparative analysis of the performance of Islamic bank and conventional bank operating in Turkey produce mixed results. Karakaya and Er<sup>20</sup> analyse 6 years of data between 2005 – 2010 and document that equity capital profitability of participation banks is higher than that of commercial banks. Erol et al<sup>21</sup> compare the performance of Islamic banks in Turkey with that of commercial banks using CAMEL approach for the period of 2001 – 2009. Their results show that Islamic banks have better performance in earnings. On the other hand, Akala<sup>22</sup> analyses the period of 2005-2015 and shows that conventional banks in Turkey are performing better than Islamic banks by comparing several financial ratios over time. We contribute to Turkish Islamic banking literature by analysing their performance in terms of liquidity creation.

Second, we contribute to growing empirical liquidity creation literature using Berger and Bouwman<sup>23</sup> framework. Deep and Schaefer<sup>24</sup>, the first study that has investigated bank liquidity creation, use only liquid items from assets and liabilities side to measure liquidity creation. In a follow up study, Berger and Bouwman<sup>25</sup> emphasize the importance of a comprehensive liquidity creation measure and propose measure that considers items from both asset and liabilities sides and on – and off-balance sheet items. This comprehensive liquidity creation measure is often used in subsequent studies that are analyzing liquidity creation in developed countries as well as emerging countries (See e.g., Pana et al<sup>26</sup>; Horváth et al<sup>27</sup>; DeYoung and Huang<sup>28</sup>; Berger and Bouwman<sup>29</sup>; Fungáčová et al<sup>30</sup>; Beck et al<sup>31</sup>).

We further specifically contribute to the literature analysing liquidity aspects of Turkish banks. The number of papers studying the liquidity in the context of Turkish banks is limited and none of

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- 20 Karakaya, A., Er, B. (2013). Noninterest (Nonprofit) Income and Financial Performance at Turkish Commercial and Participation Banks, *International Business Research*, 6(1): 106.
- 21 Erol, C., Baklaci, H. F., Aydoğan, B., Tunç, G. (2014). Performance Comparison of Islamic (participation) Banks and Commercial Banks in Turkish Banking Sector, *EuroMed Journal of Business*, 9(2): 114-128.
- 22 Akala, İ. (2018). Comparing Financial Performances of Conventional and Participation Banks: Case of Turkey (2005–2015), *International Journal of Inspiration and Resilience Economy*, 2(1): 11-17.
- 23 Berger, Bouwman, 2009.
- 24 Deep, A., Schaefer, G. K. (2004). Are Banks Liquidity Transformers?, Working Paper, Harvard University.
- 25 Berger, Bouwman, 2009.
- 26 Pana, E., Park, J., Query, T. (2010). The Impact of Bank Mergers on Liquidity Creation, *Journal of Risk Management in Financial Institutions*, 4(1): 74-96.
- 27 Horvath, R., Seidler, J., Weill, L. (2014). Bank Capital and Liquidity Creation: Granger-Causality Evidence, *Journal of Financial Services Research*, 45(3): 341-361.
- 28 Deyoung, R., Huang, M. (2016). The External Effects of Bank Executive Pay: Liquidity Creation and Systemic Risk, Working Paper.
- 29 Berger, A. N., Bouwman, C. H. (2017). Bank Liquidity Creation, Monetary Policy, and Financial Crises, *Journal of Financial Stability*, 30: 139-155.
- 30 Fungacova, Z., Weill, L., Zhou, M. (2017). Bank Capital, Liquidity Creation and Deposit Insurance, *Journal of Financial Services Research*, 51(1): 97-123.
- 31 Beck, T., Dottling R., Lambert T., Van Dijk, M. (2020). Liquidity Creation, Investment, and Growth. CEPR Discussion Papers no 14956, Centre for Economic Policy Research.

these studies use the comprehensive liquidity creation measure. Alper et al.<sup>32</sup> define liquidity as the difference between liquid assets and liquid liabilities. Similar to Deep and Schaefer<sup>33</sup>, they take into account items from both assets and liabilities side. But different from Berger and Bouwman<sup>34</sup> they do not include loans and any semi-liquid items (both from asset and liability sides) in their analysis. Other studies that analyze liquidity aspects of Turkish banks measure liquidity as the share of liquid assets in total assets and have not used any items from liabilities side (See e.g., Akıncı et al<sup>35</sup>; Ozsuca and Akbostancı<sup>36</sup>).

Finally, we also contribute to the debate on the role of off-balance sheet items. It is critical to include off-balance sheet activities in liquidity creation computation because they include items such as loan commitments which can provide significant liquidity to firms, especially when obtaining new credit lines are difficult. The growing pattern of off-balance sheet (OBS) activities has attracted attention of both regulators and academicians. Globally, there is a growing pattern in off-balance sheet activities. Acharya and Richardson<sup>37</sup> reports growing pattern of the securitization-generated income in many OECD countries especially after 2003. Altunbas et. al<sup>38</sup> provide evidence on the increasing securitization in European banks. In line with global trends, the share of off-balance sheet items increased significantly after the crisis of 1994 in Turkish banking system as well. However, an early study by Altan and Parlakkaya<sup>39</sup> documents that these transactions did not positively affect the performance of the banks due to their ineffective use. Anbar and Alper<sup>40</sup> analyze the banks that are listed on Istanbul Stock Exchange for the 1999-2010 and find that the banks with higher return on equity and higher net interest margin and smaller banks use derivatives more intensely. Using data in a more recent period (2002-2017), Akin and Ozsoy<sup>41</sup> documents that loan commitments of Turkish banks take a dramatic deep dive in 2013, while at the same time the use of derivatives begins a trend of a steady increase. The importance of OBS has risen even more after the recent crisis as OBS activities of banking sector are blamed as one of the main reasons of crisis. It has been argued that the standard capital adequacy and liquidity ratios that did not consider the riskiness of

32 Alper, K., Hulagu, T., Keles, G. (2012). An Empirical Study on Liquidity and Bank Lending, Central Bank of the Republic of Turkey Working Paper, 4.

33 Deep, Schaefer, 2004.

34 Berger, Bouwman, 2009.

35 Akıncı, D. A., Matousek, R., Radić, N., Stewart, C. (2013). Monetary policy and The Banking Sector in Turkey, Journal of International Financial Markets, Institutions and Money, 27: 269-285.

36 Ozsuca, E. A., Akbostancı, E. (2012). An Empirical Analysis of the Bank Lending Channel in Turkey, Middle East Technical University ERC Working Papers in Economics, 12(05): 1-33.

37 Acharya, V. V., Richardson, M. (2009). Causes of The Financial Crisis., Critical Review, 21(2-3): 195-210.

38 Altunbas, Y., Gambacorta, L., Marques-Ibanez, D. (2009). Securitisation and the Bank Lending Channel, European Economic Review, 53(8): 996-1009.

39 Altan, M., Parlakkaya, R. (2004). Bilanço Dışı İşlemlerin Banka Performansına Etkisi: Türk Bankacılık Sektörü Örneği, İktisat İşletme ve Finans, 19(219): 107-122.

40 Anbar, A., Alper, D. (2011). Bankaların Türev Ürün Kullanım Yoğunluğunu Etkileyen Faktörlerin Belirlenmesi, Muhasebe ve Finansman Dergisi, 50: 77-94.

41 Akin, O., Ozsoy, M. (2019). Global Trends in Liquidity Creation: The Role of the Off – Balance Sheet, New Trends in Banking and Finance, Peter Lang, Berlin, p. 77-94.

OBS activities have been misleading (Barrell and Davis<sup>42</sup>). The role of off-balance sheet activities in creating liquidity diminished for the US banks with the 2008-09 financial crisis. The decrease in the role of off-balance sheet items for Turkish banks starts few years later, around 2013.<sup>43</sup> Unlike Akin and Ozsoy<sup>44</sup> we only focus on Islamic banks, rather than conventional banks, and provide evidence on the role of off-balance sheet activities in creating liquidity for these banks.

The remainder of the paper is organized as follows. Section 2 explains the details of data sources, and construction of liquidity creation measures. Section 3 presents empirical results and finally in section 4, we conclude and discuss the policy implications of our findings.

## 2. Data and Method of Analysis

In this section we first explain the data and sample construction. Then we describe the liquidity creation measures we use.

Our sample consists of 5 Islamic banks operating in Turkey for the period 2010-2017. We obtained quarterly banks' balance sheets and income statements data from the official website of The Banks Association of Turkey.<sup>45</sup> We converted nominal values into real using the inflation data obtained from the central bank's webpage.<sup>46</sup>

**Table 1: Descriptive Statistics**

	<b>Islamic Banks</b>					
	<b>Number of</b>		<b>Real Asset size, in 2017 prices</b>			
	<b>Obs.</b>	<b>Banks</b>	<b>Mean</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>
<b>2010</b>	12	3	17.6	17.8	15.4	19.6
<b>2011</b>	12	3	21.5	22.5	17.4	24.7
<b>2012</b>	12	3	25.2	27.3	19.0	29.2
<b>2013</b>	12	3	32.6	36.0	24.7	37.1
<b>2014</b>	12	3	40.3	44.7	30.7	45.4
<b>2015</b>	15	4	34.2	41.5	2.6	51.3
<b>2016</b>	20	5	29.6	36.5	5.2	54.1
<b>2017</b>	20	5	32.3	36.5	13.3	57.9

**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website. The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>. Inflation data is retrieved from Central Bank of Turkey website.

42 Barrell, R., Davis, E. P. (2008). The Evolution of the Financial Crisis of 2007—8, *National Institute Economic Review*, 206(1): 5-14.

43 Akin, Ozsoy, 2019, 77-94.

44 Akin, Ozsoy, 2019, 77-94.

45 The Banks Association of Turkey provides free access to quarterly regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>

46 Inflation data is retrieved from Central Bank of Turkey website: <http://evds.tcmb.gov.tr>

Table 1 compares the numbers and asset sizes of Islamic (participation) banks over the period 2010 – 2017. The first column presents the number of observations in each year. The second column presents the number of distinct Islamic (participation) banks included in our analysis in each year. The following columns (from three to six) provide descriptive statistics on asset sizes of Islamic (participation) banks over years. Asset size is denoted in 2017 prices (i.e. adjusted for inflation) and in million Turkish Liras.

Our main variable of interest is the aggregate liquidity created by Turkish Islamic banks. We follow Berger and Bouwman<sup>47</sup> to compute bank level liquidity created on a quarterly basis. Then we aggregate the bank level liquidity at quarter level to compute our aggregate liquidity creation measure. We follow three-step procedure to compute liquidity created from on – and off – balance sheet: (1) Each item in on – and off-balance sheet will be classified as “liquid”, “semi-liquid” and “illiquid” (2) The value of each item will be multiplied by the weight that Berger and Bouwman (2009) assigned and (3) finally the items classified will be summed under the categories defined in previous steps.

Now, we explain the steps of computing liquidity creation measure in detail.

1. Classifying items: At first step, Berger and Bouwman classifies each item on and off-balance sheet as “liquid”, “semi-liquid” or “illiquid”.

We go through all the items on the balance sheet. In asset side cash and similar items are classified as liquid assets and premises and investments are classified as illiquid assets. Berger and Bouwman<sup>48</sup> classify loans based on two characteristics: (1) category (such as business loans vs. mortgages) and (2) maturity (less than 1-year vs. longer maturity loans). We classify the loans based on their type since we do not have access to maturity information. For instance, consumer loans, credit cards and loans to depository institutions are considered as semi-liquid and the rest of the loans are classified as illiquid. On the liabilities side, we classify deposits as liquid and total equity as illiquid. Then off-balance sheet items of loan commitments and letter of credits are classified as “illiquid” whereas derivatives will be classified as “liquid” due to their easy sell and buy.

2. Assigning weights: At second step, we assign the weights of Berger and Bouwman to each item based on its category. We multiply all items that are classified as liquid by  $\frac{1}{2}$ , semi-liquid items will be multiplied by 0 and finally the items classified as illiquid will be multiplied by  $-\frac{1}{2}$ .
3. Constructing liquidity creation measures: At third step, we sum the value of items multiplied by corresponding weights at bank-quarter level. Finally, we aggregate bank level liquidity at quarter level to obtain our aggregate level liquidity measures.

Following the steps defined above, we obtain five aggregate liquidity creation measures for Islamic banks. First, we have liquidity created from on-balance sheet (nonfat) and second liquidity created from on and off-balance sheet together (fat). Then we further disentangle the aggregate liquidity creation into liquidity created on the asset – and liability-side, as well as aggregate liquidity created off-balance sheet.

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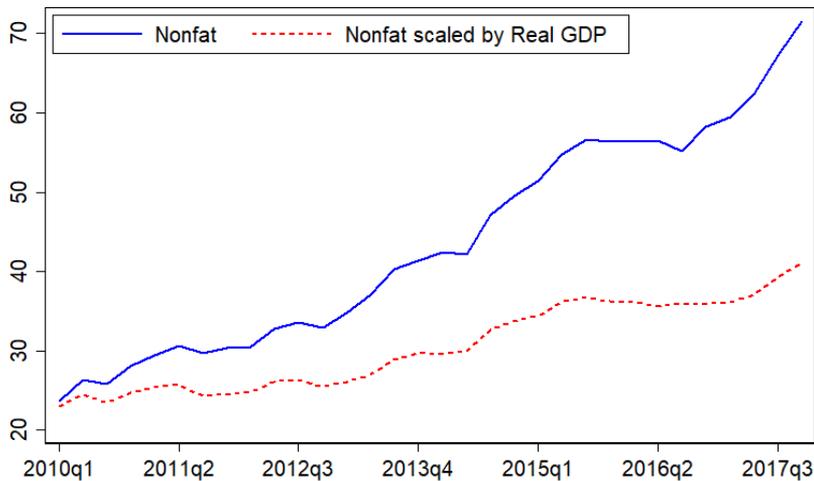
47 Berger, Bouwman, 2009.

48 Berger, Bouwman, 2009.

### 3. Results

In this section we present our results on liquidity creation performance of Islamic banks operating in Turkey during the period of 2010-2017.

**Figure 1:** Aggregate Liquidity Creation (Nonfat) by Islamic Banks



Nonfat values are in billion Turkish Liras and adjusted for inflation by denoting all values in 2017 prices.

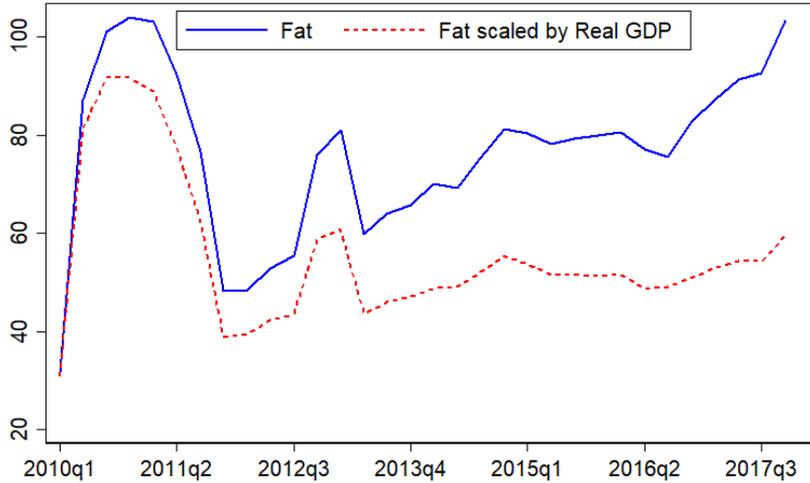
**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website<sup>49</sup>.

Figure 1 shows the aggregate liquidity created by Islamic (participation) banks in Turkey over the period 2010 – 2017 (solid line). Liquidity creation measure is based on Nonfat definition. For each quarter the nominal amount of liquidity created by Islamic banks are aggregated and then converted into 2017 prices in order to remove the effect of inflation. Hence, the observed increase in Figure 1 is not inflation driven. At the beginning of the sample, the aggregate liquidity created by Turkish Islamic banks are around 24 billion Turkish Liras and reaches to 72 billion TLs by the end of sample. That is a massive increase for a period of seven years. On the other hand, Turkish economy has a decent growth in the same period. To better understand whether Islamic banks' liquidity creation trails the growth of Turkish economy or exceed it, we divide the aggregate liquidity measure by the real GDP level. The dashed line in Figure 1 depicts this ratio, which captures the growth of liquidity creation by Islamic banks in excess of real GDP growth. There we observe also the steady positive trend. In fact, the scaled Nonfat measure doubles during the sample period, which implies that half of the overall increase (solid line) is parallel to the real

49 The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>.

economic growth while the other half represents the growth of liquidity created by Turkish Islamic banks with respect to the overall economic growth.

**Figure 2:** Aggregate Liquidity Creation (Fat) by Islamic Banks in Turkey



Fat values are in billion Turkish Liras and adjusted for inflation by denoting all values in 2017 prices.

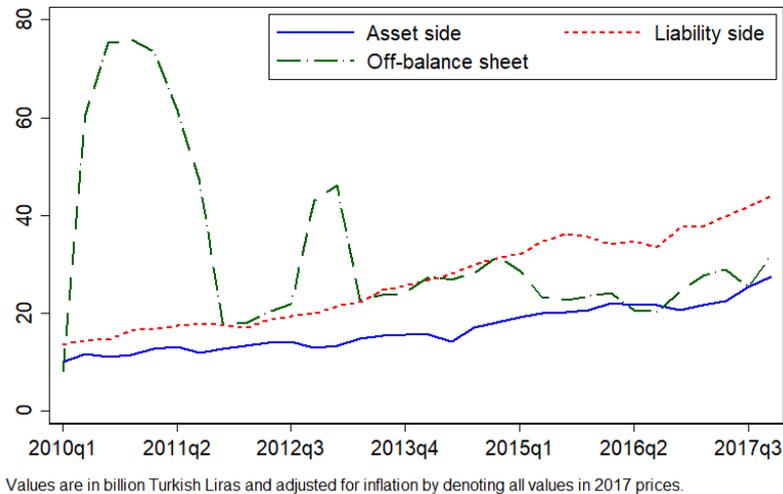
**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website<sup>50</sup>.

Figure 2 shows the aggregate liquidity created by Islamic (participation) banks in Turkey over the period 2010 – 2017 (solid line). The observed smooth and continuous trend in Figure 1 does not quite emerge in Figure 2, in which the liquidity creation measure is based on Fat definition. In other words, now the aggregate liquidity creation measure includes the liquidity created via off-balance sheets. When plotted in Figure 2, Fat-based aggregate liquidity creation by Islamic banks exhibit a bumpy path. It starts around 32 billion TLs and quickly rises above 100 billion TLs by the end of first year, 2010. This sudden spike is a temporary phenomenon though: By the end of 2011, the aggregate liquidity created decreases to 48 billion TLs. There is another spike around the end-of 2012 and early 2013, which also remains temporary. Other than these two short-lived eccentric periods, there is a steady and positive trend for aggregate liquidity created by Islamic banks in this case as well. By the end of the sample, i.e. fourth quarter of 2017, the liquidity creation measure reaches to 103 billion TLs. Compared to Figure 1, this measure of liquidity creation is larger both as of the beginning and end of the sample. This implies that Islamic banks have also been creating liquidity via off-balance sheet items. Again we see the liquidity created in excess of economic growth when we scale the aggregate Fat measure by the real GDP (dashed line). Similar to the finding in Figure 1, half of the real increase in aggregate Fat measure corresponds to the economic growth while the other half is due to expansion of the Islamic banks in Turkey. To

50 The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>.

better understand the channels of liquidity creation by Turkish Islamic banks we next decompose the aggregate liquidity creation into subcomponents.

**Figure 3:** Decomposition of Aggregate Liquidity Creation by Islamic Banks



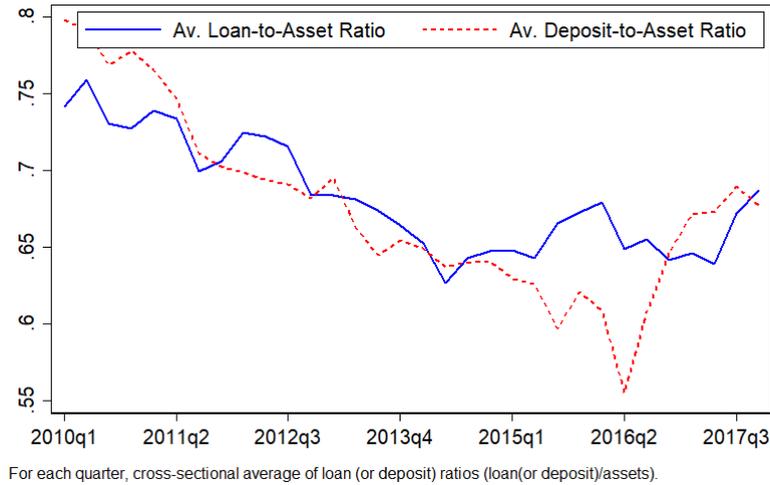
**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website<sup>51</sup>.

Figure 3 shows the decomposition of aggregate liquidity created by Islamic (participation) banks over the period 2010 – 2017. In Figure 3 we plot three main forms of liquidity creation by Islamic banks. To be specific, we decompose the aggregate liquidity creation into liquidity created on the asset – and liability-side, as well as the liquidity created off balance sheets. When we compare the liquidity creation on the asset and liability sides we observe that more liquidity created with liabilities than assets. This is true as of the beginning of sample and the gap only increases over time. Banks accept liabilities and turn them into assets. Hence, the way assets are allocated for a given amount of liability can imply a higher or lower liquidity creation. Regarding the liability side, banks would create more liquidity if they finance themselves with liquid liabilities such as demand deposits and create less liquidity if they would issue long-term debt or issue equity. Our results indicate that for Turkish Islamic banks the main avenue to create liquidity is the latter than the former. By the end of 2017, Islamic banks have been providing liquidity to the public by an amount of 44 billion TLs using their liabilities, while the same amount by using their assets is only 27 billion TLs. We also plot in the same figure the liquidity created by Islamic banks using their off-balance sheet items. As we discuss in Figure 2, this category seems bumpy especially early in the sample. What is more interesting is the fact that liquidity created via off-balance sheets is greater than the liquidity created via assets for most of the sample period. In sum, Turkish Islamic banks mainly create liquidity via their liabilities.

51 The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>.

The liquidity created with off-balance sheets cannot be overlooked as it is around, if not above, the liquidity created on the asset side. We next delve deeper into asset and liability sides.

**Figure 4:** Loan and Deposit Ratios of Islamic Banks in Turkey



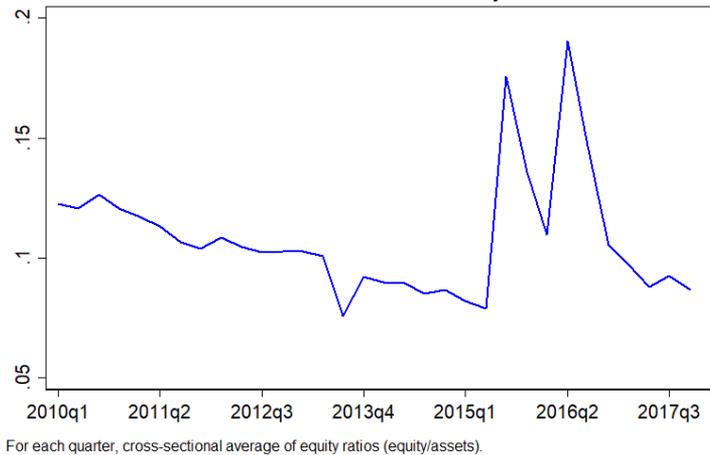
**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website<sup>52</sup>.

The main item among assets of a bank is loans and similarly deposits are usually the main source of funding, hence a major liability item. In Figure 4, we plot time-series behavior of the average loan-to-assets and deposit-to-assets ratios across Turkish Islamic banks over the period 2010-2017. The data points show cross-sectional averages across the banks for each quarter. First thing that strikes a viewer is the high co-movement between the two. There seems to be a downward trend for both of the series from 2010 to 2016, which then reverses to some extent. Despite this recent reversal, the sample-end values are significantly below the starting levels: The deposit ratio is almost 80 percent in the first quarter of 2010 and only 67 percent by the end of 2014. Similarly, the loan ratio starts from 74 percent and decreases to 68 percent. These patterns are likely to be driven by newly-established Islamic banks. When a new bank enters the market it is mostly financed with equity and equity-resembling debt and only after establishment starts collecting deposits which takes some time to pick up. That is, it is only natural that a newly-established bank needs some time to penetrate into the deposit market and attract customers from existing banks. Hence it is likely that newly-established Islamic banks pull down the average deposit ratio of Islamic banks. A similar argument can be made for loans ratio as well. If the newly-established Islamic banks are indeed responsible for the observed patterns, one would expect to see traces of it on the average equity ratio of Islamic banks. The new

52 The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>.

banks would enter the market with significantly higher equity ratios, as discussed. To see if this is indeed the case, we next plot the average equity ratio of Islamic banks over our sample period, in Figure 5.

**Figure 5:** Average Equity Ratio of Islamic Banks in Turkey



**Source:** Authors' calculation based on the regulatory dataset obtained from The Banks Association of Turkey website<sup>53</sup>.

Figure 5 shows the average Equity Ratio of Islamic (participation) banks over the period 2010 – 2017. Equity Ratio is defined as the ratio of total equity to total gross assets. The data points show cross-sectional averages across the banks for each quarter. In Figure 5 we observe that the average equity ratio is around 12 percent and is around 9 percent by the end of sample period. However, we also observe major spikes in third quarter of 2015 and second quarter of 2016. These are exactly the quarters for which the newly established Vakıf Katılım and Ziraat Katılım show up in our database. How does the smooth behavior of liquidity creation around these exact dates in Figures 1 to 3 square with the observed impacts of newly-established banks in Figures 4 and 5? To put another way, why we have not observed spikes in Figures 1 to 3? We can think of two possible explanations. First, it is possible that newly-established banks did not create any significant liquidity since they have entered the sample. Let's remind ourselves that creating liquidity requires attracting liquid liabilities such as demand deposits and extending risky long-term loans, which probably requires some relationship building with the customers. Another alternative is the substitution among Islamic banks. That is, it is possible that the liquidity created by the newly-established banks come at the expense of liquidity created by existing Islamic banks. For instance, new banks can be attracting deposits from the existing Islamic banks' customers and similarly borrowers of long-term loans can be switching from older Islamic banks to newer ones. Were this to be the case, indeed we would not observe any change in the aggregate liquidity creation. The truth is quite likely to be a combination of the two explanation

53 The Banks Association of Turkey provides free access to quarterly detailed regulatory dataset at <https://www.tbb.org.tr/tr/bankacilik/banka-ve-sektor-bilgileri/istatistiki-raporlar/59>.

we laid out. Nevertheless, the two explanations have different implications for the future of Islamic banking in Turkey. The first explanation does not imply anything positive or negative about the future of Turkish Islamic banks. The second explanation, on the other hand, implies that Islamic banks compete with each other rather than being alternatives to conventional commercial banks and other formal and informal financial institutions. This explanation implies that there exists a certain clientele for Islamic banks of Turkey and Islamic banks compete within this given pool of customers and do not attract new customers into the Islamic banking system. That would also imply that, going forward, the (insufficient) demand for Islamic banking is the main impediment for the growth of Islamic banking in Turkey rather than the supply of Islamic banking instruments. Simply, it can be a demand issue rather than a supply one. The newly established Islamic banks being state-owned rather than being private sector ventures also speak volumes about the unattractive or unpromising demand for the Islamic banking in Turkey. Having said this, pinning down the exact answer is not straightforward and beyond the scope of current paper and so we leave it for future research.

#### 4. Conclusion

This paper analyzes the aggregate liquidity created by Turkish Islamic banks. Following Berger and Bouwman<sup>54</sup> liquidity created on – and off-balance sheet are computed for Islamic banks operating in Turkey. Furthermore, their methodology allows us to disentangle contribution to the liquidity creation from the asset and liability sides. Comparing these liquidity creation measures, we document the aggregate liquidity created by Islamic banks and further we elaborate how it changed over time.

We find that during our sample period the liquidity created by Turkish Islamic (participation) banks has tripled, in inflation-adjusted terms. We further show that Islamic banks have created liquidity both on and off their balance sheets. Finally, we disentangle the source of liquidity creation by computing liquidity created from asset and from liabilities side separately. Banks can create liquidity for their customers with their assets, such as illiquid loans and with their liabilities, such as by offering demandable deposits. When we compare the liquidity created on the asset and liability sides, we observe that Turkish Islamic Banks have been creating more liquidity with their liabilities than their assets. In some quarters the amount of liquidity created via liabilities is double of liquidity created via assets. Despite the secular upward trend in aggregate liquidity created by Turkish Islamic banks, their loan-to-asset and deposit-to-asset ratios have been declining in our sample period, which suggests that the observed continuous upward trend has been driven by extensive margin (i.e. bank sizes growing in real terms) rather than the intensive margin (banks creating liquidity more effectively).

Our results would be of interest for policymakers in Turkey. First, Aysan et al.<sup>55</sup> show that a significant portion of financing for small and medium-sized enterprises in Turkey is supported by Islamic rather than conventional banks. This result indicates that it is important to explore the stability of Islamic banks which can be endangered by excessive liquidity creation. Secondly, in line with Turkish

54 Berger, Bouwman, 2009.

55 Aysan, A. F., Disli, M., Ng, A., Ozturk, H. (2016). Is Small the New Big? Islamic Banking for SMEs in Turkey, *Economic Modelling*, 54: 187-194.

government's economic target of transforming Istanbul into a prominent financial center, Islamic banking has been argued as one of the important avenues to become a financial hub at region level. However, the existing studies discuss the insufficient demand and stagnation in Islamic banking in Turkey (See e.g. Savasan et al.<sup>56</sup>; Egresi and Belge<sup>57</sup>; Yanikkaya and Pabuçcu<sup>58</sup>; İkiş<sup>59</sup>). Our analysis also provides some insights on the demand problem in the sector. We show that the newly established state-owned banks (Ziraat Katılım and Vakıf Katılım) did not increase the aggregate liquidity created which may hint problems in the demand side and will have important implications for the development of Islamic banking in Turkey in the future.

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