The Risk of Implicit Guarantees: Evidence from Shadow Banks in China*

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Abstract

The shadow banking literature is anchored on the premise that shadow banking intensifies financial risks through its connection with regular banks. We document the importance of implicit guarantees as the risk transmission channel using a detailed micro-level data set on wealth management products, which are the most prominent shadow banking products in China. We find that when the risk perception of a bank increases, the bank extends stronger implicit guarantees to the investors of wealth management products to safeguard its reputation. Stronger guarantees incur more expenses and erode bank equity, thus amplifying impacts of negative shocks to the related regular banks. The expenses account for a significant reduction in bank profits, especially for banks that are less healthy. Our results suggest that risk-weights for off-balance-sheet exposures should be higher for riskier banks.

Keywords: Implicit Guarantee, Shadow Banking, Off-Balance-Sheet Financing, Wealth Management Product

JEL classification: G21, G23, G28

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1 Introduction

As the Financial Stability Board (2011) has noted, the shadow banking sector can elevate systemic risk through its tight connection with the regular banking system. In the literature, many theories on shadow banking have incorporated this idea into their frameworks, e.g., Plantin (2014); Moreira and Savov (2017); Huang (2018); Begenau and Landvoigt (2018). Nevertheless, there is a lack of empirical work identifying the interconnectedness and quantifying the magnitude of risk. Our paper addresses this gap in the literature by analyzing a unique data set from a fast-growing shadow banking sector in China—the market of wealth management products (WMPs) issued by Chinese commercial banks. By the end of 2017, the outstanding volume of WMPs was USD 5 trillion, accounting for 14 percent of the banking sector's total liability.[1]

Implicit guarantees, a common practice for shadow banking in both China and the U.S., could potentially establish a crucial risk transmission channel from the shadow banking sector to its traditional counterpart.[2] The main goals of our paper are to empirically identify this risk transmission mechanism, and to infer its magnitude. The back-of-envelope calculation based on our regression findings indicates that if the risk measure of a medium-sized Chinese bank increases by one standard deviation, the additional expenses incurred by implicit guarantees over a quarter would be 0.64 percent of its equity and 11 percent of its quarterly net income.

We exploit a unique feature of WMPs to study implicit guarantees, that is, the provision of implicit guarantees for WMPs is more frequent and transparent than that for other products like securitized assets. Unlike time deposits, whose rates are explicitly guaranteed by banks upfront, for a WMP, its issuing bank indicates a target return only when selling it. The return that investors actually earn on a WMP is subject to the bank's discretion on the due date. Long-run reputational concerns drive banks to actually pay target returns on expiration dates when their investors may choose to leave. The provision of implicit guarantees in the context of WMPs means their issuing banks deliver target returns, which we can observe clearly and also frequently. By contrast, exercising implicit guarantees in the context of securitized products is much less frequent and often under the table because it violates regulatory guidance.[3]

The key finding of this paper is that riskier banks extend stronger implicit guarantees. The result implies that if the market believes that a bank is more likely to fail, the bank becomes more inclined to pay the target return of its expiring WMP although it has no legal obligation of doing so and the WMP investors may leave immediately. Figure 1 illustrates the risk transmission channel. A regular bank is subject to shocks to its perceived risk due to fundamental and/or non-fundamental reasons. We find that given an adverse shock to its perceived risk, a bank would volunteer to deliver higher realized returns to its maturing WMPs, (Arrow 2). The expense of such stronger implicit guarantees ultimately erodes the bank's equity (Arrow 3), which has already been hit by the negative shock (Arrow 1). Our empirical exercises are designed to establish the causality from Arrow 1 to Arrow 2, and the magnitude

[1] By comparison, the outstanding value of WMPs' U.S. counterpart—asset-backed commercial papers—was below 1.3 trillion at its peak in 2007 (Acharya, Schnabl and Suarez, 2013).

[2] In the 2007-09 financial crisis, we observed many examples of implicit guarantees. See Duffie (2010) and McCabe (2010) for further details of examples mentioned below. Major banks such as Goldman Sachs, HSBC, and Citigroup volunteered to save their internal hedge funds and structured investment vehicles that were in trouble. Forty-four money market mutual funds received support from their sponsors to avoid "breaking the buck." The most striking example is of Bear Stearns voluntarily bailing out two of its internal hedge funds nine months before its own collapse in 2008.

[3] See the Federal Reserve Board's supervisory letter on implicit recourse provided to asset securitization and Statement of Financial Accounting Standards No. 140.

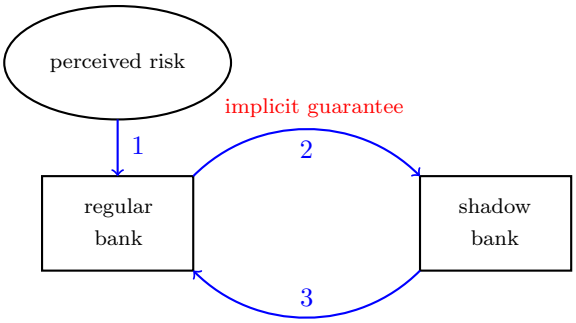

Figure 1: Risk transmission channel

of the channel represented by Arrow 3 is not trivial according to our back-envelope calculation mentioned earlier.[4]

We proxy the perceived risk of a bank on a particular date by the yield of the interbank certificate of deposit (CD) issued by the bank around that date. The interbank CD issuance and the payment of an expiring WMP are two decisions that the bank is making simultaneously. To address endogeneity, we instrument the yield of the interbank CD that is linked to a WMP with the yield of the interbank CD issued by the same bank on the issuance date of the WMP. Figure 2 illustrates an example. For a WMP that was issued on January 30 and matures on May 30, we use the yield of interbank CD "B" to proxy the bank's perceived risk, which, in turn, is instrumented by the yield of interbank CD "A" that was issued by the bank just before the WMP's issuance date of January 30. Conditional on the target return of a WMP, any innovation captured by its realized return should be unrelated to information that was available up to its issuance date. Our instrumented regressions show that if a bank's interbank CD yield jumps right before its WMPs mature, the bank tends to pay higher realized returns.

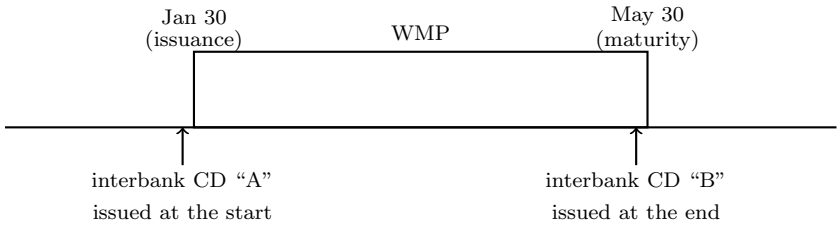

Figure 2: illustration of identification strategy

We conduct three sets of robustness checks. First, we employ the default of the trust product distributed by a bank as a pure reputational shock to the bank. We find that banks deliver significantly higher returns to WMPs that mature right after a default. Trust products are arranged by standalone trust companies, which often employ the branches of commercial banks as distributing channels. Hence, the failure of a trust product does not affect the distributing bank's fundamentals. However, retail customers typically blame the bank for advertising low-quality investment products.[5]

Our second robustness test addresses the problem that the Chinese banking system is affected by

[4] As anecdotal evidence, a Bloomberg article reports that Chinese banks could "dip into" their own balance sheets to protect their WMP investors against potential losses. See https://www.bloomberg.com/news/articles/2019-04-14/china-s-savers-ignore-efforts-to-cool-3-trillion-wmp-market.

[5] For example, investors protested at Hua Xia Bank in Shanghai because of the failure of the trust products that they had bought from an employee of the bank. See https://www.businessinsider.com/investors-protest-chinese-wmps-2012-12.

occasional government interventions. To show that our results are not driven by a certain time period, we include time fixed effects as well as bank-by-time fixed effects in our main regression. In our third robustness test, we split the sample for the main regression into two groups: WMPs for retail clients and WMPs for institutional investors. The rationale for this exercise is that institutional investors are more sophisticated than retail clients, and certain segmentation may exist between the markets of these two groups of investors.

In addition to the direct evidence highlighted so far, we also find that when interbank investors price interbank WMPs and CDs they fully take into account the fact that weaker banks are more likely to deliver target returns. In particular, the risk premium of an implicit guarantee for a bank declines if the yield of its interbank CD rises. In other words, as the default risk of a bank increases, the risks of its on-balance-sheet and off-balance-sheet debt tend to converge. To calculate the premium, we construct a sample in which we pair each interbank WMP with an interbank CD issued by the same bank that has almost the same issuance and maturity dates. We measure the risk premium of an implicit guarantee as the difference in returns between the WMP and the CD. We believe that interbank WMPs and CDs share the same group of investors, and, roughly the same underlying assets. Hence, the interbank WMP-CD spread indicates the additional risk that interbank WMPs carry, i.e., the risk of implicit guarantees.

We investigate what happens to banks that do not deliver target returns to their WMP investors, i.e., Arrow 2 in Figure 1 fails. The predictive regressions indicate that these banks generally offer higher target returns in the future to retain their customers.

Our findings have three implications for shadow banking. First, our results highlight a channel through which shadow banking amplifies the short-run adverse effects of shocks to banks' perceived risks. A negative shock leads to more guarantees (Arrow 2 in Figure 1), and the additional expense incurred by implicit guarantees harm the bank's equity in the short run. Second, implicit guarantees associated with shadow banking lead to additional funding costs for banks with high default risks. On the one hand, riskier banks already have to "promise" higher target returns for attracting their shadow bank investors; on the other hand, riskier banks are more "obligated" to pay high target returns (i.e., stronger implicit guarantees). These pressures ultimately cause additional funding costs, which do not apply to safe banks. Lastly, since riskier banks are more inclined to pay the target returns of their WMPs, bank regulators should assign higher risk-weights to riskier banks for their off-balance-sheet exposures. Nevertheless, we have not observed any regulatory changes that account for this fact.

Literature. This paper contributes to the fast-growing shadow banking literature. In particular, our empirical evidence supports models in which shadow banking elevates financial instability through its tight connection with traditional banks (Plantin, 2014; Moreira and Savov, 2017; Huang, 2018; Begenau and Landvoigt, 2018). Empirical papers on shadow banking have mostly focused on whether shadow banking *alone* causes adverse effects to the financial market (Keys, Mukherjee, Seru and Vig, 2010; Benmelech, Dlugosz and Ivashina, 2012). Our paper instead show empirically that the interplay between shadow banking and traditional banking could also have negative impacts. Within the decade after the 2007-09 financial crisis, the shadow banking sector in the U.S. expanded again; this expansion is largely driven by the tightening bank regulations in the aftermath of the crisis (Buchak, Matvos, Piskorski and Seru, 2018; Irani, Iyer, Meisenzahl and Peydro, 2018)

Our paper is related to Kacperczyk and Schnabl (2013) and Acharya, Schnabl and Suarez (2013). Kacperczyk and Schnabl (2013) show that the characteristics of sponsors affect the investment choices

of money market mutual funds prior to the 2007-09 financial crisis, and investigate the extent to which these funds were prone to the market-wide run. Our paper, instead, examines how sponsors respond to idiosyncratic adverse shocks ex post. Acharya et al. (2013) document that banks absorbed most of the losses on asset-backed commercial paper conduits via different forms of guarantees. Our paper offers more detailed characterization of banks' guaranteeing behaviors and also their quantitative implications.

This paper speaks to the literature on implicit guarantees/recourses in shadow banking. Higgins and Mason (2004) show that exercising implicit guarantees improve banks' performance in the future. Calomiris and Mason (2004) argue that although securitization with implicit guarantees is motivated by regulatory arbitrage, it indeed leads to a more efficient outcome given the overly tight capital requirement faced by banks. Gorton and Souleles (2007) demonstrate that securitization arises as an implicit collusion between firms and investors to avoid bankruptcy cost. Ordoñez (2016) constructs a model in which banks provide implicit guarantees because of their reputation concerns. We contribute to this literature by connecting reputation models to data. We focus on the implicit guarantees that banks in China extend to their off-balance-sheet wealth management products and show that less healthy banks load more risk from shadow banking. Faltin-Traeger, Johnson and Mayer (2010) examine the securitization data in the U.S. and find a similar result: the spreads of Asset-Backed Securities are actually higher for some sponsors with better rating.

Our paper also contributes to the burgeoning literature that studies China's rapidly growing shadow banking sector of which the three main components are WMPs, entrusted loans, and trusted loans. Hachem and Song (2016) argue that tighter liquidity regulation and bank competition jointly induced the rapid growth of shadow banking. Chen, He and Liu (2017) attribute the growth of shadow banking to the stimulus packages and debt rollover through the lens of the Municipal Corporate Bonds. Acharya, Qian and Yang (2016) show that the boom of wealth management products is due to the four-trillion-yuan stimulus package and bank competition. The paper that is closest to ours is Allen, Gu, Qian and Qian (2017) on implicit guarantees of trusted loans. They show that the expectation of implicit guarantees of central governments or banks flattens the spread-to-risk relationship. Our study complements these works by focusing on the ex-post evidence, and emphasizing the strategic provision of implicit guarantee on WMPs by banks. We show that banks choose to provide more guarantees precisely when it is costlier to do so, which further deteriorates the fragility of the traditional banking sector.

The rest of the paper is as follows. Section 2 describes China's banking system, wealth management products, and the interbank CD market. In Section 3, we illustrate our construction of the main sample and report summary statistics. Sections 4-6 focus on the empirical findings and evidence. Section 7 discusses the implication of the results and concludes.

2 Institutional Backgrounds

There are generally four types of domestic commercial banks in China: state-owned banks, of which there are five, known as the "Big Five"; national joint-equity banks, of which there are 12; urban banks; and rural banks. Big Five banks are much larger than all the other banks. On the one hand, Big Five banks enjoy direct government support; on the other hand, their operations are constrained by orders from the central government. Joint-equity banks, although smaller than Big Five banks, are still much larger than urban and rural banks. In particular, the amount of deposits raised by an average joint-equity bank is

around 25 times larger than that by an average urban or rural bank by the end of 2013. [6] Nevertheless, the total assets of all urban and rural banks are comparable to the total assets of the twelve joint-equity banks.

Joint-equity, urban, and rural banks are less capable of absorbing deposits than Big Five banks for two reasons. First, the Big Five banks are supported by the central government, and are therefore perceived to be much safer than all other commercial banks. Given that deposit rates are capped by regulatory authorities, safer banks are strongly preferred by depositors.[7] Second, the Big Five banks have enormously extensive branch networks over the entire country. Other banks, however, typically have a presence in a particular region of the nation. Both retail and institutional depositors find it more convenient to have bank accounts with Big Five banks for the purpose of daily transactions. Consequently, in order for joint-equity, urban, and rural banks to raise credit, they turn to alternative means such as WMPs and interbank CDs. In this section, we provide detailed institutional backgrounds of wealth management products, the interbank CD market, and trust products.

2.1 Wealth Management Products

There are a number of recent papers on China's wealth management products (WMPs). Acharya et al. (2016) and Hachem and Song (2016) discuss the history of this market, and explain the important role of WMPs for small and medium-sized banks in China. In this section, we will focus on the background information that is critical for our empirical analyses.

WMPs are investment products that are similar to time deposits. Customers of WMPs range from retail clients to non-financial institutional and interbank investors. The investors of WMPs are supposed to obtain returns and principals at the maturity date. We can categorize WMPs by the nature of the guarantees: (*i*) WMPs where the principals and returns are explicitly guaranteed; (*ii*) WMPs where the principals are explicitly guaranteed but not the returns; and (*iii*) WMPs where neither principals nor returns are explicitly guaranteed. Regulatory authorities treat only the third type as issuing banks' off-balance-sheet liabilities. Hence, banks are inclined to issue WMPs with no guarantees. Hereafter, WMPs refer to those without any guarantees unless we state otherwise. Bank regulators require banks to fully inform investors that either returns or principals of WMPs are not guaranteed in any legally binding form. However, when a bank sells a WMP, it typically indicates a return that investors can expect, which we label as the target return.

WMPs vs. Time Deposits. There are two major *differences* between WMPs and time deposits. First, the investors of a WMP can take *no legal action* against its issuing bank if the realized return deviates from the target return. The second difference is about *timing*. For time deposits, banks decide deposit rates only around the issuance dates. For a WMP, there are two critical dates for decision making: the issuance date when the issuing bank fixes the target return, and the maturity date when the bank chooses the realized return.

Implicit Guarantee. The implicit guarantee of a WMP refers to the non-contractual guarantee of the target return that the issuing bank signals in the marketing phase. The issuing bank will exercise the implicit guarantee only at the WMP's maturity date. Since no WMP is a one-shot game, and a bank typically rolls over its maturing WMP, the issuing bank has incentives to offer implicit guarantees by paying the target return, as shown by the summary statistics in the following section.

[6] The median size of the 12 joint-equity banks is around 45 times larger than the median size of urban and rural banks.
[7] For details about the regulatory frictions in China's banking system, see (Acharya et al., 2016).

WMPs vs. Securitization. Two major differences between WMPs and securitized products are worth mentioning, given their critical role in the Chinese and U.S. shadow banking systems, respectively. First, the information on the assets that back the WMPs is very opaque. When investors purchase WMPs, they know only the rough categories of underlying assets (e.g., fixed income, loans, equity, etc.) and the percentages of each category in the asset portfolio. In the case of securitization, however, the information on the underlying assets is transparent. The second difference, which is more crucial, is whether the underlying assets are *bankruptcy remote*. In the case of securitization, its underlying assets are bankruptcy remote, i.e., if the asset originator defaults, its creditors cannot claim the assets that back the securitized products. The bankruptcy remote status is ensured by the trust law that governs the securitization.[8] The bankruptcy remote status is unclear for the underlying assets of WMPs as WMPs are governed by the banking supervision law and the commercial banking law, and not the trust law. Therefore, the investors of a WMP are exposed to the default risk of the issuing bank because the bank's creditors may claim the underlying assets of the WMP.[9]

Realized Returns at Banks' Discretion. The realized return of a WMP is essentially at the discretion of the issuing bank at the time when the WMP matures. Three major facts support this statement.[10] First, since the identities of the underlying assets are unclear to WMP investors, it is almost impossible for them to verify the actual returns of the portfolio. Second, there exists maturity mismatch between WMPs and their underlying assets. Moreover, a significant portion of the underlying assets are illiquid assets like business loans. Hence, when a WMP matures, a significant proportion of its underlying illiquid assets have not yet generated return, and there is no marketplace for the assessment of asset values. Third, one common practice of WMP issuing banks, which is officially prohibited by regulatory authorities but difficult to eliminate, is that a bank uses a large pool of underlying assets to support multiple WMPs. In this case, issuing banks can decide which WMPs' investors obtain higher returns. This decision process is not transparent.

Despite the frictions highlighted above, the size of the WMP market grew rapidly over the last decade. By the end of 2017, the WMP market was valued at approximately USD 5 trillion. More importantly, WMPs are very popular among Chinese households and firms as WMPs are considered as relatively "safe" investments that offer more favorable returns than regular bank deposits. The WMP market has survived and thrived because issuing banks care about their long-run reputation. Even though issuing banks are not legally obligated to pay target returns, they are afraid that they will lose their WMP customers if they miss target returns by a wide margin. We will show that such reputation concerns are particularly important for risky banks.

2.2 Interbank Certificate of Deposit

The interbank CD market was launched in December 2013 by China's central bank, the People's Bank of China (PBoC). Since then, it has become an important source of interbank credit for non-Big-Five banks in China. According to our calculation, the ratio of outstanding interbank CD to assets is 6.8% on average for each bank with a standard deviation of 8.4%. By issuing interbank CDs, a bank can take a deposit of RMB 50 million or more at a negotiated interest rate from other banks and financial

[8] See Gorton and Souleles (2007) for a discussion of bankruptcy remote and securitization in the U.S. context. See Phua (2019) for a discussion of securitization in China and the role of the trust law.

[9] See the Chinese article Lv and Li (2018) that offers a detailed legal analysis on the governance of WMPs.

[10] We cannot guarantee that the three facts persist beyond our sample period from January 2012 to March 2017 because of the government interventions implemented since 2019.

institutions such as insurance and security companies. Maturities of interbank CDs could be 1 month, 3 months, 6 months, 9 months, 12 months, and more than 1 year.

We believe that the yield of a bank's interbank CD is an accurate indicator of the market's perception of its default risk for the following reasons. The issuance of interbank CDs faces minimum regulatory restrictions, and the pricing of interbank CDs is market-based (see Amstad and He (2019) for a thorough review of the bond market in China). Moreover, interbank CDs have a fairly active secondary market,[11] and they also serve as collateral for the repurchase agreements between financial firms. Transactions of interbank CDs are conducted on a centralized online platform organized by a government agency, the National Interbank Funding Center. The agency publicly discloses detailed information on the issuance and trading of interbank CDs.

2.3 Trust Products

A pure reputational shock to banks is ideal for identification. We will explore one reputational shock: the failure of trust products that banks sell on behalf of standalone trust companies. There are around 68 trust companies in China,[12] whose primary function is to extend trust loans to companies in the real sector such as real estate developers. To raise funds for trust loans, trust companies issue trust products to retail and institutional customers. Typically, both trust loans and trust products are off the balance sheets of trust companies. Since commercial banks in China have very large clients bases, trust companies often delegate the sales of their trust products to banks. The trust products are almost identical to time deposits, and they are backed by trust loans arranged by trust companies. The feature that is critical for our identification is that a trust product or its default is irrelevant for the fundamental of the bank that offers its branches for distributing the product. Hence, a trust default event would damage only the bank's reputation, and not its fundamental. Indeed, investors of default trust products commonly protest in front of bank branches where they purchased the products when a default is reported. See Footnote 5 for details on such an incidence that occurred to Huaxia Bank, a joint-equity bank in China, in 2012.

3 Data and Summary Statistics

We construct our main sample based on two sources of raw data: wealth management products (WMPs) and interbank certificates of deposit (CDs) issued by Chinese commercial banks. WMP data are collated by a subsidiary of China's bank regulatory agency, China Banking and Insurance Regulatory Commission (CBIRC). [13] The interbank CD data is collated by the National Interbank Funding Center.[14] Incidents of default cases of trust products are drawn from news reports.

3.1 Raw Data Sets

Wealth Management Products. Our raw WMP sample is the universe of all WMPs issued by domestic commercial banks in China from January 2012 to March 2017. In June 2013, to improve the transparency of wealth management products, CBIRC issued an order that all banks must submit

[11] For instance, the trading volume of interbank CDs in December 2017 is USD 688 billion, and the trading volume of the money market in the same month is USD 1.08 trillion.

[12] See Allen, Gu, Qian and Qian (2017) for details of trust products in China.

[13] https://www.chinawealth.com.cn

[14] http://www.chinamoney.com.cn

information on all their WMPs issued since 2011. Banks that failed to do so would receive an official warning and might even be suspended from issuing new WMPs. Therefore, the CBIRC data set is by far the most comprehensive data source of WMPs in China. All the WMP information must be registered in the China Banking Wealth Management Registration System and posted online by a subsidiary of CBIRC—China Central Depository and Clearing Company. The published product information includes the target return, realized return, identity of the issuing bank, maturity, starting and ending dates of sales, starting and expiration dates, types of guarantees (explicit guarantees of both the principal and the return; explicit guarantees of only the principal; no explicit guarantees), types of customers (retail, institutional, private-banking, and interbank), risk ratings (five categories), and minimum purchase threshold. Target returns, which are only suggestive, have no legal implications.[15] One drawback of our data set is that we do not observe the size of each WMP issuance.

Table 1: Summary Statistics

This table reports the summary statistics of six key variables of our main sample: a WMP's realized return, (high) target return, maturity (days), the gap between the realized return and the target return, the fraction of WMPs with realized returns below target returns, and the fraction of WMPs with realized returns equal to target returns.

	mean	std	p10	p25	p50	p75	p90	mean	std	p10	p25	p50	p75	p90
	all client types (382,915 observations)							institutional clients (163,971 observations)						
realized r	4.38	(0.93)	3.15	3.78	4.40	5.07	5.45	4.09	(0.93)	2.96	3.44	4.04	4.69	5.26
target r	4.54	(1.08)	3.25	3.83	4.50	5.16	5.83	4.17	(0.96)	2.96	3.44	4.11	4.88	5.35
maturity (days)	107	(90.1)	31	38	89	159	189	104	(95.1)	29	34	70	169	193
realized r − target r	-0.17	(0.60)	-0.57	-0.01	0.00	0.00	0.00	-0.08	(0.40)	-0.10	0.00	0.00	0.00	0.00
$\mathbf{1}\{\textit{realized } r < \textit{target } r\}$	0.26	(0.44)	0.00	0.00	0.00	1.00	1.00	0.13	(0.33)	0.00	0.00	0.00	0.00	1.00
$\mathbf{1}\{\textit{realized } r = \textit{target } r\}$	0.72	(0.45)	0.00	0.00	1.00	1.00	1.00	0.87	(0.34)	0.00	1.00	1.00	1.00	1.00

Table 1 shows the summary statistics of key variables of the raw WMP data. The fraction of institutional WMPs is substantial; they account for more than 40 percent of all WMPs in terms of numbers. The maturity of most WMPs, which is generally short term, ranges from one month to six months. In terms of WMPs' performances, roughly three quarters of total WMPs' realize returns equal or exceed their target. This fraction is even higher for institutional products. Figure 3 in Appendix presents the cumulative distribution of the realized-target return gap of WMPs (= *realized return*−*target returns*). Hereafter, returns we report or use for regression are the continuously compounded annual rate, e.g. the variable "*realized r*" reported in Table 1 is

$$\textit{realized } r = \ln(1 + \textit{annualized realized return}).$$

Interbank Certificates of Deposit. The basic information on interbank CDs includes the yield on the issuance date, maturity, identity of the issuing bank, size, and starting date. Summary statistics are shown in Table 2. Between 2014 and 2016, 22,438 interbank CDs were issued of which only 194 were issued by the Big Five banks. Since Big Five banks have access to large amounts of stable deposits from their nationwide branch networks, they do not have to turn to the interbank market for funds. The major issuers of interbank CDs are joint-equity, urban, and rural banks. The average yields of interbank CDs issued by different types of banks tend to be very similar. The sizes of interbank CDs issued by different

[15] In practice, banks sometimes offer two target returns: a high one and a low one. However, observations based on the raw data suggest that banks never tempt to guarantee the low target returns of their WMPs. Hereafter, the target return of a WMP refers only to the high one if two target returns are offered for a WMP.

types of banks are consistent with their relative size. In addition, the median maturity of interbank CDs issued by rural banks is three months, which is half of the median maturity of interbank CDs issued by joint-equity and urban banks. Thus, rural banks face higher rollover risk.

Table 2: Summary Statistics of Interbank CDs

This table reports the summary statistics of the yield of interbank CDs in our raw sample and the bank-type sub-groups.

	yield				*size (100 million RMB)*				*maturity (month)*				*N*
	mean (std)	Q_1	Q_2	Q_3	mean (std)	Q_1	Q_2	Q_3	mean (std)	Q_1	Q_2	Q_3	
Big Five	3.32 (0.80)	2.71	2.95	4.07	13.4 (13.0)	5	10	20	4.47 (3.41)	3	3	6	194
joint-equity	3.28 (0.69)	2.83	2.99	3.44	14.4 (16.5)	5	10	18	6.29 (4.64)	3	6	9	6051
urban	3.33 (0.63)	2.95	3.10	3.49	6.80 (6.77)	2.8	5	10	5.87 (4.43)	3	6	9	10120
rural	3.23 (0.57)	2.89	3.05	3.30	3.80 (4.14)	1.3	3	5	3.93 (3.40)	1	3	6	6073
full sample	3.29 (0.63)	2.89	3.05	3.44	8.08 (10.8)	2	5	10	5.44 (4.34)	3	3	6	22438

Default of Trust Products. We collect default events of trust products reported in the Chinese media from 2011 to 2016. We draw from three sources: WiseNews, which contains the largest amount of digital content of Chinese newspapers, and is widely used in Chinese media research (Qin, Strömberg and Wu, 2018); Baidu, the largest Chinese search engine in China; and Google.

The keywords that we use for searching the new reports include combinations of "trust products" + "default", "trust product" + "credit event", and "trust product" + "repayment". Despite our exhaustive search, some low-profile default events may still be missing. For such cases, we believe that the general public was not supposed to know of such events, and thus no significant reputational problem should arise. In total, we find six default events of trust products, which we then link to banks that sell the relevant products.

3.2 The Main Sample

In constructing the main sample, we drop all WMPs issued by Big Five banks because they enjoy strong implicit guarantees from the central government. Consequently there is likely no meaningful variation in their default risk, at least in our sample period.

To take into account a bank's default risk, we link its WMP with its 3-month interbank CD that is issued on or less than seven days before the WMP's maturity date. The yield of the interbank CD proxies the perceived risk of the bank. The common endogeneity problem arises because the return payment of the WMP and the issuance of the interbank CD are decisions made by the bank almost simultaneously. To address the endogeneity problem, we match the WMP with the 3-month interbank CD that the bank issues on or within seven days **before** the issuance date of the WMP. Our main sample comprises 41,122 WMPs that pair with the two types of interbank CDs.

Table 3 displays the summary statistics of key variables: a WMP's realized and target returns, the WMP maturity, the realized-target return gap, the dummy of the realized return hitting the target return, the dummy of the realized return missing the target return, the yield of the interbank CD issued around the maturity date of the WMP ($CD\ yield_{end}$), the yield of the interbank CD issued around the issuance date of the WMP ($CD\ yield_{start}$), and the overnight Shanghai Interbank Offered Rates (Shibor) on the maturity date of the WMP ($overnight\ shibor_{end}$). Table 3 shows that the returns of WMPs for institutional clients are lower than those for retail investors. Institutional investors in this case include

Table 3: Summary Statistics

This table reports the summary statistics of key variables of our main sample: a WMP's realized return, (high) target return, maturity (days), the realized-target return gap, the dummy of the realized return hitting the target return, the dummy of the realized return missing the target return, the yield of the interbank CD issued around the maturity of the WMP ($CD\ yield_{end}$), the yield of the interbank CD issued around the issuance date of the WMP ($CD\ yield_{start}$), and the overnight Shibor on the WMP's maturity date ($overnight\ shibor_{end}$).

	mean	std	p10	p25	p50	p75	p90	mean	std	p10	p25	p50	p75	p90
	all client types (41122 observations)							institutional clients (27054 observations)						
realized r	3.75	(0.91)	2.76	3.05	3.68	4.31	5.07	3.48	(0.75)	2.66	2.96	3.34	3.92	4.56
target r	3.86	(1.00)	2.81	3.15	3.73	4.40	5.16	3.55	(0.77)	2.71	3.00	3.39	4.02	4.69
maturity (days)	105	(86.4)	30	36	90	175	185	101	(87.6)	28	34	86	165	184
realized r − target r	-0.11	(0.57)	-0.10	0.00	0.00	0.00	0.00	-0.07	(0.33)	-0.10	0.00	0.00	0.00	0.00
$\mathbf{1}\{realized\ r < target\ r\}$	0.20	(0.40)	0.00	0.00	0.00	0.00	1.00	0.16	(0.36)	0.00	0.00	0.00	0.00	1.00
$\mathbf{1}\{realized\ r = target\ r\}$	0.79	(0.41)	0.00	1.00	1.00	1.00	1.00	0.84	(0.37)	0.00	1.00	1.00	1.00	1.00
$CD\ yield_{end}$	3.36	(0.72)	2.68	2.81	2.99	4.06	4.50	3.33	(0.71)	2.68	2.79	2.99	4.02	4.48
$CD\ yield_{start}$	3.33	(0.76)	2.68	2.80	2.98	3.87	4.69	3.31	(0.75)	2.67	2.78	2.96	3.83	4.69
$overnight\ shibor_{end}$	2.13	(0.41)	1.79	2.00	2.04	2.28	2.58	2.12	(0.40)	1.79	2.00	2.04	2.28	2.54

both interbank investors and non-financial firms. In terms of maturity, WMPs tend to be short term; the median maturity of WMPs in our sample is about 3 months.

For a given WMP, if no 3-month interbank CDs are issued around either its issuance date or its maturity date, we can still use the yield information of the issuing bank's outstanding interbank CDs to proxy for the default risk of the bank. To control the maturity term premium, we request that such outstanding interbank CDs will mature in around three months. One caveat of using outstanding interbank CDs' yield information is that the yield information itself is sometimes an estimate provided by the trading platform as interbank CD transactions do not occur everyday. After we extend our main sample, we have observations on 72,145 WMPs; the summary statistics of the extended sample are reported in Table 12 in the Appendix.

4 Main Empirical Results

As we have discussed in Section 2.1, the realized return of a WMP is subject to the issuing banks discretion at the time when the WMP matures. Nevertheless, the issuing bank cannot pay any arbitrary return to its investors given the target return indicated at the selling stage. Therefore, the realized return of a WMP reveals the extent to which the bank is willing to implicitly guarantee the target return. In this section, we uncover the main determinants of implicit guarantees. We focus on the perceived risk of a bank as the main determinant of the implicit guarantees that the bank extends to its WMPs. The main measure for the perceived risk is the yield of the 3-month interbank CD issued by the bank around the time its WMP matures. We will present our key empirical strategy and findings, followed by several robustness tests to address concerns with our empirical strategy.

4.1 Suggestive Evidence

To motivate our causal analyses, we first present two sets of suggestive evidence as background information: (*i*) banks that pay high yields in the interbank CD market also pay high returns in the WMP market; (*ii*) banks tend to pay target returns to their WMP investors when banks are perceived to be

riskier. These two sets of suggestive evidence are documenting correlations.

For the first set of evidence, we run regressions of WMPs' target returns (*target r*) and realized returns (*realized r*) against yields of their issuing banks' interbank CDs ($CD\ yield_{end}$) and other control variables. Columns 1 and 2 in Table 4 show that banks with higher interbank CD yields also pay higher returns to their WMP investors. These results indicate that investors' perception of a bank's riskiness should be consistent between the WMP market and the interbank CD market.

The second set of evidence point out the direction for our causal analyses. We would like to highlight that there is a robust positive correlation between a bank's tendency of paying target returns and its perceived riskiness, and this correlation holds across different specifications. Columns 3 and 4 in Table 4 show the regression results of the realized-target return gap (*realized r* − *target r*) against yields of their issuing banks' interbank CDs ($CD\ yield_{end}$) and other control variables *without* and *with* bank-fixed effects, respectively. The two regressions show that the correlation hold for both cross-bank and within-bank variations. Moreover, we run a linear binary regression of the dummy for the realized return of a WMP missing its target return against the same set of control values; the results indicate that the greater the risk perception of the bank, the lower the probability that the bank misses the target return (see Column 5 in Table 4).

Table 4: Implicit Guarantees: Suggestive Evidence

This table reports results of regressions of the realized return of a bank's WMP (*realized r*) against the yield of the bank's interbank CD issued around the WMP's maturity date ($CD\ yield_{end}$), the WMP's target return (*target r*), guarantee types, risk rating, and the overnight Shibor at the WMP's maturity date ($overnight\ shibor_{end}$).

	(1)	(2)	(3)	(4)	(5)
dependent variable	*target r*	*realized r*	*realized r* − *target r*	*realized r* − *target r*	$\mathbf{1}\{$*realized r* < *target r*$\}$
$CD\ yield_{end}$	0.45266***	0.44678***	0.15788***	0.14875***	-4.24821***
	(0.08548)	(0.08908)	(0.04923)	(0.05561)	(1.47115)
target r			-0.32800***	-0.34161***	9.49484***
			(0.04249)	(0.04327)	(1.57015)
principal guaranteed	-0.00757***	-0.00992***	-0.00467***	-0.00494***	0.25750**
	(0.00282)	(0.00074)	(0.00109)	(0.00166)	(0.12186)
principal & return guaranteed	-0.00996***	-0.01225***	-0.00435***	-0.00569***	0.15492
	(0.00286)	(0.00123)	(0.00114)	(0.00174)	(0.10493)
rating = 2	0.00151	-0.00105	-0.00180*	-0.00205	0.14772
	(0.00279)	(0.00087)	(0.00097)	(0.00167)	(0.12844)
rating = 3	0.00048	-0.00152	-0.00142	-0.00184	0.17873
	(0.00247)	(0.00159)	(0.00124)	(0.00182)	(0.12429)
rating = 4	0.01414	0.00058	-0.00847*	-0.00873	0.24771*
	(0.01722)	(0.00609)	(0.00507)	(0.00549)	(0.13106)
rating = 5	0.00743**	0.00508***	0.00032	0.00018	0.31792***
	(0.00285)	(0.00137)	(0.00108)	(0.00152)	(0.11652)
$overnight\ shibor_{end}$	-0.00571***	-0.00574***	-0.00205***	-0.00198***	0.03363
	(0.00074)	(0.00064)	(0.00043)	(0.00046)	(0.02125)
bank-fixed effect	Yes	Yes	No	Yes	Yes
observations	41105	41105	41122	41105	41105
adjusted R^2	0.317	0.365	0.302	0.329	0.434

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 Empirical Challenge and Strategy

Equation (1) presents the core test of our paper, i.e., the regression of the realized-target return gap of WMP i of bank b (*realized r − target r*) against the yield of the interbank CD issued around the maturity date of the WMP ($CD\ yield_{end}$) along with controls such as the target return, return guarantee types, risk ratings, and the overnight Shibor rate on the WMP's maturity date.

$$\begin{aligned} realized\ r_{i,b}\ -\ target\ r_{i,b} &= \beta_1 \times CD\ yield_{end,i,b} + \beta_2 \times target\ r_{i,b} + other\ controls_{i,b} \\ &+ bank\ fixed\ effect_b + quarterly\ fixed\ effect(maturity\ date_{i,b}) + e_{i,b} \end{aligned} \tag{1}$$

This simple regression is subject to endogeneity for the following reasons. The first issue is sample selection. We only select cases where banks are able to issue interbank CDs when they have WMPs maturing. Hence, our test cannot address the behavior of banks that cannot raise credit from the interbank market due to their imminent default risks. Second, the issuance of an interbank CD itself can alleviate the issuing bank's liquidity problem, which in turn can help the bank pay a relatively high realized return. Third, a maturing WMP itself depletes the issuing bank's liquidity, which could raise the bank's default risk in three months, and thus raise the CD yield.

To address endogeneity, we instrument the yield of the interbank CD issued around a WMP's maturity date with the yield of the interbank CD issued by the bank around the WMP's issuance date (see Figure 2 in Introduction for an example). The instrumental variable is valid for the following reasons. First, the realized return decision is made only on the maturity date of the WMP. Conditional on the target return, which reflects all other information available up to the issuance date, the random error in the realized return should be the result of the innovation that arrives after the issuance date. Therefore, this random error cannot be predicted by the CD yield on the issuance date of the WMP. Second, the default risk of a bank is persistent to some degree. Hence, the yields of the two interbank CDs on two different dates are correlated as shown in Column 2, Table 5.

4.3 Empirical Results

Table 5 shows the results of the main regression. Column 1 depicts the results of the OLS regression, which duplicates Column 4 in Table 4; column 2, the results of the first-stage regression, which shows that the yields of a bank's interbank CDs tend to be persistent over time. Column 3 shows the results of the 2SLS regression, where the CD yield around a WMP's maturity date is instrumented by the CD yield around the WMP's issuance date. In addition, we run the same 2SLS regression with the extended sample where we use the secondary market yield information on outstanding interbank CDs when no interbank CDs were issued around either the maturity dates or the issuance dates of the WMPs; these results are reported in column 4.

The key result of Table 5 is that riskier banks are more inclined to pay relatively high realized returns (i.e., closer to the target returns). In other words, if a bank becomes riskier at the moment when its outstanding WMP is due, the bank will be less likely to default. Columns 3 and 4 in Table 5 show that if the CD yield of a bank increases by 100 basis points, realized returns obtained by its WMP investors would on average increase by more than 60 basis points. Note that the standard deviation of the interbank CD yield is 63 basis points. As a caveat, we need to emphasize that this empirical finding

Table 5: Implicit Guarantees

This table reports results of regressions of the realized-target return gap of a bank's WMP (*realized r − target r*) against the yield of the bank's interbank CD issued around the WMP's maturity date (*CD yield*$_{end}$), the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$). Column 1 reports the results of the OLS regression; Column 2, the first-stage regression of CD *CD yield*$_{end}$ against the yield of the bank's interbank CD issued around the issuance date of the WMP (*CD yield*$_{start}$); Column 3, the 2SLS regression of the main sample; Column 4, the 2SLS regression of the extended sample using the secondary market yield information to proxy for the default risk of a bank.

	(1)	(2)	(3)	(4)
dependent variable	*realized r − target r*	*CD yield*$_{end}$	*realized r − target r*	*realized r − target r*
CD yield$_{end}$	0.14875***		0.66925***	0.61571***
	(0.05561)		(0.15558)	(0.13662)
target r	-0.34161***	-0.02287	-0.43361***	-0.38847***
	(0.04327)	(0.01441)	(0.06202)	(0.05357)
principal guaranteed	-0.00494***	-0.00080***	-0.00536***	-0.00461***
	(0.00166)	(0.00019)	(0.00144)	(0.00140)
principal & return guaranteed	-0.00569***	-0.00190***	-0.00526***	-0.00469***
	(0.00174)	(0.00042)	(0.00143)	(0.00160)
rating = 2	-0.00205	-0.00105***	-0.00117	-0.00107
	(0.00167)	(0.00034)	(0.00139)	(0.00153)
rating = 3	-0.00184	-0.00152***	-0.00053	-0.00047
	(0.00182)	(0.00045)	(0.00135)	(0.00156)
rating = 4	-0.00873	-0.00090*	-0.00682*	-0.00512*
	(0.00549)	(0.00049)	(0.00364)	(0.00263)
rating = 5	0.00018	-0.00141***	0.00263*	0.00152
	(0.00152)	(0.00042)	(0.00147)	(0.00197)
overnight shibor$_{end}$	-0.00198***	0.00993***	-0.00772***	-0.00702***
	(0.00046)	(0.00056)	(0.00158)	(0.00141)
CD yield$_{start}$		0.42030***		
		(0.01979)		
regression type	*OLS*	*1st stage*	*2SLS*	*2SLS*
observations	41105	41105	41105	72145
CD yield info	*primary*	*primary*	*primary*	*primary + secondary*
adjusted R^2	0.303	0.624	0.054	0.029

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

cannot address how an insolvent bank would prioritize the payment of its outstanding WMPs. This is because by selection our sample contains only banks that are able to tap the interbank credit market upon the maturity dates of their outstanding WMPs.

Quantitative Implications. The expenses incurred by implicit guarantees are not negligible. Acharya, Qian and Yang (2016) document that the ratio of WMPs due over a quarter to its bank equity ratio is 1.41 and the quarterly net income over bank equity ratio is 0.0583 for an average medium-sized bank in China. Given the standard deviation of joint-equity banks' interbank CD yield 0.69 percent, the estimate of *CD yield*$_{end}$ in our main regression 0.67 implies that one standard deviation increase in interbank CD yield of an average joint-equity bank leads to the additional expense over a quarter that amounts to $0.69 \times 0.67 \times 1.41 = 0.65$ percent of the bank's equity. This extra expense caused by implicit guarantees occupies around $\frac{0.65}{0.0583} = 11$ percent of the bank's quarterly net income.

We next interpret the coefficient estimates of other variables. Given the same target return, banks

pay significantly lower returns to WMPs with explicit principal guarantees or return guarantees.[16] Note that WMPs with explicit guarantees are banks' on-balance-sheet liabilities, which offer less regulatory arbitrage opportunities than WMPs without any guarantees. Therefore, the customers who prefer WMPs with no guarantees are more important from the banks' perspective. In addition, investors of WMPs with no guarantees choose to take on more risks by self-selection. Hence, they ought to be more sensitive to WMPs' realized returns than investors of WMPs with explicit guarantees. The same logic also explains why WMPs with higher ratings (i.e., riskier) yield higher realized returns. The tightness of the interbank liquidity measured by the overnight Shibor negatively affects the realized returns paid by banks. Banks are less inclined to pay out cash if they have the option of not doing so when liquidity becomes more scarce.

Strong Implicit Guarantee (i.e., High Realized Return) $\neq$ High Credit Spread. The typical credit spread insight cannot explain our empirical finding. When a firm issues a bond, creditors demand higher spread at the issuance stage if they perceive the firm's default probability to be high. WMPs share a similar feature, that is, riskier banks offer higher target returns to their WMP investors (see Column 1 in Table 4). However, we wish to highlight the difference in timing. Decisions on realized returns are made when the WMP matures. Specifically, the issuing bank decides to pay higher returns on its WMPs if the bank's perceived default risk rises when WMPs mature. Note that the issuing bank is not obligated to pay any return to its WMP investors. To sum up, in the case of a typical corporate bond, it is bond investors who demand high risk premium on the bond issuance date to compensate for the future risk exposure; in the case of a WMP, it is the issuing bank that volunteers to offer a high return on the WMP maturity date to its investors, who may refuse to roll over the WMP.

Short-Run vs. Long-Run. Our empirical results imply that a bank may experience a short-run vicious cycle due to its shadow banking operations. A negative shock to a bank's perceived risk would definitely harm its daily operations such as raising funds. Nevertheless, our results show that even under such an unfavorable circumstance, the bank becomes more willing to pay out cash, which hurts the bank's short-run financial health. Then what is the rationale behind this seemly counter-productive behavior? Our explanation is that raising the realized return could enhance the bank's reputation and generate long-run profits. We believe that the marginal benefit of doing so is higher when the bank's reputation or perceived risk deteriorates.

Policy Implication. Since the 2007-09 global financial crisis, bank regulators realize the critical role of off-balance-sheet risk exposure for the capital adequacy of commercial banks. Since banks' risk exposure to their off-balance-sheet operations is largely the consequence of their implicit guarantees, our results imply such risk exposure varies for different banks according to their perceived risks and also fluctuates over time for an individual bank. Therefore, the appropriate risk-weight for banks' off-balance-sheet risk exposure should incorporate the *dynamic* and *heterogeneity* nature of implicit guarantee.

4.4 Robustness Tests

In this subsection, we present three sets of robustness tests. In the first robustness test, we examine the impacts of trust defaults, which we consider to be pure reputational shocks, on banks' implicit guarantees

[16] Banks sometimes offer two target returns: low and high. The return guarantee refers to the guarantee of the low one rather than the high one; the high target return is more relevant given given Figure 3 in Appendix.

of their WMPs' target returns. For our second robustness test, we acknowledge that various forms of government intervention play a critical role in China's banking system. Accordingly, we incorporate time fixed effects into our baseline regressions. Lastly, we show that our main finding is not driven by the segmentation between banks' retail client market and institutional investor market.

4.4.1 Trust Shock

We employ trust defaults as exogenous shocks to banks' perceived risks in order to test the robustness of our main findings. Recall that banks offer their branches as the distributing platform of trust products arranged by standalone trust companies. The failure of any trust product would only harm the relevant banks' reputation but not their fundamentals. We use these exogenous reputational shocks to address the three empirical challenges discussed in Section 4.2. In particular, the sample selection issue is taken care of because we include all banks regardless of whether they issued interbank CDs in our sample period.

We restrict our sample to retail WMPs because institutional and interbank WMP investors are more sophisticated and comprehend that trust default events have zero effects on banks' fundamentals. The summary statistics of the robustness test sample is shown in Table 13 in the Appendix. We say that a bank's retail WMP is hit by a trust default shock if the WMP matures within a certain window of days after the default event. If we consider 60-, 30-, 15-, and 7-day windows, 668, 305, 172, and 88 retail WMPs are influenced by trust shocks, respectively.

Table 6: Implicit Guarantees: Trust Shock

This table reports regressions of the realized-target return gap of a bank's WMP (*realized r − target r*) against the trust shock, the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight Shibor*$_{end}$) with bank fixed effects, WMP maturity quarter fixed effects for the sample of retail WMPs. The sample size of this test is 198,748.

	(1)	(2)	(3)	(4)
trust shock	0.00167**	0.00184*	0.00177*	0.00101**
	(0.00075)	(0.00100)	(0.00091)	(0.00043)
target r	-0.50247***	-0.50263***	-0.50278***	-0.50287***
	(0.07696)	(0.07706)	(0.07715)	(0.07722)
principal guaranteed	-0.00471***	-0.00471***	-0.00471***	-0.00471***
	(0.00086)	(0.00086)	(0.00086)	(0.00086)
principal & return guaranteed	-0.00477***	-0.00477***	-0.00477***	-0.00477***
	(0.00082)	(0.00082)	(0.00082)	(0.00082)
rating = 2	0.00004	0.00004	0.00004	0.00004
	(0.00089)	(0.00089)	(0.00089)	(0.00089)
rating = 3	0.00094	0.00094	0.00094	0.00094
	(0.00101)	(0.00101)	(0.00101)	(0.00101)
rating = 4	0.00539***	0.00539***	0.00539***	0.00539***
	(0.00154)	(0.00154)	(0.00154)	(0.00154)
rating = 5	0.00473*	0.00473*	0.00473*	0.00473*
	(0.00262)	(0.00262)	(0.00262)	(0.00262)
overnight shibor$_{end}$	0.00032***	0.00032***	0.00032***	0.00032***
	(0.00005)	(0.00005)	(0.00005)	(0.00005)
windows (days)	60	30	15	7
adjusted R^2	0.655	0.655	0.655	0.655

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The robustness test is the regression of the realized-target return gap of WMP i of bank b (*realized r−*

target r) against the dummy of the trust shock, the target return (*target r*), return guarantee types, risk ratings, and the over-night Shibor rate on the WMP's maturity date with bank fixed effects and WMP maturity quarter fixed effects (equation 2). We expect the coefficient of the trust shock to be positive for the following reason. Although the failure of a trust product does not affect the balance sheet of the bank providing the distribution channel, the failure affects the bank's reputation among its retail customers because they blame the bank for distributing and endorsing low-quality products. Indeed, retail customers protested in front of the branches where they purchased the trust products that defaulted. Given that the bank's reputation deteriorates due to the trust default, the bank would be more cautious when determining the realized returns of its maturing WMPs. Therefore, we expect that the bank volunteers to pay higher (realized) returns to the investors of WMPs that are scheduled to mature right after the default.

$$\begin{aligned} \textit{realized } r_{i,b} - \textit{target } r_{i,b} = \beta_1 \times \textit{trust shock}_{i,b} + \beta_2 \times \textit{target } r_{i,b} + \textit{other controls}_{i,b} \\ + \textit{bank fixed effects}_b + \textit{maturity quarterly fixed effect}_{i,b} + e_{i,b} \end{aligned} \tag{2}$$

Our identification assumption is as follows: The default of a trust product is orthogonal to the selling bank's fundamentals. Nevertheless, the default event hurts the bank's reputation among its retail customers. Therefore, the coefficient of the trust shock reveals the effect of the reputational shock. We assume that a WMP is hit by the trust shock ($shock = 1$) if it matures within 60 days after the default of a trust product sold by the WMP's issuing bank. Our tests also consider shorter windows ranging from 7 days to 30 days

Results presented in Table 6 show that banks hit by trust shocks extend stronger implicit guarantees, that is, they pay higher realized returns given the target returns that they had advertised at the selling stages. Conditional on the target return, if a WMP happens to mature in the aftermath of a trust shock, its issuing bank will significantly raise the realized return. The coefficients of the trust shock indicate that such a negative reputation event would incur additional interest expenses of at least 10 basis points.

Although the results of the trust shock are largely consistent with the results of the baseline regression, we highlight a major difference between the two. When a trust shock hits a bank, the bank's fundamentals are supposed to remain intact. Therefore, a trust shock is a pure reputational shock. However, when the yield of a bank's interbank CD rises, its default risk rises, which signals that its fundamentals might deteriorate. Hence, we interpret the rise in a bank's interbank CD yield as a combination of the effects of the reputational shock and of the fundamental shock.

Lastly, we divide our trust default test sample by year and run the same regression (2). Table 14 in the Appendix shows that trust shocks have statistically significant positive effects on banks' extension of their guarantees for target returns for most years with one exception—the year 2015. Note that the sign of the coefficient of "trust default" in 2015 is still consistent with the coefficients in other years.

4.4.2 Time Fixed Effects

Occasional intervention from different regulatory agencies could have significant effects on the WMP market. To ensure that these effects do not contaminate our finding, we incorporate various forms of quarter fixed effects into our main regression (1). In particular, we add the quarter fixed effects to the baseline regression (Column 2, Table 7). In addition, we run the same regression for sub-samples of

Table 7: Implicit Guarantees: time fixed effect and WMP maturity

This table reports results of regressions of the realized-target return gap of a bank's WMP (*realized r − target r*) against the yield of the bank's interbank CD issued around the WMP's maturity date (*CD yield*$_{end}$), the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$) with WMP maturity quarter fixed effects. Column 1 reports the results of the regression without quarter fixed effects as a benchmark; Column 2, the fixed-effects regression; Column 3, the fixed-effects regression of the sub-sample of WMPs with 20-to-40-day maturity; Column 4, the fixed-effects regression of the sub-sample of WMPs with 80-to-100-day maturity; and Column 5, the fixed-effects regression of the sub-sample of WMPs with 170-to-190-day maturity.

	(1)	(2)	(3)	(4)	(5)
CD yield$_{end}$	0.66925***	3.58916***	0.51691***	0.54338***	3.69448
	(0.15558)	(1.14908)	(0.13570)	(0.14907)	(2.90511)
target r	-0.43361***	-0.44882***	-0.49932***	-0.51000***	-0.40739***
	(0.06202)	(0.05927)	(0.11011)	(0.04833)	(0.13513)
principal guaranteed	-0.00536***	-0.00641***	-0.00749***	-0.00536***	-0.00450
	(0.00144)	(0.00140)	(0.00141)	(0.00100)	(0.00307)
principal & return	-0.00526***	-0.00640***	-0.00708***	-0.00532***	-0.00531
guaranteed	(0.00143)	(0.00133)	(0.00126)	(0.00094)	(0.00341)
rating = 2	-0.00117	-0.00173	-0.00272***	-0.00069	-0.00076
	(0.00139)	(0.00121)	(0.00069)	(0.00119)	(0.00287)
rating = 3	-0.00053	-0.00139	-0.00296***	-0.00033	0.00072
	(0.00135)	(0.00118)	(0.00086)	(0.00102)	(0.00288)
rating = 4	-0.00682*	-0.00777**	-0.00797***	0.01147	-0.00385
	(0.00364)	(0.00307)	(0.00070)	(0.00878)	(0.00254)
rating = 5	0.00263*	0.00211		0.00303***	0.00378
	(0.00147)	(0.00132)		(0.00103)	(0.00345)
overnight shibor$_{end}$	-0.00772***	-0.02836***	-0.00407***	-0.00547***	-0.02687
	(0.00158)	(0.00975)	(0.00133)	(0.00138)	(0.02027)
sub-sample by maturity (days)	full sample	full sample	[20,40]	[80,100]	[170,190]
quarterly FE at maturity	No	Yes	Yes	Yes	Yes
observations	41105	41105	10566	9580	7156
adjusted R^2	0.054	-2.214	0.320	0.358	-3.007

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

WMPs with different groups of maturities: 20-40 days, 80-100 days, and 170-190 days; the results are shown in columns 3, 4, and 5, respectively. The results in Table 7 show that riskier banks tend to provide more implicit guarantees even if we take into account the quarter fixed effects. Since certain change in regulatory rules target a particular type of banks, we run tests that incorporate the bank-by-quarter fixed effects (see Table 15 in the Appendix for results). Overall, we show that our main empirical finding is not driven by government interventions.

4.4.3 Market Segmentation and Clients

There are generally two types of WMP clients: institutional and retail. Institutional investors include non-financial firms and more specialized interbank investors. Generally, institutional investors are more sophisticated and are also able to gather more information on the backgrounds of WMP issuers. Therefore, banks may extend different degrees of implicit guarantees towards different types of clients. Moreover, there could exist a certain degree of market segmentation leading to the following scenario: While institutional investors expect the default risk of a bank to be rising, and therefore respond accordingly, retail clients' risk assessment of the bank may not be updated in as timely a manner as institutional investors'

Table 8: Implicit Guarantees: Clients

This table reports results of regressions of the realized-target return gap of a bank's WMP (*realized r − target r*) against the yield of the bank's interbank CD issued at the WMP's maturity date ($CD\ yield_{end}$), the WMP's promised return (*target r*), guarantee types, risk rating, and the overnight Shibor at the WMP's maturity date ($overnight\ shibor_{end}$) for sub-samples of WMPs of different client types. Columns 1 and 2 report results of OLS and 2SLS regressions of the full sample as benchmarks, Columns 3 and 4 OLS and 2SLS regressions of the sub-sample of WMPs for institutional and interbank clients, Columns 5 and 6 the OLS and 2SLS regressions of the sub-sample of WMPs for retail and private banking clients.

	(1)	(2)	(3)	(4)	(5)	(6)
$CD\ yield_{end}$	0.14875***	0.66925***	0.07200***	0.35767***	0.17532*	0.78752***
	(0.05561)	(0.15558)	(0.01966)	(0.11273)	(0.09201)	(0.14704)
target r	-0.34161***	-0.43361***	-0.15024***	-0.22674***	-0.51298***	-0.58378***
	(0.04327)	(0.06202)	(0.03971)	(0.05930)	(0.06496)	(0.07127)
principal guaranteed	-0.00494***	-0.00536***	-0.00246***	-0.00290***	-0.00899***	-0.00808***
	(0.00166)	(0.00144)	(0.00093)	(0.00094)	(0.00234)	(0.00183)
principal & return guaranteed	-0.00569***	-0.00526***	-0.00233**	-0.00219**	-0.01042***	-0.00917***
	(0.00174)	(0.00143)	(0.00100)	(0.00092)	(0.00205)	(0.00147)
$rating = 2$	-0.00205	-0.00117	-0.00110	-0.00067	-0.00428**	-0.00249*
	(0.00167)	(0.00139)	(0.00114)	(0.00102)	(0.00188)	(0.00140)
$rating = 3$	-0.00184	-0.00053	-0.00132	-0.00055	-0.00283	-0.00091
	(0.00182)	(0.00135)	(0.00111)	(0.00091)	(0.00181)	(0.00145)
$rating = 4$	-0.00873	-0.00682*	-0.00417***	-0.00386***	-0.01435***	-0.00777*
	(0.00549)	(0.00364)	(0.00097)	(0.00086)	(0.00399)	(0.00395)
$rating = 5$	0.00018	0.00263*	-0.00204**	-0.00318***	-0.00392***	0.00059
	(0.00152)	(0.00147)	(0.00098)	(0.00110)	(0.00054)	(0.00090)
$overnight\ shibor_{end}$	-0.00198***	-0.00772***	-0.00085***	-0.00401***	-0.00261***	-0.00935***
	(0.00046)	(0.00158)	(0.00028)	(0.00144)	(0.00066)	(0.00108)
sub-sample by client types	*full*	*full*	*institutional*	*institutional*	*retail*	*retail*
regression type	*OLS*	*2SLS*	*OLS*	*2SLS*	*OLS*	*2SLS*
observations	41105	41105	27036	27036	14048	14048
adjusted R^2	0.303	0.054	0.230	-0.092	0.433	0.263

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

risk assessment because retail clients cannot access information that is readily available to institutional investors. Consequently, when a bank's perceived risk in the interbank market rises (i.e., its interbank CD yield rises), the bank becomes more reliant on the retail market due to market segmentation. Therefore, the bank will deliver higher realized returns to maturing WMPs to appease and retain retail investors. This pattern of events could plausibly explain our main results.

To address this concern, we split the main sample into the retail investor group and the institutional investor group. We run the same set of regressions; the results are shown in Table 8. Columns 3-6 show that banks tend to pay relatively high realized returns regardless of the client type when they are perceived to be riskier. Therefore, our main results are not entirely driven by market segmentation. Nevertheless, a comparison of Columns 4 and 6 indicates that the realized returns of retail WMPs are indeed more sensitive to the market's perception of the default risk of the issuing bank.

5 Risk Premium of Implicit Guarantees

WMP investors are exposed to the risk that the actual returns they obtain could deviate from the target returns they were informed of while purchasing products even if the issuing banks are financially sound. In

contrast, interbank CD investors always receive the face value unless the bank files for bankruptcy. Hence, if investors choose interbank WMPs over interbank CDs, they must demand a premium to compensate the additional risk they are exposed to, i.e., the risk premium of implicit guarantees.

To test the hypothesis above, we construct a sample of interbank WMP-CD pairs. We pair each interbank WMP with an interbank CD that was issued by the same bank if the differences between their issuance dates and their maturity dates are within 6 days of each other. If there are multiple interbank CDs satisfying the criterion, we select the one with the smallest distance with respect to their issuance dates. The advantage of this sample is that the two instruments of each pair share the same issuer and, more importantly, the same group of potential investors. Given the general condition that interbank WMPs and CDs are backed by the same asset pools of their issuing banks, the difference between the returns of the two assets is almost purely the risk of implicit guarantees.[17]

In the sample, we find 8,718 interbank WMP-CD pairs. We calculate the spread of the interbank WMP-CD pairs in two ways: *WMP return*$-$*CD yield* and (*WMP return* $-$ *CD yield*)/ *CD yield*. Table 16 in the Appendix presents the summary statistics of the spreads. Panel A shows that the average spread of all interbank WMP-CD pairs is slightly above 75 basis points, which is 23 percent of the average interbank CD yield, and larger than the one standard deviation of interbank CD yields. At the time we collected the data, there were outstanding WMPs without information on realized returns. Hence, the number of interbank WMP-CD pairs with WMPs' realized returns is $6,273$, which is significantly less than the size of the core sample $(8,718)$.

Our test is a regression of interbank WMP-CD spread against interbank CD yield, the type of bank, maturity, the type of guarantees, risk ratings, and the overnight Shibor on the WMP's maturity date (see Table 9). First of all, we find evidence that complements the key result of previous sections, that is, as the perceived risk of a bank increases, the risk premium of its implicit guarantee declines. Suppose the interbank CD yield of a bank increases by 1 percent because the interbank market questions its default risk. The target return of the bank's interbank WMP would only increase by 43 basis points on average. In other words, the interbank WMP-CD spread declines by 57 basis points.

The mechanism behind the result above is that the market anticipates (correctly) that while the bank raises the target return of its WMP as its interbank CD yield elevates, its propensity to pay the target return also rises. Hence, the risk of implicit guarantees declines, and the bank does not have to raise the target return by exactly the amount that the interbank market requests for its CD. To support this mechanism further, we regress the realized return of a bank's interbank WMP (*realized r*) against the yield of the bank's interbank CD issued around the WMP's issuance date ($CD\ yield_{start}$) and the WMP's target return (*target r*) as well as other controls (see Table 17 for results). This test shows that higher interbank CD yield indeed predicts better realized return even if we control a WMP's target returns.

The interbank WMP-CD spread also depends on other variables. For instance, the spread is smaller

[17]Interbank WMPs and interbank CDs are similar in two key aspects. First, interbank WMPs and interbank CDs are almost equally exposed to the default risks of their issuing banks. This similarity in exposure is largely because assets that back WMPs are neither fully transparent nor clearly bankruptcy remote (see Footnotes 8 and 9). If a bank fails, the management of its WMPs would stall and the liquidation of assets underlying its WMPs would be very opaque and noisy. Second, both types of assets are traded in free markets that are subject to minimal government intervention. One difference between the two types of assets may cause concerns over our risk premium measure: interbank CDs can be traded in a secondary market while interbank WMPs cannot. However, since both types of assets have relatively short maturities, the liquidity premium of interbank CDs is likely to be small. Chen, Cui, He and Milbradt (2017) quantify the interaction between default risk and liquidity risk of corporate bonds. They find the interaction accounts for around 10% of credit spread. Notice that the median maturity of corporate bonds in their sample is 5 years and the maturity of most interbank CDs and interbank WMPs is less than 1 year.

Table 9: Risk Premium of Implicit Guarantees

This table displays the results of regressions of the interbank WMP-CD spread against the yield of the bank's interbank CD issued around the same time (*CD yield*), the maturity of the WMP, the size of the interbank CD, guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$). The regressions depicted in Columns 1, 3, and 5 use the WMPs' target return to calculate the spread of the interbank WMP-CD pair; the regressions depicted in Columns 2, 4, and 6 use the WMPs' realized return.

Dependent Variable	*WMP return* $-$ *CD yield*		$\frac{\textit{WMP return} - \textit{CD yield}}{\textit{CD yield}}$	
	target	*realized*	*target*	*realized*
	(1)	(2)	(3)	(4)
CD yield	-0.260***	-0.368***	-12.737***	-16.603***
	(0.027)	(0.028)	(0.950)	(0.934)
maturity	0.000***	0.001***	0.010***	0.016***
	(0.000)	(0.000)	(0.001)	(0.001)
CD size	-0.000***	-0.000*	-0.001***	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
principal guaranteed	-0.004***	-0.005***	-0.136***	-0.151***
	(0.001)	(0.001)	(0.023)	(0.018)
principal & return guaranteed	-0.004***	-0.004***	-0.116***	-0.126***
	(0.001)	(0.001)	(0.030)	(0.027)
rating = 2	-0.000	-0.000	-0.012	-0.006
	(0.001)	(0.000)	(0.019)	(0.009)
rating = 3	0.001*	0.001**	0.031	0.045**
	(0.001)	(0.001)	(0.020)	(0.019)
rating = 4	0.001*	0.001**	0.027*	0.039**
	(0.000)	(0.001)	(0.015)	(0.015)
overnight shibor$_{end}$		-0.001*		-0.022
		(0.000)		(0.018)
observations				
adjusted R^2				

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

for WMPs whose principals are explicitly guaranteed by issuing banks. We also run the same sets of regressions for the extended sample, in which we pair interbank WMPs with outstanding interbank CDs that mature around the same date. The results are shown in Table 18 in the Appendix.

6 Failing WMP Investors

We argued that "riskier" banks provide more implicit guarantees due to reputation concerns. In this section, we examine whether the realized return of a WMP missing its target return would harm its issuing bank's reputation. As demonstrated in Section 4.1, the target return of a bank's WMP is a reasonable proxy of its reputation, that is, its perceived risk of default. Our hypothesis is that if a bank underperforms, i.e., misses its WMP's target return, it needs to offer higher target returns subsequently to attract investors. More specifically, we run two sets of predictive regressions to show that a larger realized-target return gap of a bank's WMPs is correlated with higher target returns offered by the bank subsequently.

First, we test the predictability of the average realized-target return gap of a bank's WMPs that mature on date t for the average target return of WMPs issued by the bank between $t+1$ and $t+30$. Column 1 of Table 10 estimates the response of average target returns with bank fixed effects and day

Table 10: Aftermath of Failing WMP Investors I

This table displays the results of regressions of the average target return of a bank's WMP from $t-1$ to t against the average gap between the realized and target returns of its WMP that mature on date t. The regressions reported in Columns 1 and 2 use the return gaps of all WMPs, while the regressions in Column 3 and 4 use the return gaps of institutional and retail WMPs calculated separately. Column 3 represents the subsample of institutional WMPs, and Column 4, the subsample of retail WMPs.

	(1)	(2)	(3)	(4)
$(mean\ of\ target\ -\ realized)_{i,t}$	-0.06136***	-0.01267***		
	(0.02213)	(0.00370)		
$(mean\ of\ target\ -\ realized)_{i,t}^{institutional}$			-0.00285***	-0.00256***
			(0.00070)	(0.00092)
$(mean\ of\ target\ -\ realized)_{i,t}^{retail}$			-0.01047*	-0.00101
			(0.00580)	(0.00202)
client type	*all*	*all*	*retail*	*institutional*
bank fixed effect	*yes*	*yes*	*yes*	*yes*
date fixed effect	*yes*	*yes*	*yes*	*yes*
bank-date fixed effect	*no*	*yes*	*yes*	*yes*
observations	150021	149900	45151	44729
adjusted R^2	0.735	0.877	0.855	0.761

standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

fixed effects. In line with the reputation channel, we find a statistically significant positive correlation between the return gaps for a bank's WMPs and the future target returns promised by the bank.

We know that institutional investors have various advantages over investors in terms of accessing and processing information. Is the predictive relationship stronger for retail clients? We address this heterogeneity in columns 3 and 4 of Table 10 by separating the returns according to client types. The coefficients on the average gap of institutional WMPs are significant for the future target returns of both institutional WMPs and retail WMPs. In contrast, the average realized-target gap of retail WMPs are correlated with the future target returns of retail WMPs, but not with the future target returns of institutional WMPs. The results show that bank reputations in the institutional WMP market are not affected by the past performance of retail WMPs, which can be explained by the information advantage of institutional investors.

The results thus far highlight a strong link between the past performance of a bank's WMPs and its future target returns. However, the daily average realized-target gap return might be capturing the accumulation of innovations in a bank's reputation up to the maturity date. Our second set of predictive regressions addresses this concern by exploring the association along a longer time horizon. In particular, we compute the monthly average realized-target return gap of a bank's WMPs and also the monthly average target return. With the bank-month sample points, we construct a balanced panel. Columns 1 to 3 of Table 11 present the estimates of the association between the monthly average target return of a bank and its lagged monthly average gaps (from $t-1$ to $t-6$). The positive correlation between the target returns and the first two lags are statistically and economically significant. The coefficients imply that a one-standard-deviation increase in the monthly average gaps leads to target returns that are 30 basis points higher in the next month, and 23 basis points higher in the month after, which correspond to a third and a quarter of the standard deviation of the target returns, respectively. Columns 4 through 6 of Table 11 add bank fixed effects and month fixed effects; the coefficients of interest decrease slightly

Table 11: Aftermath of Failing WMP Investors II

This table displays the results of regressions of the average target return of a bank's WMP over a month against the lagged average gap of its WMPs' realized and target returns (with gaps from $t-1$ to $t-6$) with bank fixed effects and day fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
$(\textit{mean of target - realized})_{i,t-1}$	0.63329***	0.40569***	0.40725***	0.39510***	0.26806***	0.26273***
	(0.07913)	(0.07136)	(0.07593)	(0.09029)	(0.06454)	(0.06713)
$(\textit{mean of target - realized})_{i,t-2}$	0.12790	0.33677***	0.31853***	0.10273*	0.25653***	0.23923***
	(0.08069)	(0.06205)	(0.07004)	(0.05728)	(0.06341)	(0.07145)
$(\textit{mean of target - realized})_{i,t-3}$		0.09346	0.07887		0.08044**	0.05577*
		(0.05983)	(0.06493)		(0.03745)	(0.03240)
$(\textit{mean of target - realized})_{i,t-4}$		0.01293	0.02979		0.01468	0.03115
		(0.01166)	(0.04528)		(0.01045)	(0.02170)
$(\textit{mean of target - realized})_{i,t-5}$			0.02017			0.04395*
			(0.03643)			(0.02544)
$(\textit{mean of target - realized})_{i,t-6}$			-0.00112			0.00501
			(0.01110)			(0.01324)
bank fixed effect	*no*	*no*	*no*	*yes*	*yes*	*yes*
month fixed effect	*no*	*no*	*no*	*yes*	*yes*	*yes*
observations	18338	16481	15062	18317	16462	15046
adjusted R^2	0.180	0.200	0.201	0.756	0.773	0.781

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

but remain statistically significant.

7 Final Remarks

In this paper, we show empirically that a bank is more inclined to extend implicit guarantees when the market expectation of its default risk increases. Our finding uncovers three insights regarding the risks of shadow banking. First, the presence of shadow banking gives rise to an adverse spiral as shown by Figure 1 in the Introduction. If a bank experiences a negative shock to its perceived risk, the bank extends more costly guarantees to preserve its reputation, which, in turn, will deteriorate the bank's equity in the short run. Second, when high-risk banks raise credit via shadow banking, our result implies that they face additional funding costs due to the stronger implicit guarantees expected by investors. These two insights naturally lead to a policy implication: A bank's risk-weight of its off-balance-sheet exposure ought to depend on its own default risk. Riskier banks should be assigned higher weight to their off-balance-sheet businesses.

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Appendix

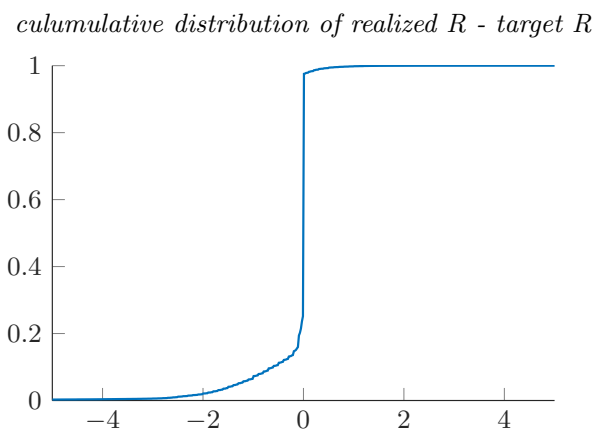

Figure 3: This figure shows the cumulative distribution of the realized-target return gaps for the raw WMP sample.

Table 12: Summary Statistics

This table reports the summary statistics of six key variables of the extended sample: a WMP's realized return, the target return, maturity (days), the yield of CD issued around the maturity of the WMP ($CD\ yield_{end}$), the yield of the CD issued around the issuance date of the WMP ($CD\ yield_{start}$), and the overnight Shibor on the WMP's maturity date ($overnight\ shibor_{end}$).

	mean	std	p10	p25	p50	p75	p90	mean	std	p10	p25	p50	p75	p90
	all client types (72,164 observations)							institutional clients (44,770 observations)						
realized r	3.87	(0.93)	2.86	3.15	3.83	4.50	5.16	3.59	(0.81)	2.76	3.00	3.44	4.11	4.78
target r	3.98	(1.01)	2.86	3.20	3.92	4.55	5.31	3.66	(0.82)	2.76	3.05	3.49	4.11	4.88
maturity (days)	112.94	(89.97)	31.00	40.00	91.00	180.00	188.00	110.28	(93.48)	30.00	35.00	90.00	180.00	189.00
realized - target	-0.12	(0.55)	-0.10	0.00	0.00	0.00	0.00	-0.07	(0.35)	-0.10	0.00	0.00	0.00	0.00
$\mathbf{1}\{realized\ r < target\ r\}$	0.22	(0.41)	0.00	0.00	0.00	0.00	1.00	0.15	(0.35)	0.00	0.00	0.00	0.00	1.00
$\mathbf{1}\{realized\ r = target\ r\}$	0.77	(0.42)	0.00	1.00	1.00	1.00	1.00	0.84	(0.36)	0.00	1.00	1.00	1.00	1.00
$CD\ yield_{end}$	3.29	(0.67)	2.71	2.82	3.00	3.58	4.45	3.28	(0.67)	2.71	2.81	2.99	3.46	4.40
$CD\ yield_{start}$	3.34	(0.73)	2.71	2.83	3.00	3.74	4.66	3.32	(0.73)	2.70	2.81	2.99	3.72	4.68
$overnight\ shibor_{end}$	2.09	(0.40)	1.78	1.95	2.02	2.26	2.51	2.09	(0.40)	1.78	1.95	2.02	2.26	2.49

Table 13: Summary Statistics of Retail WMPs

Panel A of the table reports the summary statistics of 199,019 retail WMPs. Panel B shows the number of retail WMPs that are affected depending on how the window of the trust default shocks is defined.

Panel a

	mean	sd	p10	p25	p50	p75	p90
realized r	4.58	(0.85)	3.54	4.07	4.59	5.16	5.54
target r	4.82	(1.08)	3.63	4.11	4.69	5.40	6.20
maturity (days)	109	(84.3)	35	45	91	150	187
$realized\ r - target\ r$	-0.24	(0.71)	-0.95	-0.10	0.00	0.00	0.00
$\mathbf{1}\{realized\ r < target\ r\}$	0.37	(0.48)	0.00	0.00	0.00	1.00	1.00
$\mathbf{1}\{realized\ r = target\ r\}$	0.58	(0.49)	0.00	0.00	1.00	1.00	1.00
$overnight\ shibor_{end}$	2.54	(0.93)	1.78	1.99	2.31	2.97	3.52

Panel b

7 days	88
15 days	172
30 days	305
60 days	668

Table 14: Implicit Guarantees: Trust Shocks

This table reports regressions of the gap between the realized return and the target return of a bank's WMP (*realized r − target r*) against the trust shock, the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$) with bank fixed effects and WMP maturity quarter fixed effects for the subsample of retail WMPs by year.

	(1)	(2)	(3)	(4)	(5)
trust shock	0.00103***	0.02616***	0.00098	0.00044***	0.00044***
	(0.00021)	(0.00069)	(0.00065)	(0.00011)	(0.00013)
target r	-0.21414***	-0.62360***	-0.74056***	-0.45866***	-0.30052***
	(0.04459)	(0.12880)	(0.10208)	(0.07228)	(0.10001)
principal guaranteed	-0.00158***	-0.00499***	-0.00682***	-0.00611***	-0.00364***
	(0.00060)	(0.00143)	(0.00122)	(0.00168)	(0.00140)
principal & return	-0.00167**	-0.00506***	-0.00732***	-0.00664***	-0.00407**
guaranteed	(0.00071)	(0.00102)	(0.00128)	(0.00171)	(0.00165)
rating = 2	0.00057	0.00221	0.00035	-0.00229*	-0.00137*
	(0.00066)	(0.00181)	(0.00133)	(0.00121)	(0.00080)
rating = 3	0.00092	0.00310	0.00194	-0.00130	-0.00089
	(0.00073)	(0.00190)	(0.00159)	(0.00106)	(0.00067)
rating = 3	0.00464**	0.00622***	0.00652***	0.00051	-0.00057
	(0.00219)	(0.00157)	(0.00222)	(0.00159)	(0.00061)
rating = 5	0.01763	0.00244	0.00278	-0.00012	-0.00088
	(0.01301)	(0.00195)	(0.00197)	(0.00096)	(0.00065)
overnight shibor$_{end}$	0.00003	0.00046***	0.00094***	-0.00036	-0.00201**
	(0.00004)	(0.00007)	(0.00013)	(0.00026)	(0.00078)
year of subsample	2013	2014	2015	2016	2017
observations	26428	37020	45924	51237	12502
adjusted R^2	0.298	0.668	0.778	0.600	0.470

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Implicit Guarantees: Time Fixed Effects and WMP Maturity

This table reports results of regressions of the realized return of a bank's WMP (*realized r*) against the yield of the bank's interbank CD issued around the WMP's maturity date (*CD yield*$_{end}$), the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$) with bank-by-quarter fixed effects. Column 1 reports the result of the first-stage regression; Column 2, the 2SLS regression; Column 3, the 2SLS regression of the sub-sample of WMPs with 20-to-40-day maturity; Column 4, the 2SLS regression of the sub-sample of WMPs with 80-to-100-day maturity; and Column 5, the 2SLS regression of the sub-sample of WMPs with 170-to-190-day maturity.

	(1)	(2)	(3)	(4)	(5)
dependent variable	*CD yield*$_{end}$	*realized r − target r*			
CD yield$_{end}$		3.53678***	0.52907***	0.51921***	1.10543
		(1.09108)	(0.16077)	(0.15913)	(1.00448)
target r	-0.00767**	-0.45185***	-0.46383***	-0.50928***	-0.48777***
	(0.00348)	(0.06215)	(0.12689)	(0.04673)	(0.14366)
principal guaranteed	0.00011	-0.00675***	-0.00813***	-0.00555***	-0.00631**
	(0.00007)	(0.00142)	(0.00163)	(0.00100)	(0.00248)
principal & return	-0.00000	-0.00697***	-0.00765***	-0.00557***	-0.00817***
guaranteed	(0.00008)	(0.00154)	(0.00138)	(0.00110)	(0.00270)
rating = 2	0.00001	-0.00206*	-0.00347***	-0.00075	-0.00253
	(0.00009)	(0.00118)	(0.00086)	(0.00115)	(0.00212)
rating = 3	-0.00007	-0.00107	-0.00357***	-0.00023	-0.00070
	(0.00009)	(0.00109)	(0.00101)	(0.00087)	(0.00228)
rating = 4	0.00038***	-0.00834***	-0.00876***	0.01118	-0.00546***
	(0.00009)	(0.00297)	(0.00086)	(0.00869)	(0.00187)
rating = 5	0.00009	0.00130		0.00239**	0.00107
	(0.00008)	(0.00119)		(0.00118)	(0.00232)
overnight shibor$_{end}$	0.00789***	-0.02829***	-0.00411***	-0.00461***	-0.00796
	(0.00057)	(0.00973)	(0.00149)	(0.00151)	(0.00626)
CD yield$_{start}$	0.05883***				
	(0.00832)				
regression type	*1st stage*	*2SLS*	*2SLS*	*2SLS*	*2SLS*
sub-sample by maturity (days)	full sample	full sample	[20,40]	[80,100]	[170,190]
observations	41019	41019	10518	9515	7103
adjusted R^2	0.899	-1.909	0.294	0.360	0.043

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Summary Statistics: Interbank WMP-CD Spreads

This table reports the summary statistics of interbank WMP-CD spreads that we calculate based on either the WMPs' target returns or realized returns.

Panel A: *WMP return − CD yield*

	target return					*realized return*				
bank types	mean (std)	Q1	median	Q3	N	mean (std)	Q1	median	Q3	N
joint-equity	0.0075(0.0051)	0.0054	0.0068	0.0087	4957	0.0077(0.0056)	0.0058	0.0073	0.0092	3716
urban	0.0072(0.0051)	0.0048	0.0067	0.0084	2211	0.0076(0.0040)	0.0058	0.0072	0.0088	1395
rural	0.0055(0.0041)	0.0029	0.0051	0.0073	1550	0.0056(0.0038)	0.0031	0.0053	0.0076	1162
all banks	0.0071(0.0050)	0.0048	0.0066	0.0085	8718	0.0073(0.0050)	0.0053	0.0070	0.0087	6273

Panel B: (*WMP return − CD yield*)/ *CD yield*

	target return					*realized return*				
bank types	mean (std)	Q1	median	Q3	N	mean (std)	Q1	median	Q3	N
joint-equity	0.2385(0.1705)	0.1694	0.2172	0.2758	4957	0.2454(0.1891)	0.1772	0.2283	0.2929	3716
urban	0.2268(0.1646)	0.1433	0.2136	0.2734	2211	0.2435(0.1230)	0.1784	0.2370	0.2877	1395
rural	0.1707(0.1286)	0.0847	0.1607	0.2356	1550	0.1774(0.1133)	0.0952	0.1707	0.2376	1162
all banks	0.2235(0.1642)	0.1482	0.2093	0.2701	8718	0.2324(0.1661)	0.1648	0.2214	0.2828	6273

Table 17: Implicit Guarantees: Interbank WMP-CD Pairs

This table reports results of regressions of the realized return of a bank's interbank WMP (*realized r*) against the yield of the bank's interbank CD issued around the WMP's issuance date ($CD\ yield_{start}$), the WMP's target return (*target r*), guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date ($overnight\ shibor_{end}$) with monthly fixed effects on the issuance and maturity dates of WMPs. Column 1 shows the regression results for the full sample; Column 2, the sub-sample of joint-equity banks' WMPs; Column 3, the sub-sample of urban banks' WMPs; Column 4, the sub-sample of rural banks' WMPs.

	(1) full sample	(2) joint-equity	(3) urban	(4) rural
$CD\ yield_{start}$	0.179***	0.218***	0.187**	0.035
	(0.052)	(0.068)	(0.073)	(0.022)
target r	0.767***	0.766***	0.585***	0.933***
	(0.095)	(0.114)	(0.189)	(0.041)
maturity	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
principal guaranteed	-0.002*	-0.004***	-0.001*	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)
principal & return guaranteed	-0.001***	-0.002***	-0.002*	-0.000
	(0.000)	(0.001)	(0.001)	(0.000)
$rating = 2$	-0.000	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)
$rating = 3$	0.000	0.000	0.001*	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)
$rating = 4$	-0.000	-0.000		0.000
	(0.001)	(0.001)		(0.000)
$overnight\ shibor_{end}$	0.001	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)
observations	14113	8332	3317	2460
adjusted R^2	0.883	0.869	0.913	0.981

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Risk Premium of Implicit Guarantees (extended)

This table shows the results of regressions of the interbank WMP-CD spread against the yield of the bank's interbank CD issued around the same time (*CD yield*), the maturity of the WMP, the size of the interbank CD, guarantee types, risk ratings, and the overnight Shibor on the WMP's maturity date (*overnight shibor*$_{end}$). The regressions depicted in Columns 1, 3, and 5 use the WMPs' target return to calculate the spread of the interbank WMP-CD pair; the regressions depicted in Columns 2, 4, and 6 use the WMPs' realized return.

Dependent Variable	*WMP return* $-$ *CD yield*		$\frac{\textit{WMP return} - \textit{CD yield}}{\textit{CD yield}}$	
	target	*realized*	*target*	*realized*
	(1)	(2)	(3)	(4)
CD yield	-0.191***	-0.160***	-11.285***	-10.609***
	(0.042)	(0.029)	(1.128)	(0.825)
maturity	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
CD size	-0.000***	-0.000**	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
principal guaranteed	-0.006***	-0.006***	-0.185***	-0.187***
	(0.001)	(0.001)	(0.017)	(0.017)
principal & return guaranteed	-0.005***	-0.005***	-0.145***	-0.151***
	(0.001)	(0.001)	(0.023)	(0.018)
rating $= 2$	-0.001	-0.001	-0.021	-0.015
	(0.001)	(0.000)	(0.019)	(0.013)
rating $= 3$	0.001	0.001**	0.017	0.027**
	(0.000)	(0.000)	(0.012)	(0.011)
rating $= 4$	0.001**	0.001**	0.026***	0.025**
	(0.000)	(0.000)	(0.010)	(0.010)
overnight shibor$_{end}$		-0.002		-0.057
		(0.001)		(0.036)
observations	18188	15750	18186	15748
adjusted R^2	0.325	0.310	0.376	0.338

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$