Beyond Regulatory Arbitrage: Novel Evidence on ABCP Market

Angela Gallo Barbara Casu*

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Abstract

Based on a unique dataset of ABCP conduits, we show that interest rates changes fuelled the growth of this key shadow banking sector in the years leading to the financial crisis. We support two main transmission mechanisms, a demand side and a funding (supply) side channel. First, on the demand side, in line with the theoretical literature, we document that an increase in demand for near-money assets leads to higher issuance of ABCP notes and in turn to higher demand for safe collateral. However, on the supply side, conduits were constrained by the higher interest rates as it increased their cost of borrowings, resulting in lower issuance. The first channel dominated before the crisis, leading to the rapid expansion of the ABCP market. We document that both channels created incentives for the conduits to purchase higher-yield collateral, such as MBS and CDO securities, whose risks were ultimately borne by the sponsoring banks when the ABCP market collapsed in August 2007.

Keywords: interest rates, asset-backed commercial paper, safe collateral, financial crisis.

JEL Codes: G01, G23, G28

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1 Introduction

The USD ABCP (asset-backed commercial paper) market collapsed in August 2007, marking the start of the global financial crisis. Despite being almost immune to distress during the previous decade, in 2007, the ABCP market experienced a run by money market funds, causing a drop of about 35% of the total amount outstanding over a short time period of just a few months. This episode had a severe impact on the entire financial system, and in particular on large US and European banks sponsoring the conduits issuing ABCP notes. As reported by S&P, Nov. 20, 2008 "For the first time in more than 10 years, ABCP conduits were drawing liquidity regularly to repay commercial paper and participants were asking more questions surrounding conduits' assets". This liquidity ABCP conduits were drawing upon came from the agreements provided by the sponsoring banks, which were contractually required to stand behind the notes and bring assets back onto their balance sheets, thus transferring losses back into the commercial banking system (Financial Crisis Inquiry Commission, 2011). To reduce the potential impact of such a collapse on the liquidity of banks and on the entire financial system, it required the intervention of the Federal Reserve, which provided specific funding liquidity facilities: the Term Auction Facility (TAF) in 2007 and the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility later in 2010.

The run on the ABCP market revealed the systemic nature of this component of the shadow banking sector, highlighting both its reliance on short-term debt funding being rolled over (Covitz et al., (2013) and Schroth et al., (2014)) and the strong interconnections between commercial banks and shadow banking activities via liquidity puts (Acharya et al., (2013)). However, it must be noted that the collapse of the ABCP market also had such a substantial impact because of the large size it reached in the run-up to crisis, fuelled by several years of exponential growth (Figure 1a). In January 2007, ABCP amount outstanding accounted for $1.3 trillion in the US market, about 59.9% of the whole commercial paper market, up from 7.5% in 1990. These $1.3 trillion of ABCP outstanding corresponded to the amount of near-money debt manufactured by shadow banks to respond to the demand for safe assets by money market investors (Figure 1b) and to liquidity lines committed by sponsoring banks. In comparative terms, the repo market - that also experienced a similar run - financed 4% of outstanding private-label ABS against about 23% financed

by ABCP conduits ((Gorton and Metrick, (2012); Krishnamurthy et al., (2014)). What were the drivers of the ABCP market exponential growth? Was this growth related to increasing risk-taking?

[Figure 1 about here.]

Previous literature in this area is limited, mainly because of the lack of granular data on ABCP conduits and the difficulty in gathering comparable accounting data, as these entities are based in offshore centres or in special jurisdictions as Delaware (US) and Cayman Islands. As a result, most contributions to the literature on shadow banking are theoretical. One notable exception is the paper by Acharya et al., (2013), which provides empirical evidence to support the hypothesis of regulatory arbitrage. According to this hypothesis, ABCP growth was fuelled by the removal of accounting rules on the consolidation of conduits' assets on banks' balance sheets implemented in July 2004. As reported by Acharya et al., (2013), "the timeline of these (accounting) changes closely coincides with changes in ABCP outstanding. The growth stalled in late 2001 [..]. From late 2001 to late 2004, ABCP outstanding was flat after several years of growth. However, starting in late 2004, at the time bank regulators issued exemption [...] growth in ABCP picked up again.". The authors suggest that discretionary financial regulation also played a role in encouraging banks securitization activity. Combining the regulatory arbitrage hypothesis with the too-big-to-fail view, Acharya and Richardson (2009) suggest that banks were willing to provide liquidity guarantees to ABCP conduits and retain the asset risk on their balance sheet because of implicit guarantees.

More recently, the theoretical literature has advanced a demand-side explanation, whereby the growth of shadow banking is indirectly linked to the substantial demand for risk-less debt from institutional cash pools, such as money market funds (see Pozsar, 2011). Gennaioli et al., (2013) build a model where outside investors wealth drives the demand for risk-less debt and, indirectly, for securitization, which allowed banks to meet this higher demand by pooling and tranching cash flows. The authors suggest that, when the demand for risk-less debt is very high, banks respond by diversifying their portfolios and by buying risky loans, thus increasing their exposure to systematic risk as they reduce idiosyncratic risk through diversification, but neglect aggregate tail risk. This model, however, is silent on the determinants of increased demand for risk-less debt. In order to

explain the drivers for the demand for so called near-money assets both Sunderam (2015) and Nagel (2016) attribute a special role to liquidity premium and interest rates. Sunderam (2015) builds a theoretical model showing that investors treated ABCP as money-like claims and tests the model predictions on USD ABCP aggregate market data. The results suggest that ABCP conduits grew to respond to increasing demand for money-like instruments and the role of securitization was to reduce the cost of creating collateral, i.e. to increase the elasticity of supply. Nagel's theoretical model shows that higher interest rates imply higher opportunity costs of holding money and hence a higher premium for the liquidity services benefits of assets that are close substitutes for money.

Building on this theoretical literature and based on a hand-collected dataset of ABCP conduits operating on the USD market in the period 2003-2007, this paper aims to provide empirical evidence that interest rates increases fuelled the growth of this key shadow banking sector in the years leading to the financial crisis. We identify two main transmission mechanisms, a demand side and a funding (supply) side channel. In line with the theoretical literature, we posit that the demand channel operated via the increase in money premium for near-money assets. Higher demand from money market investors lead to higher ABCP issuances, a positive relationship that is consistent with the overall growth of the market (Figure 1(a)). However, the demand channel alone fails to explain the increasing leverage and risks accumulated in ABCP portfolios, which ultimately made them vulnerable to runs (Schroth et al., (2013). By recognizing the de-facto bank nature of ABCP conduits (maturity, liquidity and risk transformation), we argue that interest rates may affect ABCP conduits via another channel, that is via the cost of borrowing. The rates paid by the conduits on ABCP notes issued have two components, the market short-term interest rate and a spread which depends on the rating of the conduits. This spread is typically in the order of a few basis points and it remained almost constant until the market collapsed in August 2007 as reported in Covitz et al., (2013)[1]. As shown in Figure 2a, ABCP rates increased over time as they are tightly linked to short-term interest rates (which increased from 1% in 2003 to 5.25% in June 2007). As the Federal Reserve started to increase the short-term rate from June 2004, with

[1]To explain the low volatility of commercial paper spread, Adrian (2017) notes that because commercial banks sponsoring ABCP conduits benefit from formal official sector backstops, their support in terms of liquidity and credit can distort the cost of the conduit's liabilities by leaving investors with the assumption that these liabilities were "ostensibly" safe, so that the required spread was very low.

+0.25% increase in almost all of the following months until June 2006, conduits faced higher and increasing funding costs on their short-term liabilities. As the average maturity of ABCP notes is 30 days, the responsiveness of this liabilities is very high so that the conduits are immediately affected. This mechanism lowered the margins, i.e. the profitability of conduits[2], which is similar to banks' net interest margins, to the extent that the increase in interest rates is not wholly and immediately benefiting the collateral in the conduits' portfolio. The term spread for this period is presented in Figure 2b. The effect of short-term interest rates on term spread is a near perfect negative one-to-one relationship in the US in the period before the crisis, as suggested by Adrian and Shin, (2013). Increasing interest rates did not corresponded to higher longer-term rates and the term spread even turned negative between June 2006 and June 2007. Using aggregate data, Adrian and Shin, (2013) find that increases in the federal funds target rate are generally associated with a slower growth rate of short-term liabilities for financial intermediaries. In a similar fashion, we argue that higher interest rates could create a supply channel negatively associated with ABCP issuance and reduces the marginal profitability of an extra pool financed by the conduit.

[Figure 2 about here.]

We find empirical evidence for both the demand and the supply channel, both on the liability side of ABCP conduits (net ABCP issuance) and on the asset side (net amount of new transactions financed). This suggests that conduits that continued to operate during the pre-crisis period of increasing interest rates were expanding, but under funding stress. In order to disentangle the two channels, we focus on the period around the first increase of the federal funds rate in June 2004 and run a difference-in-difference test to confirm the existence of the funding (supply) channel and validate the assumption that interest rates are a proxy for funding costs. This additional test also reduces endogeneity concerns that decisions on interest rates were directly linked to the increasing amount of credit in the economy, to which ABCP conduits contributed by purchasing assets such as mortgages and mortgage-backed securities. Around June 2004, the ABCP market had not begun its period of exponential growth, as the demand for safe assets from money market funds had yet to

[2]The net profitability of the conduits can be proxied by difference between the rates paid by the ABCP notes and the yield gained on the underlying portfolio, minus the costs related to the fees paid on the liquidity and credit support, the costs for hedging with derivatives on interest rate and exchange rate, and in some cases insurance.

pick up. ABCP conduits' portfolios at the time were relatively small and mainly invested in trade receivables and auto loans. More importantly, this market segment was entirely "in the shadows" for regulators and policy makers, that is, they were scarcely aware of key developments in shadow banking at the time.

Given the evidence of their expansion under funding stress, we can expect that ABCP conduits had to find ways to compensate for the increasing funding constraints to be able to continue to respond to the still growing demand for near-money assets from investors. To this end, we test whether the expansion of ABCPs portfolios is associated with changes in portfolio composition, in terms of rating of the collateral and the type of collateral (asset class) they purchased to support their expansion. We find that both channels increase the demand for CDO, mortgage and mortgage-backed securities and reduce the purchases of more traditional conduits' assets such as trade receivables, auto loans and credit card loans. The funding channel in particular is associated with a lower percentage of AAA-rated collateral in the portfolio. This support a search for yield strategy of shadow banks, which is binding these intermediaries when interest rates are raising. The demand channel drives a substitution within the investment grade assets towards higher-yield assets different from AAA-rated assets (i.e., from A spectrum to B). This mechanism is consistent with the theoretical model of Gennaioli et al., (2013), where the authors argue that at higher level of demand for risk-less debt, intermediaries cannot generate enough collateral with safe projects (which are exhausted) and therefore use risky collateral diversified in pools (whose tail aggregate risks are neglected). The evidence of an increasing share of CDO and MBS in conduits' portfolios is consistent with the narrative of the difficulties faced by conduits to sell off their assets during the run. To better link this evidence to the conduits' exposure to their post-crisis conditions, we test whether the holdings of higher percentages of CDO and MBS is associated with a higher participation in the Term Auction Facility (TAF) established by the Federal Reserve at the end of 2007. We consider the participation in the TAF as a proxy of the sponsoring banks' exposure to the run on their ABCP conduits and thus their liquidity shortages. Our cross-sectional analysis supports the existence of this link, but only for the holdings of mortgages.

Our contributions to the literature are manifold. First, we contribute to the understanding of

the exponential growth of the ABCP market in the run up to the crisis and we identify drivers beyond the regulatory arbitrage hypothesis. To the best of our knowledge, we are the first to empirically support the theoretical literature on shadow banking and combine it with the growing literature on demand for near-money assets and interest rates. The use of granular data on ABCP conduits allow us to investigate both demand- and supply-side channels. We add to the literature with empirical evidence supporting relevant theoretical predictions on the role of money premium but also with novel evidence of an expansion of "under funding stress" fuelled by changes in interest rates.

As the ABCP market's expansion required more collateral, we provide unique evidence that shadow banks were not only suppliers of money-like assets but also buyers of safe assets. Therefore, we also contribute to previous literature that link the recent financial crisis to demand for safe assets (see Acharya and Schnabl (2009); Caballero (2010); Bernanke (2011); Pozsar (2011)). According to these views, the financial crisis was driven by an insatiable demand from the rest of the world for safe, high-quality debt instruments. Our evidence documents that shadow banks as ABCP conduits also contributed to this demand.

Moreover, we are the first to investigate ABCP conduits' portfolio decisions, providing an insight on the drivers behind the build-up of risks in this market. We also contribute to the stream of literature on the bank risk-taking channel of monetary policy suggested by Borio and Zhu (2012) and explored in previous literature with reference to the traditional banking system (Jimenez et al., (2014); Ioannidou et al., 2015). This literature empirically documents that low interest rates are associated with a lower quality of bank lending. In our context, we provide evidence that the increased cost of borrowing created incentives for risk-taking in a sort of "reverse" search for yield, which is binding shadow intermediaries when interest rates are raising.

Our results are relevant to both regulators and policy makers as they shed light on the interaction between monetary policy interventions and changes in the behaviour of financial agents outside the regulated banking sector. Our results also foster a better understanding of the build-up of risks in the shadow banking sector before the global financial crisis, which were ultimately borne

by banks. This issue is particularly relevant in light of current regulatory initiatives aiming to transform shadow banking into a resilient market-based financing to the real economy.

The remainder of this paper is structured as follows. Section 2 provides some institutional background on the ABCP market and on conduits' assets and liabilities. Section 3 describes our empirical design, data and sample. Section 5 reports our main results on ABCP asset and liabilities and on the changes in conduits' portfolio composition. Section 7 concludes.

2 ABCP conduits: Institutional setting

ABCP conduits are an integral part of the shadow credit intermediation process described by Pozsar et al., (2013). The role of the ABCP conduits is the financing of different types of shadow banks performing credit, maturity and liquidity transformation similar to traditional banks.

	Step (1)	Step (2)	Step (3)	Step (4)	Step (5)	Step (6)	Step (7)
Function	Loan Origination	Loan Warehousing	ABS Issuance	ABS Warehousing	ABS CDO Issuance	ABS Intermediation	Wholesale funding
Shadow Banks	Banks Finance Comp.	**Single Seller Multi-seller**	SPV by broker-dealer	**Hybrid**, TRS/Repo broker-dealer	SPV by broker-dealer	SIV, **securities arbitrage**, HFs	2a-7MMFs Cash funds
Shadow Banks Funding	Deposits CP, Bonds	**ABCP**	ABS	**ABCP** Repo	ABS CDO CDO squared	**ABCP**, MTN Repo	$1 NAV shares

Shadow Credit Intermediation Process (Pozsar et al., (2013))

An ABCP conduit is a special-purpose vehicle (SPV) structured to be minimally capitalized, bankruptcy remote and legally separate from its sponsor. ABCP conduits are often established and administered by major commercial banks, finance companies and large manufactures. The purpose of an ABCP entity is limited in its activities to purchasing assets and funding those purchases through the issuance of ABCP notes.

In the United States, the SPV often takes the form of a limited purpose company, established and

organized under the laws of Delaware[3]. In Europe, the typical conduit is organized as a limited purpose corporation under Jersey or Channel Island law, with a charitable trust as owner[4].

ABCP notes are issued against transactions that have been accumulated over time. During the revolving phase, an ABCP conduit typically acquires and retires transactions at the same time as it issues and retires CP (commercial paper)[5]. Conduits generally use the proceeds thereof to pay maturing CP in a process called rolling the CP. The ABCP conduit contains limits on the amount of CP that can be issued in aggregate and against each transaction at any time based on a variety of factors, including the amount of performing assets in the conduit or in the new pool which are defined as the aggregate financing limit and transaction financing limit, respectively.

Rolling the CP typically repays 100% of the principal component of maturing CP. Because of the diversity of the assets that back the conduits' notes and the lack of cash flow matching (which makes them different from a term securitization), third party liquidity provisions are a key determinant of ABCP credit quality and thus for eligibility in the portfolio of institutional investors such as money market mutual funds. Conventional CP issues are typically supported by a line of credit from a commercial bank, generally guaranteeing 102% of the amount of ABCP outstanding [6]. Typically, the sponsoring bank provides such liquidity facility for each transaction to address timing mismatches between payment streams of the assets and the CP maturity dates, or to repay CP investors in the event that CP cannot be rolled, namely a market disruption[7]. Under the Basel I and II frameworks, little capital (or zero in the case of Basel I) was required for liquidity support to banks off-balance sheet asset-backed commercial paper conduits (Adrian, 2017).

The owner of the conduit receives nominal dividend payments and because the SPV does not gen-

[3] An SPV may also be organized as a cooperative corporation, a trust, a limited liability corporation or partnership, or a limited partnership.

[4] Similar structures are possible in other English law jurisdictions such as Bermuda, the Bahamas or the Cayman Islands. In France, the SPV may be organized as a Societe Anonyme.

[5] This is different from a term securitization having a fixed pool of collateral and issuing fixed-income medium-long term bonds with an exact matching of the cash flows between assets and liabilities. While ABCP conduits share certain features with term securitization, they differ in the following ways: conduits investments in assets can be revolving and fluctuate in size; conduits may invest in various asset types, thereby creating diversified portfolios. conduits frequently fund long-term assets by issuing short-term liabilities, relying on liquidity support for potential repayment shortfalls caused by asset and liability timing mismatches; in conduits, there is no scheduled amortization of assets and liabilities since the additional issuance of CP may be used to, and in most cases is expected to, maintain the conduits' investment in assets.

[6] The additional 2% is for the coverage of the interest rates to be paid to investors on the notes issued.

[7] Liquidity facilities generally support a transaction in one of three ways: they may cover the vast majority of risks except for defaulted assets; they may cover a portion of the credit risk by short tailing a transaction; they may fully wrap a transaction by covering all credit risk. Sponsoring banks providing liquidity may use the facility to transfer the transaction out of the conduits for any reason.

erally have any employees, fees are paid to an administrator (normally the sponsoring bank) to manage the flow of CP and funds. The ability to pay fees and dividends depends on the conduits' profitability. The profitability of the conduits results from the difference between the rates paid on the short-term notes issued and the yield gained on the portfolio of underlying assets, minus the costs related to the fees paid for the liquidity and credit support, for hedging interest rate and exchange rate risk, and in some cases insurance.

The set-up of an ABCP conduit enables the originator to benefit from money market financing that it might otherwise not have access to because its credit rating is not sufficiently strong. A bank may also decide to set up an ABCP conduit for balance sheet or funding reasons.

2.1 ABCP assets

The portfolio of an ABCP conduit consists of transactions collateralized by underlying assets. Such assets are referred to as collateral, while the conduits interest in these transactions is referred to as asset interests. The conduit acquires assets via an asset purchase or a secured lending transaction from sellers which is often an SPV of a company or of a bank that is set up to facilitate the conduits acquisition of the transactions. Each transaction that is added to the portfolio must be structured and credit enhanced so that the resulting risk profile of the CP conduit is commensurate with its CP rating. The maintaining of a high short-term rating is necessary to place ABCP notes with Money Market Mutual Funds (MMMFs), so that conduits mostly purchase transactions with highly-rated assets.

The sellers are typically other financial institutions (or their SPV) or non-financial firms (or their SPV), that are unable to access the CP market because of their rating (Lemmon et al., 2014). If the sellers' short-term rating is high enough, they may act as the liquidity providers. If not, one bank or a syndicate, may serve as the liquidity provider. Program wide-credit enhancements (PWCE) are available as a fungible layer of credit support across all transactions[8]. This is the second loss protection which is at conduit-level, as the first loss protection is provided by the seller at the transaction level (i.e., over-collateralization).

[8] An integral part of assessing CP risk profile of a conduit is the size of its PWCE relative to the size and composition of its portfolio of transactions.

Some common assets or asset interests that ABCP conduits finance are trade receivables, auto and equipment loans and leases, credit-card receivables, but include also products of a range of securitization and secured lending techniques. The type of assets in the conduit's portfolio is determined by the type of conduits. the main types of conduits are: multi-seller, single-seller, arbitrage, hybrid and repo.

Multi-seller ABCP conduits, the most traditional type of conduits, provide funding to a multitude of unaffiliated originators/sellers in exchange for asset interests. Individual sellers assets are acquired transaction by transaction, typically accumulating into a diversified portfolio across asset types and industries to support the CP issued by the conduit. They purchase assets with short duration such as receivables and lease, but also temporarily warehouse mortgages until the pool is built. Similarly, Single-seller conduits purchase assets only originated by the sponsoring banks and its subsidiaries.

An arbitrage ABCP conduit mainly finance investments in securities and aims to take advantage of upward sloping yield curve, issuing highly rated paper paying an interest rate less than the yield on the assets backing the notes. The strategy requires the conduit to invest in assets with rating higher than AA to reduce the cost of their financing. Since 2005, some conduits were created to include both the features of the multi-seller and arbitrage conduits, and were defined as hybrid ABCP conduits.

A different type is the repo conduit that issue ABCP whose maturity is matched and secured against highly rated banks. The conduit issues ABCP and re-invests the cash proceeds under a repo with an A-1 / P-1 bank with a matched or shorter maturity than the CP. Effectively, investing in the ABCP issued by a repo conduit is akin to lending money to a diversified portfolio of highly rated banks on a collateralised basis since the investor is a senior creditor to the pool of collateral the banks have pledged. The collateral is held in a Tri-Party account, and is marked-to-market on a daily basis, and held at market standard haircuts (over-collateralised).

For all the types of conduits, the purpose is to minimise regulatory capital requirements of the sponsoring banks and take advantage of the special fiscal and accounting treatment provided by the jurisdiction in which the SPV is based.

2.2 ABCP liabilities

The commercial paper market is a key source of short-term funding for major businesses. CP generally is classified in three categories: non-financial, financial, and asset-backed. Traditional non-financial and financial paper, respectively, are unsecured short-term debt issued by highly rated corporations, including industrial firms, public utilities, bank holding companies, and consumer finance corporations. Companies issued CP as a low-cost alternative to bank loans, as it was exempted from Securities and Exchange Commission (SEC) registration in the pre-crisis period[9], to finance trade receivables and inventories. Similar to Treasury bills, CP is typically issued at a discount, meaning that the buyer pays less than face value and receives face value at maturity and the interest paid is equal to the face value minus the purchase price. Although CP is issued at short maturities to minimize interest expense, many issuers roll over CP by selling new paper to pay off maturing paper. Because of modest credit risk, yields on CP are slightly higher than on Treasury bills of similar maturity. Large denominations and short maturities typically limit the CP market to large institutional investors, such as MMMFs. ABCP trades exactly as conventional CP, but they are issued against transactions that have been accumulated over time. The administration and legal treatment is also more onerous because of the need to establish the CP trust structure and issuing SPV. ABCP tenors are generally limited to 365 days but can be as long as 397. In US market, maturities range up to 270 days but average about 30 days. ABCPs are rated by all major rating agencies. ABCP yields are generally higher that conventional CP and thus higher than Treasury bills yields. Moodys (2009) attributes the yield premium specifically to the lack of transparency, noting that traditional CP is relatively easily understood, while ABCP is issued by an unfamiliar SPV with assets from anonymous sellers.

[9]CP is exempt from SEC registration if the following three criteria are met: (i) the maturity of the paper is less than 270 days, (ii) notes must be of a type not ordinarily purchased by the general public, and (iii) issues must be used to finance current transactions (Hahn, 1998).

3 Research Design and Data

3.1 Empirical Design and Testable Hypotheses

We set up our empirical design to identify the impact of changes in interest rates and in the demand for near-money assets on ABCP's behaviour in the run-up of the financial crisis. We focus on the period between January 2003 and March 2007, corresponding to the exponential growth of the ABCP market. In this period, federal funds rates increased from 1% in 2003 to 5.25% in June 2007 and the institutional cash pools' demand for insured deposits' alternatives reached the highest level ever (Figure 1b). Interest rates and institutional demand are expected to impact ABCP conduits in different ways. We posit that the interest rates channel operates via its impact on the funding cost of the conduits, i.e. the rates paid on the issued notes. Given their short-term maturity and relative low credit risk, commercial paper rates are set by adding a spread to the market short-term rates. This spread is in the order of few basis points and depends on the rating of the conduits, while the largest component of cost is closely dependent on short-term interest rates (Figure 2a). ABCP liabilities are expected to be very responsive to changes in interest rates given the short-term maturity of their issuance (average of 30 days) so that higher interest rates immediately increase the cost of funding for ABCP conduits. To the extent that the longer-term assets they hold are not as responsive as the liabilities and the short-term rates changes are not transferred immediately to longer maturities on the yield curve (Figure 2b), this compresses conduits' margins and leads to an immediate contraction of their liabilities. As the higher funding costs also reduce the marginal profitability of an extra pool financed by the conduit, we should expect a similar contraction in the financing of new transactions.

H1. Supply-side Hypothesis: ABCP conduits decrease the issuances of near-money debt and the financing of new collateral in response to an increase in interest rates.

On the other hand, as suggested by the theoretical literature (Sunderam, 2014), higher demand for near-money assets proxied by the liquidity premium required by the investors (higher premium is associated with higher demand) drives the response of the shadow banking system. Because investors saw ABCP notes and other near-money assets as close substitutes, ABCP conduits met

this demand by manufacturing short-term risk-less debt and thus increased their liabilities. As the manufacturing implies the purchases of new transactions, we should expect an increase in the new collateral financed by the conduit.

H2. Demand-side Hypothesis: ABCP conduits increase the issuances of near money debt and the financing of new collateral in response to an increase in demand.

To avoid potential concerns that ABCP liabilities and assets and macro variables could have stochastic trend that generate spurious correlation between levels of these variables, we run the analyses in a time-differenced specification. A key assumption underlying our identification approach is that interest rate changes are exogenous to ABCP conduits behaviour. In other words, that interest rates did not respond to the expansion of this shadow banking market and more precisely to changes in the amount of ABCP notes issued and the financing of new transactions. Given the peculiar characteristics of these entities (SPV based in special jurisdictions, anonymity of the assets, exemption of the liabilities) and the initiatives taken by policy-makers and regulators to understand and collect data on the shadow banking system only after the financial crisis, we can assume that there was no monitoring in place during our time period. However, one could argue that interest rates changes could be responsive to the assets accumulated in the conduits portfolios, which included CDOs and Mortgage-backed securities. Conduits' financing could have thus contributed to the inflated credit markets' conditions, as those created in the mortgage market in the US economy, which were the target of monetary policy decisions. In this case, endogeneity concerns may persist.

To address this concern and strengthen our identification of a casual link between interest rates and ABCP conduits' behaviour, we run a difference-in-difference test on a short window around the first increase of the federal funds rate in June 2004. In this period, ABCP conduits were far from being in the spotlight of monetary authorities as the ABCP market was very small with only weak evidence of growth in the previous years. More importantly, conduits' smaller portfolios were largely invested in traditional assets such as trade receivables and auto loans. Finally, the demand

from outside investors was at a very early stage of its growth [10]. We focus on different reactions to this funding shock and use as a determinant the condition of the sponsor being headquartered in the US or operating in the USD ABCP market but headquartered in a third country. Our hypothesis is that conduits sponsored by Non-US sponsors may suffer more from the funding shock as they operate on lower margins because of higher operational costs, such as costs for hedging interest rates and exchange risks, fees to dealers and for the provision of liquidity lines in a different currency. Because a conduit has no employees or governance, we note that conduits' behaviour are ultimately decided by the sponsors. Sponsors are directly affected by the lower margins of the conduits because it reduces their ability to pay dividends and fees. Therefore, we focus on this funding constraint at the sponsor-level rather than a conduit-level.

In aggregate, we observe that the market expanded during the period before the crisis, so that the impact of the demand-side channel prevailed. However, we find evidence of the existence of both channels at work, thus suggesting that the ABCP market growth spurred by the demand from outside investors came at an increasing funding costs for the conduits. We call this mechanism "expansion under funding stress". How did conduits manage to expand at higher funding costs?

We empirically investigate one potential strategy of the conduits to remain profitable. This strategy consists in portfolio reallocation towards the financing of higher-yield collateral, to partially compensate for higher costs. This could be consistent with a search for yield, which is binding these intermediaries when interest rates are increasing. Therefore, we test the impact of interest rate changes on the composition of the conduits' portfolios in terms of the rating and type of the collateral. Changes in the composition by ratings provide evidence of a search for yield associated with the changes in interest rates, while changes in the composition by type provide evidence on which type of assets - more traditional as trade receivables and consumer loans, compared to securitization product such as CDO and MBS - were preferred among the higher-yielding assets. This evidence allows us to give support to the narrative that ABCP runs where caused by the investors' fears that the ABCP portfolios had a large exposure to CDO and MBS and that the high illiquidity

[10] After peaking in 2001, the amount of debt securities in the portfolio of money market funds remained stable and even decreased until end of 2005 and then increased until 2007 of about 40%.

of these assets forced the ABCP to draw the sponsoring banks' liquidity lines amidst the run in August 2007. The theoretical literature also predicts an increase in the riskiness of the portfolio of the conduits, driven by the demand of institutional cash pools. As suggested by Gennaioli et al., (2013), when the demand from outside investors is large, shadow banks need to expand their portfolios and start to invest in riskier projects given that the good project become exhausted. We test empirically the following hypothesis:

H3. Risk-Taking Hypothesis: ABCP conduits increase their financing of risky assets when interest rates and demand for near-money assets increase.

A key identification assumption for the risk-taking hypothesis is that the financing of higher-yield collateral is not compensated by a higher spread requested by investors. In other words, as long as the investors realize the higher riskiness of the ABCP conduits' portfolio, they can require higher spreads so that the investment in higher-yield collateral does not produce the effect of compensating the higher funding costs. Unfortunately, we do not have data on the spread paid by each conduit. At aggregate level, Figure 2a reveals that the spreads do not show much volatility in the period before August 2007. At conduit-level, Schroth et al., (2014) report that spreads remained almost constant until the run. In line with Gennaioli et al., (2013), this trend can be explained by assuming that investors neglected the build-up of risks in ABCP conduits' portfolio. Moreover, we notice that in the period 2003-2007 the magnitude of each increase of the federal funds rates was on average 0.25%. Covitz et al., (2013) report that overnight yield spread for the overall market in the first seven months of 2007, ranged between monthly average of 2 and 6 bps. At the height of the run, the spread reached an average of 47 basis point. Even assuming that a higher spread than that reported on average was required by investors because they recognized the higher risk-taking of the conduits, this would not entirely compensate for the cumulative increase in interest rates in our period of study. To support a casual link between changes in the composition of the assets and riskiness of the portfolio, we empirically test the relationship between the holding of collateral whose inclusion in the portfolio increased in line with our hypotheses and the borrowing of the sponsoring banks in the Term Auction Facility of the Federal Reserve in the months after the runs.

3.2 Data Collection and Final Sample

"Data on the shadow banking sector, by its nature, can be more difficult to obtain" (B. Bernanke 2012, Fostering Financial Stability).

Our dataset is based on a hand-collected data sample from S&P Capital IQ's reports on rated ABCP conduits. No data is directly available for ABCP conduits' balance sheets as they are typically set up in special jurisdictions such as Delaware or Cayman Islands for tax reasons. However, their issuances of short-term notes are rated by rating agencies that verify the administration and selection of assets backing them, on inception and frequently thereafter. Rating agencies assign or confirm a short-term rating based on the review of each of the purchase of new collateral (entering transactions) and the credit and liquidity support provided by the seller of the transaction, or by the sponsor. Because the rating of the conduits determines the possibility for the ABCP notes to be bought by money markets funds, conduits' sponsor are willing to share information with rating agencies about their liabilities (amount of ABCP notes issued) and their portfolios. Capital IQs reports contain detailed info on ABCP conduits issuances and on the transactions entering and exiting the portfolios on a monthly basis. Previous research (Schroth et al, 2014; Acharya et al., 2013; Covitz et al., 2013) has mostly relied on Moodys and mainly used data related to conduits' liabilities. Our dataset based on S&P is unique because we hand-collected data on both the liability and asset side, as well as on the institutional features of the conduits (sponsor, liquidity providers, type, rating). The liability data includes the monthly amount of ABCP outstanding and the overall aggregate financing limit, which proxies the amount of collateral in the portfolio but also the maximum amount of debt authorized. The asset side data includes information on the portfolio composition by rating (from AAA, to below investment grade, including not rated and not available categories) and types (such as CDO, mortgage, auto loans, trade receivables and credit cards loans).

We also collected information on portfolio activity, such entering and exiting transactions. For each of these transactions, we collected data on the amount, rating and type of the collateral as well as the amount of ABCP notes issued against. A specific feature of the S&P reports is that they provide information that is aggregate at portfolio-level and not by ABCP issuer entity. Indeed, a

single portfolio (purchasing entity) can be financed by different sub-entities, for instance, issuing in different currencies[11] or issuing different types of notes, such as extendible CP or based in different jurisdictions, but financing the same portfolio of assets. This aggregation reduces our number of units in the sample compared to previous studies, but allows us to observe the financing decisions of the conduits and their risk-taking, avoiding a double counting effect[12].

Capital IQ reports are available from 2002-2003 for a group of conduits which were established in the mid-90-early 2000, but the data reporting and collection has been more intense from 2003 onwards. Unfortunately, for the large majority of conduits, these reports are not available in the period September-October 2007, i.e. right after the collapse of the ABCP market in August 2007. The information contained in the reports are disclosed by the sponsor, which may refuse to make public some information. Depending on the analysts coverage of the ABCP information, we integrate our data with other type of reports available on Capital IQ (market report, rating confirmation report, and so on). We collected data for the USD ABCP markets, where both US and Non-US conduits were active before the crisis. US conduits were sponsored by large US banks but also by many European banks. When available, we collected monthly data, otherwise quarterly. The time horizon spans from January 2003 to June 2007, but we restrict our sample to March 2007 because the info available for June has most likely been reported amidst the run. The final sample for the USD ABCP market is composed of 74 conduits covering about 50% of the total amount outstanding. About half of the conduits in our sample are still operating. Figure 3 show total amount outstanding issued by all the conduits in our final sample and the aggregate average amount outstanding. Both measures confirm that the exponential growth of the market is captured by our sample.

[Figure 3 about here.]

In terms of comparison with previous studies using data from Moodys, we also note that Rule 2a-7 requested ABCP notes to have at least two ratings for MMMFs to purchase them. Thus, our

[11] Most of the programs sponsored by European banks had a European-based vehicle issuing on the European CP market and a US-based co-issuing vehicle issuing on the US market.

[12] An example is Compass Securitization sponsored by Westdeutsche Landesbank Girozentralem, financed by two entities: Compass Securitization Limited based in Europe and Compass Securitization LLC based in US.

coverage of the market is similar to previous studies. Differently from previous studies however, we do not include data on SIVs (Structured Investment Vehicles) and CDOs (Collateralized Debt Obligation) for two reasons, respectively. As to the former, SIVs used to issue ABCP notes but also Medium Term Notes (MTNs) on which we are unable to collect info[13]. As long as SIVs can substitute between ABCP notes and MTNs, we cannot discuss their financing and portfolio choices only with regards to ABCPs notes. Moreover, SIVs tended to be very different in terms of operations and did not require a liquidity support because of lower maturity mismatch[14]. As to the CDOs, given the structure of a term securitization which implies that the pool of collateralized assets is essentially constant over time, their - limited - issuances of ABCP notes tended to remain almost constant over time as there was no on-going entering and exiting of transactions. Variables descriptions are provided in the Appendix. Table 1 presents summary statistics for our final sample.

[Table 1 about here.]

4 Results

4.1 Expansion Under Stress: The impact on ABCP Liabilities

We study the relationship between changes in federal funds rates, our proxy for short-term interest rates, and money premium, our proxy of the demand from institutional investors, on changes in the amount of ABCP notes outstanding, i.e. conduits' liabilities. Our baseline specification is as follows:

$$\Delta log(ABCP)_{ijt} = F_i + \lambda_t + \beta \Delta fed\ rate_t + \gamma \Delta (Tbill - OIS)_t + \delta X_{ijt-1} + \epsilon_{ijt} \quad (1)$$

where $ABCP_{ijt}$ is the total amount outstanding and $\Delta \log(ABCP)_{ijt}$ is the net issuance of ABCP notes for each conduit i, sponsored by bank j in month t. $\Delta\ fedrate_t$ is the monthly change in the federal funds rate and our proxy for funding costs. $\Delta\ Tbill - OIS_t$ is the monthly change

[13]Covitz et al (2013) report 35 SIVs which accounted for 7% of the market before the collapse in 2007, and 36 CDO conduits which account for 4% of the market. MTNs financed about 21% of the assets of the SIVs.

[14]SIVs invested in floating rate assets or fixed rate assets swapped to floating assets. Thus changes in the term structure of interest rate had minimal effect on their net asset value. The conduit could survive an inverted yield curve environment because both assets and liabilities were based on short-term interest rates. Moreover, because of the lack of liquidity providers, SIVs operated under stricter limits on the ratings and liquidity characteristics of their assets.

for the difference between the yield on 3-months Treasury bills and the Overnight Indexed Swap (OIS) rate, our proxy for demand from money market investors. This spread captures the money premium that investors are willing to pay for the monetary services offered by money-like claims, so that a lower spreads indicates a higher demand from investors. [15] To support our hypothesis of a funding channel, that an increase in interest rates reduces the issuance of ABCP notes, we expect the coefficient β to be negative and significant. To support our hypothesis of a demand-side channel, that an increase in the demand of money-like assets increases the issuance of ABCP notes, we expect the coefficient γ to be negative and significant. To address a potential concern that interest rates might proxy for general macro trends in the data we include quarter-year fixed effects, λ_t. To account for any time-invariant conduit characteristics, we include conduit fixed effect F_i. X_{ijt-1} includes $\Delta log(ABCP)_{ijt-1}$ and $log(ABCP)_{ijt-1}$.

To avoid potential concerns that ABCP liabilities and macro variables could have stochastic trend that generates spurious correlations between levels of these variables, we run the analyses in a time-differenced specification. Table 2 presents summary statistics and correlations between our key variables. Our proxies for the funding and the demand-side channels have a correlation equal to 14%. Our measure for the money premium is net of the expected average of federal funds rate proxied by OIS, so that it captures information in the Treasury bill yield not driven by the overall level of short-term interest rates.

[Table 2 about here.]

Given the structure of our panel data (large T relative to N) and the dynamic nature of our dependent variable, we use the iterative bootstrap-based bias-corrected fixed effect estimator proposed by De Vos et al.,(2015) based on Everaert and Pozzi (2007). Standard errors are adjusted for global cross-sectional dependency to account for any cross-sectional dependence of residuals due to the commonality of interest rates and liquidity premium across conduits. Results are shown in Table 3.

[15] A similar specification is used by Sunderam (2015) for aggregate data analysis.

[Table 3 about here.]

Column (1) shows the results of the estimation of equation (1), when our proxy for the funding channel is included, $\Delta fedrate_t$. The results support the supply-side hypothesis, as the coefficient β is negative and significant. Larger changes in short-term interest rates are associated with a reduction in the issuance (in excess of the roll-over) of ABCP notes. Similarly, Column (2) shows the results of estimating equation (1), when our proxy for the money premium is included. The results support the demand-side hypothesis, as the coefficient γ is negative and significant. Larger changes in the demand from money market investors (lower spread) are associated with an increase in the ABCP conduits' liabilities. Column (3) presents results for the full model in equation (1), where we test supply and demand channels contemporaneously. We provide evidence that the demand side channels dominated in the years before the crisis so that the ABCP market expanded while interest rates increased.

Nagel (2016) suggests a more general effect of interest rates on the liquidity premium of near-money assets: higher interest rates imply higher opportunity costs of holding money and hence a higher premium for liquidity services benefits of assets that are close substitute for money. This theory predicts that higher interest rates should increase the demand for near-money assets as ABCP notes. We assume this mechanism to be less immediate that the change in the cost of funding, and therefore use as a proxy the lagged change in the federal funds rate. Based on these predictions, we add to the model in equation (1) the lagged change of the federal funds rate. The results of this specification are shown in Column (4). We find a positive and significant coefficient for the lagged interest rates with the ABCP net issuances, while the (specific) liquidity premium on the 3-months Treasury bills remains significant.

Table 4 presents a battery of additional tests. Columns from (1) to (3) present the results of equation (1) augmented with additional controls for the funding and supply channels, where the variable of interest is our proxy for funding cost. In Column (1), we add funding-side controls such as the lagged value of the change in conduits' aggregate financing limit, the capacity of utilization which proxies for the leverage and the portfolio turnover, which proxies for the level of portfolio

activity of the conduit. In Column (2), we include also macro-variables such as the GDP, the VIX, a proxy for credit spreads on securitized assets (Credit Trend) and the exchange rate USD to Euro [16]. In Column 3 we include additional fixed effects for the short-term rating of the conduit to capture the different ability to react to shock depending on the ratings, but also that higher rating conduits face higher demand than lower rating conduits. In all three specifications, we find a negative and significant coefficient for our proxy of funding costs, i.e. the change in the federal funds rate, supporting the supply-side hypothesis.

Columns from (4) to (6) present the results of equation (1) augmented with the additional supply and demand-side controls and rating fixed effects, where our variable of interest is the spread between Treasury bill yield and OIS, our proxy for the demand-side channel. In all three specifications, we find a negative and significant coefficient for the spread, supporting the hypothesis that a lower spread (higher money premium) increases the demand of money-like assets to which the conduits respond issuing more.

Finally, Column (7) presents the results for the full model in equation (1), where the proxies for the supply-side and demand-side channels are included contemporaneously, augmented with the additional controls for the funding channel, additional macro-variables to control for other demand-side drivers and the rating fixed effects. In line with previous estimations in Table 3, we find a negative and significant coefficient for the spread on the Treasury bill yield, while the coefficient for the federal funds rate is negative but insignificant. The overall expansion of the ABCP market is driven by the demand from money market investors, overcoming the negative effect of raising funding costs, as suggested by the theoretical literature and supported by the evidence from the market.

[Table 4 about here.]

One could argue that the ABCP market expansion was mainly driven by new players entering the market because of the large demand and thus greater opportunity for money market financing and/or that these conduits, such as repo conduits, may have some unobserved characteristics allowing them to respond to the demand without the same funding constraints (for instance, by taking advantage of the change in accounting rules described by Acharya et al., (2013). Table 5 presents

[16] The inclusion of the exchange rate USD/Euro is motivated by the large number of European banks sponsoring conduits operating in the USD market.

the results of our baseline regression in equation (1) for a sub-sample of conduits that entered the ABCP market before 2004 [17]. We find similar results to our previous specifications. In Column (1), we find that the coefficient of the federal funds rate is negative and significant, supporting the funding hypothesis of an negative impact of raising interest rate on conduits' liabilities because of higher costs. In Columns (2), we find that the coefficient of the spread on Treasury bill yield is negative and significant, supporting the demand-side hypothesis of an increase in near-money debt by shadow banks when investors are willing to receive a lower yield on Treasury bills as their value more the liquidity benefits offered by these near-money assets (higher liquidity premium). In Column (3), we test for the funding and demand-side channel contemporaneously and find the prevailing effect of the demand-side channel. Overall, we can exclude that our results are driven by the new entrants in the market as the channels have their impact on long-established conduits in the market.

[Table 5 about here.]

4.2 Difference-in-difference test

To mitigate endogeneity concerns that interest rates decisions may be affected by ABCP behaviour indirectly via the holdings in their portfolio of loans and securitization-related assets whose market was booming before the crisis, we run additional tests to strengthen our identification.

We focus on the ABCP market in June 2004, when the federal funds rate was first increased after a relatively long period of low and flat rates. We note that back in 2004, the ABCP market was small and conduits held a very small fraction of mortgages and securitized assets. This period is before the boom of the securitization market and before the raising demand from MMMFs. Figure 5 illustrates that the largest types of collateral for our sample in that period are trade receivables and auto loans. We use the first federal funds rate increase as a shock to the funding costs of the conduits to isolate the funding channel. We exploit the variation in the funding constraints of the conduits. We posit that some conduits operate on lower margins, because of higher operational costs, which makes them more funding constrained than others. These conduits are expected to be more affected by the increase in interest rates, forcing them to reduce their issuances more

[17] The starting date of the conduits' operations corresponds to the date of the first rating. Overall, 7 are excluded from the sample, including repo conduits.

than other conduits. We focus on sponsor-level funding constraints, as the sponsor is ultimately responsible for the behaviour of the conduit and dependent on the performance of the conduits for dividend payments. We split our sample between conduits operating with a non-US sponsor and conduits sponsored by US banks [18]. We expect the former to incur in higher costs and thus to operate with lower margin, because of the additional fees related to derivative transactions to cover interest and exchange rates, to the provision of liquidity lines in different currencies and higher costs related to the placing of paper through a dealer [19]. The specification of the difference-in-difference model is the following:

$$log(ABCP)_{ijt} = \alpha + F_i + \beta POST_t + \gamma US\ Sponsor_i + \lambda POST_t \cdot US\ Sponsor_i + \epsilon_{ijt} \qquad (2)$$

where $log(ABCP)$ is the log of total amount outstanding of ABCP notes for conduit i, sponsor j and month t. $POST$ is equal to one for every month after June 2004 and $US\ Sponsor$ is equal to 1 for US-sponsored conduits, and 0 otherwise. To account for time-invariant characteristics of the conduits, we include conduit-type fixed effects F_i is (multi-seller, single-seller, arbitrage, hybrid, repo). Standard errors are clustered by time. In our analysis, we consider two POST-windows: a longer one of six months and a shorter one of four months. Our window of interest is the shorter window, as the the impact on the funding costs is expected to be immediate. However, given the further increases in the rates in the following months [20], we first assess the overall effect and then constrain the analysis to the initial shock. The sensitivity of the liabilities is expected to be highest soon after the shock because the assets in the portfolio were originated in the previous low-and-flat interest-rate environment and pooling and purchasing of new assets requires time. We define a pre-shock window of the same length.

Before presenting the results of the difference-in-difference test, we need to verify the following

[18] Most of the Non-US sponsor are European banks. We notice that the eonia rate is almost flat during the periods investigated in the difference-in-difference tests.

[19] As reported in Anderson and Gascon (2009), large banking organizations that also distribute wholesale liabilities, such as certificates of deposits, place their paper directly. The cost of developing an in-house distribution system are less than the costs of placing paper thorough a dealer. However, a smaller sponsor may need a dealer to place its paper if it lacks the name recognition and high reputation to attract investors or its issuance are too limited to build its own distribution system .

[20] The first raise in June 30 was followed in the same year by other increases in August, September, November and December. Each of them increased the previous target rate of 0.25%.

assumptions. First, we discuss the overall effect of the shock and verify whether it is exogenous. Secondly, we discuss the pre-trend assumption. Figure 4a presents ABCP notes outstanding and the aggregate financing limit around the rate increase in June 2004. We notice a sharp reduction in the conduits' liabilities but not in their assets. This excludes the alternative explanation that the reduction in the issuances is due to the decision of the conduits to reduce their portfolio of assets and suggests that the reduction is driven by factors that are exogenous to the portfolio activity.

[Figure 4 about here.]

Table 6 presents the results ofthe estimation of an OLS regression based on equation (2) but without the interaction term US Sponsor X POST, where we test whether and how (all) ABCP conduits were affected by the increase in funding costs after June 2004 (POST). Column (1) and (3) present the results of our regressions using as dependent variable the amount of ABCP notes outstanding and a six and four months windows around the shock, respectively. Column (2) and (4) present the results when we replicate the same analyses using as dependent variable the aggregate financing limit, i.e. the aggregate value of collateral in the conduit's portfolio.

[Table 6 about here.]

In Columns (1) and (3), we find a negative and significant coefficient for POST, confirming a negative reaction of conduits' liabilities over both horizons. In Columns (2) and (4), we find a positive and insignificant coefficient, suggesting that there is no immediate negative impact on the portfolio of the conduits deriving from the funding shock. Therefore, we can conclude that the reduction in the ABCP outstanding is not driven by the decision of the conduits to reduce their portfolio of assets.

We now turn to the discussion of the pre-trend assumption. Figure 4b presents the ABCP amount outstanding for the two samples of US-sponsored conduits and Non-US sponsored conduits. Graphically, the two groups show similar behaviour before the shock, confirming that the pre-trend assumption holds, i.e. in absence of the shock the two groups would have continued to issue following a similar trend as before. Instead, their behaviour diverges soon after the rate increase in June 2004.

Table 7 presents the results for our difference-in-difference estimation for the short window of four months before and after the shock in June 2004. In Column (1) present the regression results for equation (2) without fixed effects. We find that the coefficient of US Sponsor x POST is positive and significant. Non-US sponsored conduits issue less ABCP notes after the funding cost increases in June 2004 compared to US sponsored conduits. Column (2) reports the results when the specification includes Conduit-type fixed effects as in equation (2). We find a positive and significant coefficient for the interaction terms US Sponsor x POST. In Column (3), we presents the regression results of an augmented specification of equation (2), including additional time-invariant controls at the conduit-level. We find that the coefficient for our variable of interest is lower, but still positive and significant at 10%. Finally, Column (4) present the regression results that we obtain by saturating the previous specification in Column (3) with other relevant competing interaction effects, which include proxies for funding constraints at conduit-level (lower rating, Non-US assets, arbitrage conduit-type) to control for channels operating through the conduits rather than the sponsor. We find that the coefficient of interest US Sponsor X POST remains positive and significant even after controlling for all these other constraints[21].

[Table 7 about here.]

Overall, the results from our difference-in-difference test provide strong evidence in support of the supply-side channel. They show a casual link between changes in interest rates, our proxy for funding costs, and the conduits' short-term liabilities, which are less likely to be affected by endogeneity concerns on the indirect impact of ABCP portfolio holdings on monetary authorities' decision on interest rates.

4.3 Expansion Under Stress: The impact on ABCP Assets

Recall that the intermediation function of ABCP conduits consists in the issuances of short-term risk-less debt against a pool of collateral purchased from large firms and other financial institutions. The issuance of new notes is conditional on the financing of these new transactions, i.e. on more collateral entering the portfolio of the conduits. Because of this mechanism, we expect the demand-side channel and the funding channel to impact also the decision to finance new transactions. Higher

[21] Results are robust to the inclusion of time and conduit fixed effects (unreported tables).

demand of near-money assets from money investors (lower spread on Treasury bill) is expected to drive the demand for more collateral, while higher funding costs are expected to either decrease the amount of collateral entering or even increase the amount of collateral exiting. To capture this portfolio activity, we construct a new variable Net which is equal to the difference between the total financing limit of all the new transactions entering the portfolio minus the total financing limit of the transactions exiting the portfolio for each each given month. Differently from the change in the amount of ABCP notes outstanding, this measure captures the additional expansion or contraction of the portfolio based on the value of the collateral in the portfolio. To assess the impact of our proxies of the demand-side and supply-side channels on the portfolio activity of the conduits, we design the following specification:

$$Net_{ijt} = F_i + \lambda_t + \beta \Delta fed\ rate_t + \gamma \Delta (Tbill - OIS)_t + \delta X_{ijt-1} + \epsilon_{ijt} \tag{3}$$

where Net_{ijt} is the net amount of collateral entering the portfolio for each conduit i, sponsored by bank j in month t. $\Delta\ fedrate_t$ is the monthly change in the federal funds rate and our proxy for funding costs. $\Delta\ Tbill - OIS_t$ is the monthly change for the difference between the yield on 3-months Treasury bills and the Overnight Indexed Swap (OIS) rate, our proxy for demand from money market investors. To support our hypothesis of a funding channel, that an increase in interest rates reduces the purchase of collateral, we expect the coefficient β to be negative and significant. To support our hypothesis of a demand-side channel, that an increase in the demand of money-like assets (lower spread) increases the entering of more collateral in the portfolio, we expect the coefficient γ to be negative and significant. To address a potential concern that interest rates might proxy for general macro trends in the data we include quarter-year fixed effects, λ_t. To account for any time-invariant conduit characteristics, we include conduit fixed effect F_i. X_{ijt-1} includes $\Delta log(ABCP)_{ijt-1}$ and $log(ABCP)_{ijt-1}$, to controls for the changes in liabilities in the previous period and the market size of the conduit, respectively.

Equation (3) differs from Equation (1) due to the different dynamic nature of the dependent variables. In equation (1), the dependent variable is the change in the amount of commercial paper outstanding of the conduits' liabilities. The amount outstanding of ABCP notes is a variable char-

acterized by the dynamics created by the continuous roll-over of the commercial papers and has a strong dependence on its past levels. The variable Net, our proxy of portfolio activity, is already defined in differenced terms as it captures the additional transactions entering or exiting and it is not determined on its past level. Therefore, we adopt a OLS regression to estimate equation (3)[22].

Table 8 presents the regression results. In Columns (1) to (3), we test for the funding channel and then add the demand side channel. We find a negative and significant coefficient for our proxy of the supply-side channel in Column (1) and in Column (2), when we add as an additional control the change in the ABCP notes in the previous period. An increase in interest rates is associated with a reduction in portfolio activity as less collateral is purchased by the conduit. In Column (3), we test for the supply and demand-side contemporaneously[23]. We find a negative and significant coefficient for the spread over the Treasury bill yield, while the coefficient for our proxy of the conduit's funding costs, the federal funds rate, is negative but insignificant. In line with the evidence on the conduits' liabilities, these findings suggests that the demand of near-money assets from money market investors drives the expansion of the portfolios of the conduits via the acquisition of more collateral, thought the cost of funding these purchases has increased. One could argue that the absolute amount of new collateral entering could be irrelevant depending on the size of the portfolio. To address this concern, in Column (3) to (6), we use as dependent variable the percentage of Net over the aggregate financial limit of the portfolio. This variable captures the amount of collateral entering as a proportion of the overall portfolio. Larger values of $Net\%$ indicate that the new collateral entering or the existing collateral exiting is a significant part of the overall portfolio. Column (4) presents regression results for the funding channel, where the dependent variable is $Net\%$. In Column (5) we add the change in previous funding as a control variable. We find negative and significant coefficients for the change in the federal funds rate in both specifications. In Column (6), we test for the funding and demand channel in the same specification. We find that only the coefficient of the proxy of the liquidity premium is significant

[22] As a robustness check, in unreported tables we estimate equation (1) with Net as dependent variables using the bootstrap-based bias-corrected fixed effects model for dynamic panels proposed by De Vos et al., (2015) based on Everaert and Pozzi (2007) and find similar results to the regression results for Equation (3).

[23] For ease of exposition, we do not report the results for the demand-side channel separately. In an reported tables, we find that the coefficient for the variable $Tbill - OIS$ is negative and significant in all specifications where Net or $Net\%$ is the dependent variable, in line with our hypothesis on the demand-side channel driving the expansion of the portfolio of the conduits.

and negative. As the demand increases, conduits increase the percentage of new collateral on their portfolios. Overall, these results confirm that the impact of the supply and the demand-side channels is not limited to the conduits' liabilities and thus to the response of the shadow banking system in terms of the manufacturing of near-money assets. We provide strong evidence that both channels also affect the conduits' assets, with a prevailing effect of the demand-side. To be able to manufacture the short-term safe asset for the growing demand from money market investors, conduits in turn increase their demand for collateral. Money market funds' regulation in the pre-crisis period constrained the funds to invest mostly in short-term money instruments with the higher short-term rating. Therefore, to a large extent, the demand for collateral we have evidence for is a demand for safe collateral, which ensured the maintaining of the conduit's high rating. To the best of our knowledge, this is the first empirical evidence of a demand for safe collateral from the shadow banking system.

[Table 8 about here.]

4.4 Changes in Portfolio Composition

We turn the analysis to the impact of the changes in interest rates and money premium on the compositions of the ABCP conduits' portfolios. Based on our evidence of an expansion under funding stress, in this part of the analysis we aim to capture the strategy (in terms of changes in the rating distribution and type of collateral) put in place by the conduits to expand while remaining profitable. For each quarter, we collect data on the percentage of holdings of the portfolio for each rating category and type of collateral. The rating categories range from AAA to Below Investment Grade, and include Not Rated and Not Available category. We decide to include these opaque categories in the analysis because in this context they may provide valuable information. According to S&P, Not Rated category indicates that no rating has been requested, or that there is insufficient information on which to base a rating, or that S&P Global Ratings does not rate a particular obligation as a matter of policy. The Not Available category is even more opaque category and is likely to refer to loans, in particular to consumers loans.

Types of collateral include traditional assets such a trade receivables, auto loans, consumer loans

and credit cards but also securitized assets such as CDO and Mortgage-backed securities[24]. Again, we also have a more opaque type, reported as Other, which we include in the analysis[25]. Summary statistics for our sample of ABCP conduits' portfolios are reported in Table 9. The sample runs quarterly from June 2004 to March 2007.

[Table 9 about here.]

We notice that the largest percentage of the portfolio is invested in AAA-rated collateral, about 32% on average, followed by investments in other investment grade categories. Below Investment grade collateral only represents about 10% of the portfolio on average, with maximum value of 38%. However, a significant part of the portfolio is composed of collateral for which the rating is either Not Available or not requested because of the lack of information. The largest type of collateral over the entire period is Mortgage, 17% on average, followed by Trade receivables, CDO, Auto loans and Others. Figure 5 reports the evolution over time of the percentage of holdings of the portfolios by rating category and type.

[Figure 5 about here.]

We notice a strong portfolio reallocation between 2004 and 2005, while the overall composition of the conduits remains quite constant in aggregate from 2006. In terms of type of collateral, we notice again a portfolio reallocation before 2005. Moreover, we see the increase in the holdings of mortgages from the first quarter of 2005, when also CDO holdings started to be reported. Other category also shows a strong increase since 2005. The percentage for more traditional assets, as Trade receivable, Auto loans and Commercial loans, is quite flat over time. To assess the effect of our proxies for supply and demand-side channels on the composition of the portfolio, we define the following specification:

$$\Delta\ \%\ Portfolio\ Holdings_{ijt} = F_i + \lambda_t + \beta \Delta fed\ rate_t + \gamma \Delta (Tbill - OIS)_t + \delta X_{ijt-1} + \epsilon_{ijt} \quad (4)$$

where the dependent variable $\Delta\%Portfolio\ Holdings\_ijt$ is the change in the holdings of a given type of collateral or the holdings for a given rating category for for each conduit i, sponsored

[24] S&P Capital IQ include both MBS and warehoused mortgages in the same type of collateral.

[25] OTHER is a S&P category and not a residual category assembled by us. Other type of collateral were excluded because of the lack on sufficient information, among them we have equipment loans, student loans, lease and leasing.

by bank j in quarter t. $\Delta\ fedrate_t$ is the quarterly change in the federal funds rate and our proxy for funding costs. $\Delta\ Tbill - OIS_t$ is the quarterly change for the difference between the yield on 3-months Treasury bills and the Overnight Indexed Swap (OIS) rate, our proxy for demand from money market investors. To address a potential concern that interest rates might proxy for general macro trends in the data we include half-year fixed effects, λ_t. To account for any time-invariant conduit characteristics, we include conduit fixed effect F_i. X_{ijt-1} includes $log(ABCP)_{ijt-1}$ as a proxy of the market size of the conduits. In the analysis on the changes in the composition by rating category we also control for different risk-taking ability of the conduits by adding rating fixed effects. Rating Fixed effects are motivated by the fact that conduits with different ratings may have access to different sets of investment opportunities, for instance, in terms of the support they can offer.

To support our hypothesis of a risk-taking channel created by the ABCP market's expansion under funding stress, we expect that an increase in interest rates, i.e. higher funding costs, leads to a higher increase in collateral with lower credit quality (higher-yielding collateral). Moreover, we expect that a rising demand from money market investors lead conduits to reallocate the portfolio towards collateral with lower rating but within the investment grade category to maintain their ratings.

Table 10 provides the results of OLS regressions of Equation (4) where the dependent variable is the quarterly change in the percentage of holdings for different rating class. All specifications include time, conduit and rating fixed effects. Standard errors are two-way clustered by conduits and year. In Columns (1) to (3), the dependent variable is the change in the percentage holdings of AAA-rated assets, i.e. the largest holdings of the portfolios. In Column (1), we test for the supply-side hypothesis and find a negative and significant coefficient for the change in the federal funds rate. An increase in funding costs is associated with lower holdings of AAA-rated assets, suggesting a search for yield strategy adopted by the conduits when interest rates are increasing. In Column (2), we present the results of a regression testing for the demand-side hypothesis separately. We find no evidence of an increase in the holdings of higher quality collateral when the demand increases. In Column (3), the effect of the funding channel disappears, driven by the overall insignificant effect of the demand-side channel. Overall, these results confirm our risk-taking hypothesis of a portfolio reallocation towards higher-yield collateral. Column (4) to (8), presents the results

of regressions where the dependent variable is the change in the percentage of holdings for rating categories other than AAA, in order of lower credit quality. All regressions include our proxies of funding costs and of the liquidity premium contemporaneously. We find that higher interest rates are also associated with lower holdings of other investment grade and below investment grade assets, in favour of holdings of collateral for which the rating is Not Available. This suggests that the funding channel leads to an overall reallocation of the portfolio towards lower credit quality and more opaque collateral. As to the demand side channel, we find that a lower spread on Treasury bill is associated with a decrease of holdings of investment grade collateral in favour collateral with lower ratings, carrying higher yields. Also in this case, the demand for near-money assets increases the holdings of more opaque collateral for which the rating is Not Available. While the evidence of a funding channel creating incentives for more risk-taking of shadow banks is novel in the literature, the evidence on the demand side is consistent with Gennaioli et al., (2013). The authors predict that high demand for risk-less debt drives shadow banks response by providing incentives to buy risky assets, as the good collateral has become exhausted and banks try to diversify risk through the pooling and tranching of assets.

[Table 10 about here.]

Based on this evidence of a search for yield strategy created by higher funding costs and a reallocation of the portfolio towards lower quality and more opaque assets created by the demand for money-like assets, we extend the analysis to uncover the impact of the supply and demand-side channels on the composition of the portfolio by type of collateral. Table 11 presents the results of OLS regressions of Equation (4) where the dependent variable is the quarterly change in the percentage of holdings for each type of collateral[26]. Our proxies for the funding and the demand channels are included simultaneously. We find a positive and significant coefficient for the federal funds rate when the dependent variable is the change in the percentage of holdings of CDO (Column (2)), Consumer loans (Column (4)) and Mortgage (Column (7)), while there is no significant coefficient for all others types of collateral. This suggests that higher interest rates lead to a reallocation of the portfolio from more traditional assets such as trade receivables and auto

[26]The results are robust to the inclusion of rating fixed effects.

loans to securitization-related assets. As to the demand-side channel, we find that a lower spread on the Treasury bill yield (a higher demand) is associated with a portfolio reallocation in terms of larger changes in the holdings of mortgages and consumer loans, as the coefficient is negative and significant in Column (2) and Column (7). We also find evidence for an increase in the holdings of commercial loans and CDO when the demand increases. While is not possible to define the different collateral types in terms of risks as we miss information on their yields, the results on the change in the composition of the portfolio by collateral type suggest that increasing funding costs and demand created incentives to substitute more traditional, simple and short-term type of collateral, such as receivables, with collateral which were more opaque but presumably carried higher yields, such as CDOs and MBS. In the next section, we aim to test whether the holdings on these more opaque (and illiquid) collateral is related to the exposure of the conduits to runs in August 2007.

[Table 11 about here.]

4.5 Sponsors' Borrowing from the Term Auction Facility

To further extend our analysis on the risk-taking of the conduits, we aim to establish a link between the holdings of CDOs and Mortgages, whose expansion in the portfolio of the conduits has been established in the previous section, and the exposure of the conduits' to the runs in the ABCP market in August 2007. As a proxy of the exposure to runs of the conduits, we collect data on the number of collateralized loans that the sponsors borrowed from the Term Auction facility (TAF). The Term Auction Facility of Federal Reserve was established on December 2007, soon after the ABCP market collapse, to promote the distribution of liquidity when unsecured bank funding markets were under stress. Only depositary institutions were eligible and all depositary institutions that sponsored conduits in our sample participated into the facility. To the extent that the changes in the portfolios of the conduits are the results of a risk-taking strategy, we posit that higher holdings of CDO and MBS should be positively associated with the sponsoring banks need for liquidity during the run. We proxy this liquidity need by the number of loans granted by the TAF to the sponsoring banks, $No.\ of\ TAF\ loans$. We test this hypothesis with a simple cross-sectional regression, where the dependent variable is the number of loans from the TAF and

our variable of interests are the percentages of holdings of CDO and MBS in conduits' portfolio at the end of December 2006. We add other conduit-level variables to control for the riskiness of the conduits (the rating, the arbitrage conduit-type, the number of liquidity providers).

Table 12 presents OLS cross-sectional regression for the sample of ABCP conduits operating in December 2006 whose sponsor was a depositary institution. Our sample is composed of 42 conduits. Robust standard errors are reported. In Column (1) we find a positive and significant coefficient for the percentage of Mortgage. Larger holdings of Mortgage in the portfolio at the end of 2006 lead to a higher needs of liquidity from the TAF. In Column (2), we do not find evidence for the holdings of CDO. In Column (3) we add the holdings in CDO and in Mortgage contemporaneously, and find a positive and significant coefficient for the holdings in mortgages. We conclude that the riskiness of the portfolio seems to be strongly dependent on the investment in MBS, which is consistent with the narrative of the investors' fears in August 2007 that ABCP conduits had large exposure to the US house market.

[Table 12 about here.]

5 Conclusions and Further Analyses

The ABCP market was a core short-term funding market before its collapse in August 2007, playing a unique role in the growth of shadow banking and in the inter-connectness between this system and the regular banking system. It can be argued that the collapse of this market trigged the start of the financial crisis before the default of Lehman Brothers. This market is also of on-going interest to policy-makers because of its connections to other markets and its inherent systemic risk. Regulation such as Dodd-Frank Act and Basel III have increased the monitoring on the entities operating in this market - ABCP conduits - and more importantly on the exposure of banks to these entities, initially set-up to exploit regulatory loopholes. Using a unique data set of ABCP conduits operating in the USD ABCP market over the period 2003-2007, we provide strong evidence that interest rates and money premium help to explain the exponential growth of this market and their increased sensitivity to runs. On the one hand, we find evidence of a demand-side channel, confirming the theoretical literature, that higher money premium increases the demand for money-like instruments to which the shadow banking system responded by manufacturing more asset-backed

commercial papers, seen as close substitutes of Treasury bill and other money instruments. We also find evidence that this spurred the demand for safe collateral from the shadow banking system. In addition, we provide novel evidence of a supply-side channel showing that this expansion was realized under funding stress, because higher short-term interest rates increase the funding costs of the conduits and lower their margins.

Further analyses provide evidence that the two channels affect portfolio reallocation of the conduits, as conduits search for yield to retain their profitability. During the expansion, conduits invested a lower percentage in collateral with rating AAA when interest rates were raising. Moreover, conduits substituted safer collateral (with rating category around A) with riskier collateral (rating categories around B) when the demand for near-money assets increased. In terms of collateral types, both channels are associated with an increased in the percentage of holdings of MBS and CDO. However, in particular, the holdings of MBS increased conduits' vulnerability to runs and the need for sponsoring banks to access facilities from the Federal Reserve soon after the collapse on the ABCP market.

There are several avenues for future research. The analyses conducted in this paper have assumed that the impact of interest rates on the behaviours of conduits is to a large extent independent from the impact on sponsoring banks. The risk-taking channel literature suggests that low interest rates affect the quality not just the quantity of bank lending and fuel the build-up of risks in banks' balance sheet. This in turn incentives banks to use of securitization to transfer risk off their balance sheet. Therefore, an alternative explanation of our results is that ABCP conduits expanded because of the need of the sponsoring bank to distribute MBS and CDO which ended up into conduits' portfolio because they were able to transform them into near-money assets whose demand was increasing. This narrative, however, implies that lower interest rates, via an increase bank risk taking, should lead to conduits expansion of holdings of CDO and MBS. We notice that we find an opposite mechanism, as an increase in interest rates via the increase in funding costs is associated with risk-taking of the conduits. However, further analyses could investigate the role of the sponsors and sponsors' risk-taking to provide evidence of an extended credit intermediation that starts within banks balance and continues in the shadow banking credit intermediation, as discussed by Poszar et al., (2013).

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Table 1: Summary Statistics - Our Sample of ABCP conduits

ABCP Total Amount Out. (Mil. $)	N	Mean	SD	Min	p25	Mdn	p75	Max
2003	615	6102.56	5121.4	266	2617	5027	7666	30867
2004	693	5928.51	4275.47	304	2711	4769	7744	22785
2005	799	6010.3	4390.66	51	2649	5072	8776	25849
2006	846	6748.25	5061.94	12	2935	5713.5	9902	27775
2007m3	204	7139.27	5195.72	305	2961	5980	10463	27086
Total	3157	6281.02	4768.69	12	2695	5239	8693	30867
US Sponsor	1119	7769.67	4259.9	268	4436	7705	10599	30867
Non-US Sponsor	2038	5463.65	4836	12	2320	4132	6901	27775
A-1+ (High Rating)	2115	6865.83	5071.43	12	3268	5661	9141	30867
Below A-1+	1042	5094.01	3821.98	149	2282	3842	7188	19107
Multi-seller	2400	6194.63	4114.09	12	3161	5526	8358	30867
Hybrid, Repo, Arbitrage, Single	757	6554.93	6412.72	152	2136	3659	10826	27775
US-asset	2120	6666.43	4053.08	250	3480	6055	8888	30867
Non-US asset	1037	5493.11	5894.85	12	1344	3347	7205	27775

Net Collateral (Mil. $)	N	Mean	SD	Min	p25	Mdn	p75	Max
2003	614	117.26	614.73	-2425	0	0	191	10436
2004	665	123.68	350.8	-1587	0	0	200	2265
2005	766	209.91	958.5	-6714	-9	0	225	15509
2006	812	250.11	802.14	-3555	0	47.5	331.5	11399
2007m3	195	21.26	493.35	-1414	-53	0	0	3415
Total	3052	171.12	723.96	-6714	0	0	227.5	15509

This table presents summary statistics for our sample of ABCP conduits operating on the USD ABCP market between January 2003 and March 2007. Monthly data.

Table 2: Key Variables - Correlation Matrix

	Δ $fed\ rate_t$	Δ $fed\ rate_{t-1}$	Δ $(Tbill - OIS)_t$	$log(ABCP)_t$	Δ $log(ABCP)_t$
Mean	0.09	0.09	−0.01	8.4	0.01
SD	0.1	0.1	0.08	0.89	0.08
Min	−0.21	−0.21	−0.25	2.48	−0.14
Max	0.25	0.25	0.19	9.53	0.2
$\Delta\ fed\ rate_t$	1				
$\Delta\ fed\ rate_{t-1}$	0.59*	1			
$\Delta\ (Tbill - OIS)_t$	0.14*	−0.13*	1		
$log(ABCP)_t$	−0.02	−0.02	0.00	1	
$\Delta\ log(ABCP)_t$	−0.01	0.04*	−0.08*	0.02	1

This table presents summary statistics and pair-wise correlations for the key variables used in this paper. $fed\ rate$ is the federal funds rate, our proxy for the funding costs. $(Tbill - OIS)$ is the spread of 3-month Treasury bills over 3-month overnight indexed swap (OIS) rate, our proxy for demand for money-like assets. $log(ABCP)_t$ is log of the Amount of ABCP notes outstanding. The sample runs monthly from January 2003 to March 2007. Significance level: * $p < 0.05$

Table 3: ABCP Net Issuance - Dynamic Panel Analyses

	(1) $\Delta\ log(ABCP)_t$ β / SE	(2) $\Delta\ log(ABCP)_t$ β / SE	(3) $\Delta\ log(ABCP)_t$ β / SE	(4) $\Delta\ log(ABCP)_t$ β / SE
$\Delta\ log(ABCP)_{t-1}$	-0.047^{**}	-0.048^{**}	-0.048^{**}	-0.049^{***}
	(0.019)	(0.019)	(0.019)	(0.019)
$\Delta\ log(ABCP)_{t-2}$	-0.003	-0.003	-0.003	-0.002
	(0.019)	(0.019)	(0.019)	(0.019)
$log(ABCP)_{t-1}$	-0.052^{***}	-0.053^{***}	-0.053^{***}	-0.053^{***}
	(0.005)	(0.005)	(0.005)	(0.005)
$\Delta\ fed\ rate_t$	-0.073^{***}		-0.012	0.023
	(0.026)		(0.030)	(0.034)
$\Delta\ (Tbill - OIS)_t$		-0.095^{***}	-0.091^{***}	-0.094^{***}
		(0.019)	(0.021)	(0.021)
$\Delta\ fed\ rate_{t-1}$				0.076^{**}
				(0.029)
Time FE	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes
Observations	2859	2859	2859	2859
No. of Conduits	74	74	74	74

This table reports estimations based on iterative bootstrap-based bias correction for the fixed effects model for dynamic panels proposed by De Vos et al., (2015) based on Everaert and Pozzi (2007). Standard errors are adjusted for global serial correlations. All variables - except rates - are winsorezed at 5%. Significance levels:
$^{*}\ p < 0.10, \quad ^{**}\ p < 0.05, \quad ^{***}\ p < 0.01$

Table 4: ABCP Net Issuance - Dynamic Panel Analyses - Additional Tests

	(1) $\Delta\ log(ABCP)_t$ β / SE	(2) $\Delta\ log(ABCP)_t$ β / SE	(3) $\Delta\ log(ABCP)_t$ β / SE	(4) $\Delta\ log(ABCP)_t$ β / SE	(5) $\Delta\ log(ABCP)_t$ β / SE	(6) $\Delta\ log(ABCP)_t$ β / SE	(7) $\Delta\ log(ABCP)_t$ β / SE
$\Delta\ log(ABCP)_{t-1}$	-0.061^{***}	-0.060^{***}	-0.065^{***}	-0.062^{***}	-0.062^{***}	-0.067^{***}	-0.067^{***}
	(0.020)	(0.020)	(0.022)	(0.020)	(0.019)	(0.022)	(0.022)
$\Delta\ log(ABCP)_{t-2}$	0.000	0.000	-0.015	0.001	0.001	-0.015	-0.015
	(0.018)	(0.018)	(0.022)	(0.018)	(0.018)	(0.022)	(0.022)
$log(ABCP)_{t-1}$	-0.050^{***}	-0.050^{***}	-0.044^{***}	-0.051^{***}	-0.051^{***}	-0.044^{***}	-0.044^{***}
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)
$\Delta\ fed\ rate_t$	-0.092^{***}	-0.090^{***}	-0.075^{***}				-0.022
	(0.026)	(0.027)	(0.029)				(0.032)
$\Delta\ (Tbill - OIS)_t$				-0.114^{***}	-0.115^{***}	-0.092^{***}	-0.086^{***}
				(0.01)	(0.020)	(0.021)	(0.023)
$\Delta\ log(Fin.Limit)_{t-1}$	0.018	0.018	0.042^{**}	0.017	0.017	0.041^{**}	0.041^{**}
	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.017)	(0.017)
$Capacity_{t-1}$	-0.082^{***}	-0.082^{***}	-0.098^{***}	-0.083^{***}	-0.083^{***}	-0.099^{***}	-0.099^{***}
	(0.019)	(0.019)	(0.022)	(0.018)	(0.018)	(0.022)	(0.022)
$PF\ Turnover_{t-1}$	0.136^{***}	0.136^{***}	0.149^{***}	0.134^{***}	0.134^{***}	0.147^{***}	0.147^{***}
	(0.043)	(0.043)	(0.048)	(0.043)	(0.044)	(0.048)	(0.048)
US GDP		-0.001	0.003		0.003	0.007	0.007
		(0.007)	(0.007)		(0.007)	(0.007)	(0.007)
VIX		-0.003^{**}	-0.003^{**}		-0.002	-0.002	-0.002
		(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
Credit Trend		-0.056	-0.015		0.079	0.093	0.095
		(0.107)	(0.113)		(0.110)	(0.115)	(0.115)
US EUR exch. rate		0.229^{***}	0.219^{***}		0.158^{**}	0.158^{**}	0.164^{**}
		(0.077)	(0.079)		(0.078)	(0.080)	(0.080)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	No	No	Yes	No	No	Yes	Yes
Observations	2628	2628	2191	2628	2628	2191	2191
No. of Conduits	68	68	58	68	68	58	58

This table reports estimations based on an iterative bootstrap-based bias correction for the fixed effects model for dynamic panels. Adjusted Standard errors for global serial correlations. Conduit variables are winsorezed at 5%. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 5: ABCP Net Issuance - Dynamic Panel Analyses - Old Players

	(1) $\Delta\ log(ABCP)_t$ β / SE	(2) $\Delta\ log(ABCP)_t$ β / SE	(3) $\Delta\ log(ABCP)_t$ β / SE	(4) $\Delta\ log(ABCP)_t$ β / SE
$\Delta\ log(ABCP)_{t-1}$	-0.062^{***}	-0.062^{***}	-0.062^{***}	-0.063^{***}
	(0.018)	(0.018)	(0.018)	(0.018)
$\Delta\ log(ABCP)_{t-2}$	-0.002	-0.001	-0.001	-0.001
	(0.019)	(0.019)	(0.019)	(0.019)
$log(ABCP)_{t-1}$	-0.052^{***}	-0.053^{***}	-0.053^{***}	-0.053^{***}
	(0.005)	(0.005)	(0.005)	(0.005)
$\Delta\ fed\ rate_t$	-0.065^{**}		-0.005	0.035
	(0.027)		(0.030)	(0.035)
$\Delta\ (Tbill - OIS)_t$		-0.093^{***}	-0.091^{***}	-0.095^{***}
		(0.019)	(0.021)	(0.021)
$\Delta\ fed\ rate_{t-1}$				0.086^{***}
				(0.030)
Time FE	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes
Observations	2718	2718	2718	2718
No. of Conduits	66	66	66	66

This table reports estimations based on an iterative bootstrap-based bias correction for the fixed effects model for dynamic panels. Adjusted Standard errors for global serial correlations. Conduit variables are winsorezed at 5%. Significance levels: $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Table 6: ABCP conduits' reaction to FED rate increase in June 2004

	(1) $log(ABCP)_t$ β / SE 6 months	(2) $log(Fin.Limit)_t$ β / SE 6 months	(3) $log(ABCP)_t$ β / SE 4 months	(4) $log(Fin.Limit)_t$ β / SE 4 months
US Sponsor	0.293***	0.215***	0.308***	0.251***
	(0.014)	(0.037)	(0.015)	(0.041)
Non-US Assets	−0.407***	0.088**	−0.385***	0.106***
	(0.029)	(0.029)	(0.035)	(0.027)
High rating (A-1+)	0.637***	0.599***	0.622***	0.596***
	(0.013)	(0.007)	(0.015)	(0.009)
POST	−0.042***	0.008	−0.033**	0.020**
	(0.011)	(0.008)	(0.013)	(0.006)
Conduit-type FE	Yes	Yes	Yes	Yes
Observations	684	684	455	455
R^2	0.263	0.202	0.262	0.209

This table reports OLS estimations for different periods around the federal funds rate increase in June 2004. Standard errors are clustered by time. Conduit types are Multi-seller, Single-seller, Arbitrage, Hybrid. Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 7: Difference-in-Difference: US vs Non-US Sponsored Conduits

	(1) $log(ABCP)_t$ β / SE	(2) $log(ABCP)_t$ β / SE	(3) $log(ABCP)_t$ β / SE	(4) $log(ABCP)_t$ β / SE
US Sponsor	0.401***	0.310***	0.291***	0.305***
	(0.016)	(0.014)	(0.016)	(0.006)
POST	−0.049***	−0.051***	−0.039**	−0.082***
	(0.011)	(0.011)	(0.013)	(0.019)
US Sponsor x POST	0.041**	0.044**	0.030*	0.060**
	(0.017)	(0.014)	(0.014)	(0.020)
High rating (A-1+)			0.601***	0.574***
			(0.016)	(0.014)
Non-US Assets			−0.391***	−0.350***
			(0.035)	(0.027)
Arbitrage x POST				0.093
				(0.067)
High rating (A-1+) x POST				0.084***
				(0.016)
US Sponsor x Non-US Assets				−1.808***
				(0.033)
Non-US Assets x POST				−0.065*
				(0.031)
Constant	8.278***	7.722***	7.485***	7.488***
	(0.007)	(0.039)	(0.042)	(0.042)
Conduit-type FE	No	Yes	Yes	Yes
Observations	455	455	455	455
R^2	0.068	0.113	0.270	0.282

This table reports OLS estimations for a 4-month period before and after the federal funds rate increase in June 2004. Standard errors are clustered by time. Conduit types are Multi-seller, Single-seller, Arbitrage, Hybrid. Results are robust to the inclusion of time and conduit fixed-effects (unreported table). Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 8: Net Amount of Collateral Entering the ABCP Portfolio

	(1) Net β / SE	(2) Net β / SE	(3) Net β / SE	(4) Net % β / SE	(5) Net % β / SE	(6) Net % β / SE
$log(ABCP)_{t-1}$	−36.319	−43.668	−45.046	−0.027***	−0.030***	−0.030***
	(28.867)	(33.073)	(33.069)	(0.010)	(0.010)	(0.010)
$\Delta \log(ABCP)_{t-1}$		2.246	5.568		0.008	0.009
		(52.187)	(53.077)		(0.009)	(0.009)
$\Delta\ fed\ rate_t$	−348.669**	−361.303**	−134.677	−0.056**	−0.058***	−0.026
	(165.689)	(165.493)	(192.768)	(0.021)	(0.021)	(0.021)
$\Delta\ (Tbill - OIS)_t$			−339.018***			−0.048***
			(84.751)			(0.011)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.10	0.10	0.07	0.07	0.07
Observations	2973	2898	2898	2973	2898	2898
No. of Conduits	72	72	72	72	72	72

This table reports OLS estimation for the period from January 2003 to March 2007. The dependent variables is the difference between the amount of new collateral entering the portfolio of the conduit and amount exiting for each month. In Columns (4) to (6) this difference is in percentage terms of the overall portfolio. Conduits variables are winsorized at 5%. Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 9: Summary Statistics for ABCP Portfolios Holdings (%)

	N	Mean	SD	Min	p25	Mdn	p75	Max
AAA	522	0.32	0.33	0	0.07	0.17	0.56	1
AA A	545	0.22	0.18	0	0.09	0.18	0.3	1
BBB BB B	438	0.17	0.14	0	0.05	0.14	0.25	0.6
Below Investment	388	0.1	0.08	0	0.04	0.08	0.15	0.38
Not Rated	380	0.25	0.23	0	0.06	0.16	0.42	1
Not Available	432	0.19	0.21	0	0	0.12	0.32	0.88
Auto	510	0.17	0.12	0	0.09	0.15	0.24	0.69
CDO	466	0.17	0.21	0	0.03	0.09	0.25	1
Commercial	424	0.11	0.12	0	0.03	0.07	0.16	0.79
Consumer	421	0.08	0.07	0	0.03	0.07	0.1	0.53
Credit Cards	454	0.15	0.11	0	0.06	0.14	0.22	1
Trade	544	0.17	0.16	0	0.04	0.14	0.24	0.95
Mortgage	579	0.2	0.2	0	0.06	0.14	0.31	1
Other	537	0.17	0.2	0	0.04	0.11	0.2	1

The Table reports summary statistics for the holdings of different types of collateral and rating categories for our sample of ABCP conduits as percentage of the portfolio. The data are quarterly and span from 2004q2 to 2007q1.

Table 10: ABCP Portfolio Composition by RATING of Collateral

	(1) Δ AAA β / SE	(2) Δ AAA β / SE	(3) Δ AAA β / SE	(4) Δ AA A β / SE	(5) Δ BBB BB B β / SE	(6) Δ Below/NR β / SE	(7) Δ Not rated β / SE	(8) Δ NA β / SE
$log(ABCP)_{t-1}$	−0.012	−0.012	−0.012	−0.018	−0.016	0.017	0.011	0.033
	(0.015)	(0.015)	(0.015)	(0.011)	(0.013)	(0.020)	(0.018)	(0.033)
Δ $fed\ rate_t$	−0.075**		−0.236	−0.527**	0.239	−0.734***	−0.003	0.603**
	(0.025)		(0.228)	(0.199)	(0.139)	(0.170)	(0.195)	(0.257)
Δ $(Tbill - OIS)_t$		−0.095	0.311	0.989**	−0.522**	1.269***	−0.065	−0.954*
		(0.076)	(0.443)	(0.336)	(0.214)	(0.335)	(0.451)	(0.478)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.178	0.177	0.179	0.111	0.135	0.168	0.151	0.124
Observations	432	432	432	460	376	420	312	401

This table presents OLS estimation on quarterly data from 2004q2 to 2007Q1. The dependent variable in each column is the change in the percentage of holdings of a rating category to total assets. Standard errors are clustered by quarter and conduit. Conduits variables are winsorized at 5%. Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 11: ABCP Portfolio Composition by Type of Collateral

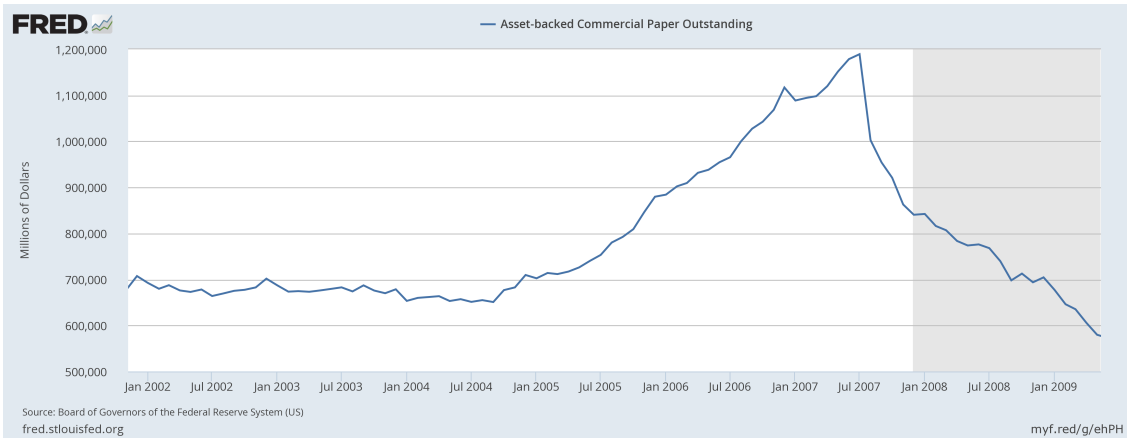
	(1) Δ Auto β / SE	(2) Δ CDO β / SE	(3) Δ Commercial β / SE	(4) Δ Consumer β / SE	(5) Δ Credit cards β / SE	(6) Δ Trade β / SE	(7) Δ Mortgage β / SE	(8) Δ Other β / SE
$log(ABCP)_{t-1}$	0.025**	0.002	−0.027	−0.020*	−0.004	0.026	−0.034	−0.006
	(0.006)	(0.027)	(0.013)	(0.008)	(0.006)	(0.014)	(0.017)	(0.023)
Δ $fed\ rate_t$	−0.065	0.251**	−0.020	0.481***	−0.017	−0.114	0.558***	−0.219
	(0.071)	(0.061)	(0.013)	(0.035)	(0.068)	(0.077)	(0.077)	(0.104)
Δ $(Tbill - OIS)_t$	0.134	−0.479*	−0.028**	−0.933***	0.100	0.259	−1.172***	0.494**
	(0.117)	(0.159)	(0.007)	(0.079)	(0.110)	(0.131)	(0.105)	(0.132)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conduit FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.125	0.199	0.176	0.284	0.108	0.107	0.169	0.208
Observations	444	455	376	363	405	476	517	460

This table presents OLS estimation on quarterly data from 2004q2 to 2007Q1. The dependent variable in each column is change in the percentage of holdings for a collateral. Standard errors are clustered by quarter and conduit. Conduits variables are winsorized at 5%. Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

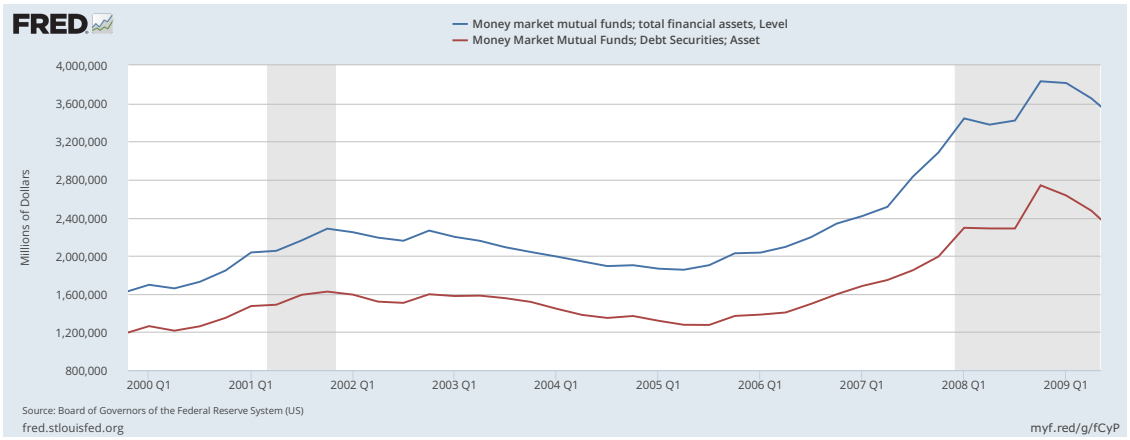
Table 12: Participation in Fed Term Auction Programme

	(1) No. TAF loans β / SE	(2) No. TAF loans β / SE	(3) No. TAF loans β / SE
A-1+	-1.274^{***}	-0.931^{***}	-1.221^{***}
	(0.303)	(0.288)	(0.305)
Arbitrage	-0.198	-0.111	-0.260
	(0.292)	(0.543)	(0.343)
Liq. providers (ln)	0.061^{**}	0.043	
	(0.028)	(0.029)	
Mortgage (%)	3.088^{***}		3.328^{***}
	(0.820)		(0.776)
CDO (%)		1.711	-1.159
		(1.852)	(1.384)
Constant	2.878^{***}	3.160^{***}	3.186^{***}
	(0.251)	(0.242)	(0.192)
N	42	43	40
R^2	0.371	0.171	0.324

This table reports OLS cross-sectional regressions for the sample of conduits operating in December 2006. The dependent variable is the log of the total number of loans a sponsor of a conduit has borrowed under the Term Auction Facility established by the Federal Reserve in December 2007, i.e. after the ABCP collapse in August. Mortgage and CDO variables are the percentage of holdings in the conduits' portfolio reported at December 2006. The number of conduits is reduced because only depositary institutions were eligible for the facility. Significance level:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

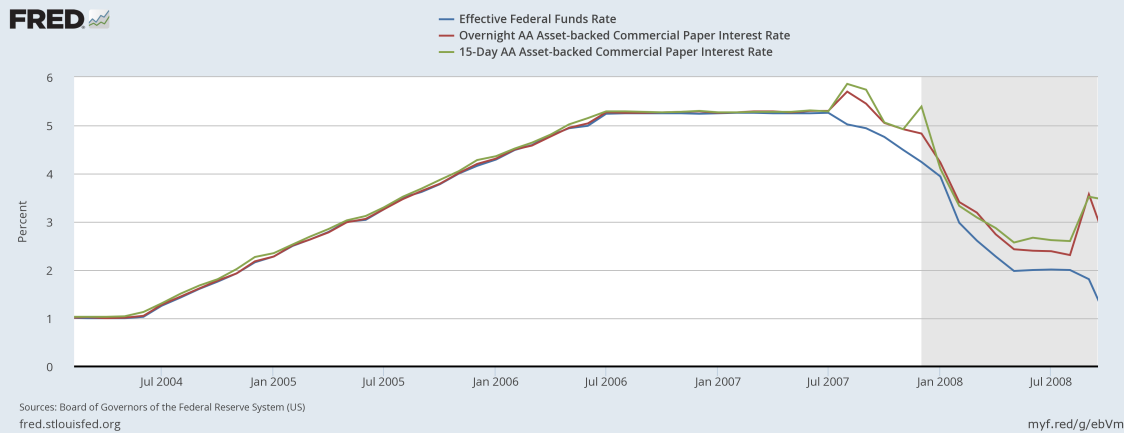


(a) Growth of Asset backed Commercial Paper Market in US in the run-up of the 2007-2008 crisis

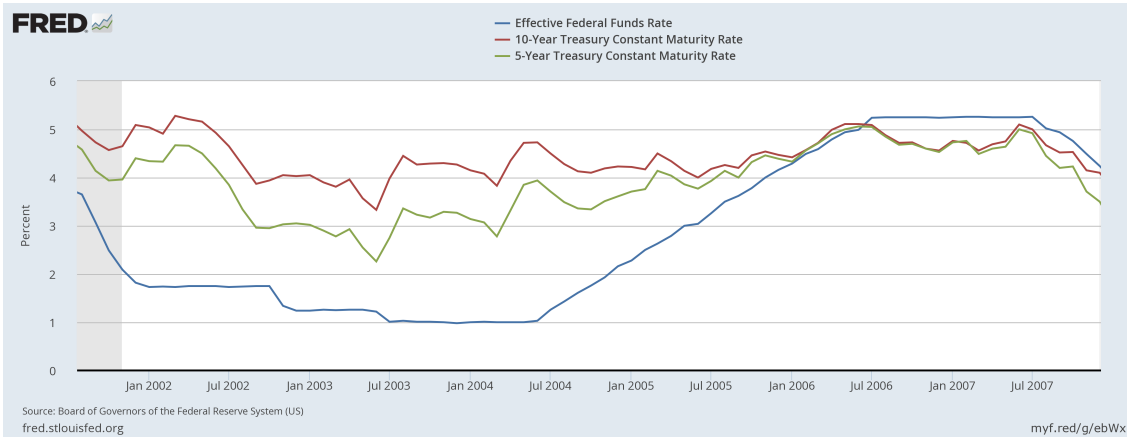


(b) Growth Money Market Funds - Total Financial Assets

Figure 1: Asset Backed Commercial Paper Market and MOney Market Funds Assets.
The Figure presents (a) the expansion of ABCP market (Amount Outstanding in mil.$) in US and (b) the expansion of financial assets held in the Money Market mutual Funds in the period before the financial crisis. Money Market Mutual Funds are major investors in commercial papers and asset backed commercial papers.

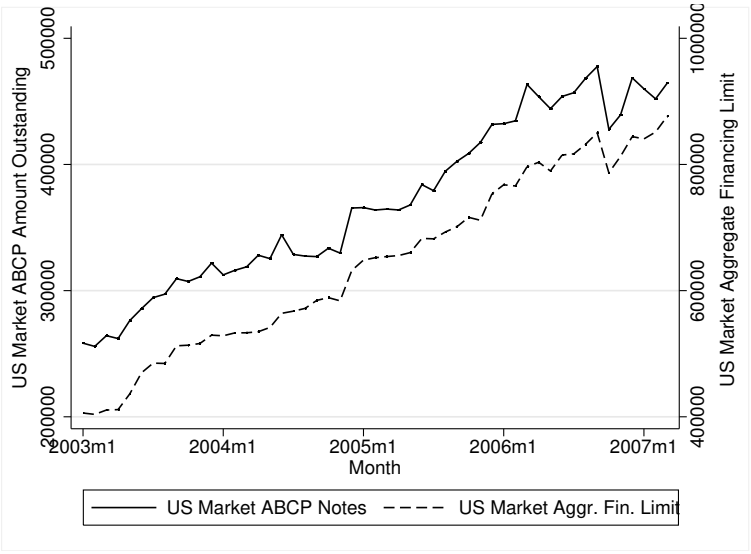


(a) ABCP rates and Federal fund rates

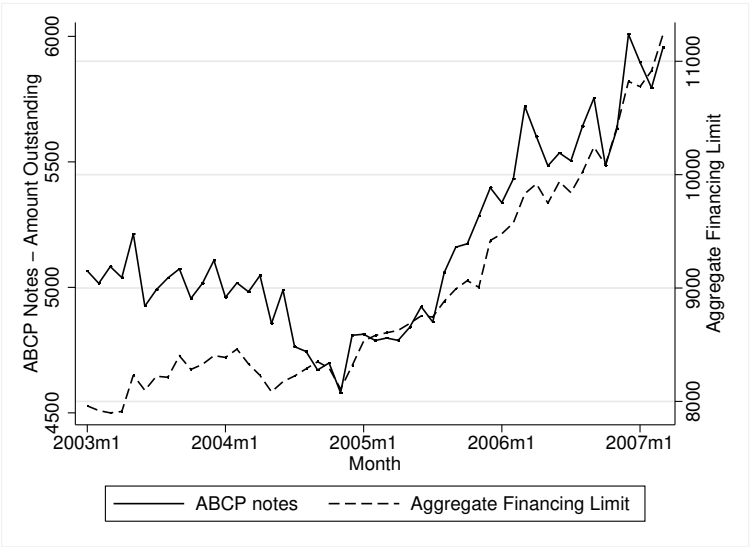


(b) Term Spread

Figure 2: Interest rates and Asset-Backed Commercial Paper rates.
The Figure presents (a) the federal funds rates and the ABCP commercial rates overnight and 15-days maturity. The difference between federal funds rates and ABCP rates is a proxy of the additional spread required by the money market investors. The panic spread in the ABCP market in August 2007, widening the spread; (b) the components of the term spread for different maturities: the 10-year Treasury Constant Maturity Rate, the 5-year Treasury Constant Maturity Rate and the effective federal funds rate. The difference between longer maturity and shorter maturity is the term spread. Changes in short-term interest rates impact the yields of other maturities along the yield curve. In the period before the ABCP market run the term spread is negative.

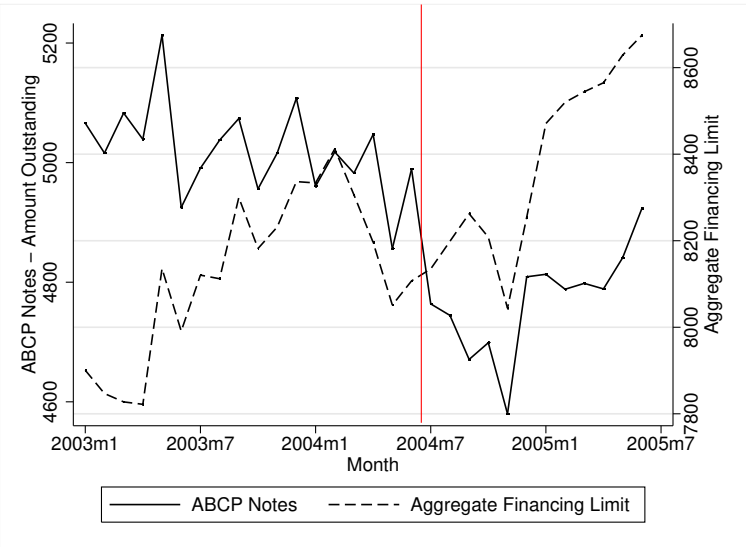


(a) Aggregate Amount of ABCP Outstanding and Financing Limit (Portfolio) (mil.$)

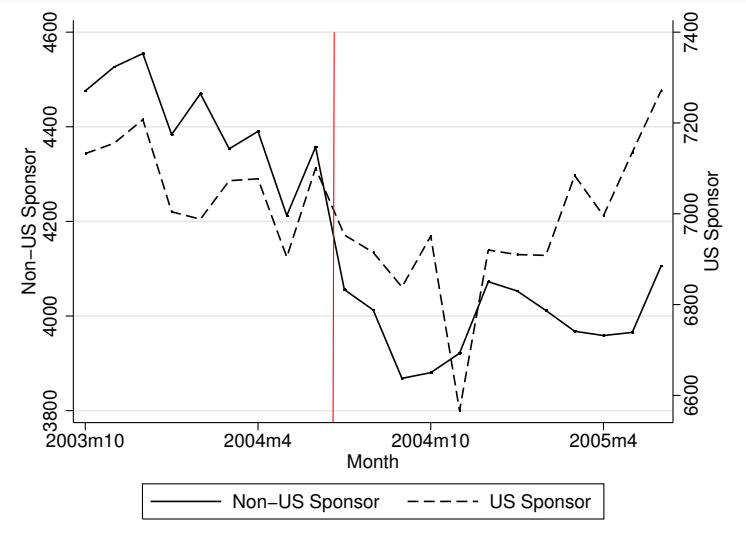


(b) Average Amount of ABCP Outstanding and Financing Limit(Portfolio) (mil.$)

Figure 3: Our sample of ABCP Conduits.
The figure presents (a) the aggregate amount of ABCP notes issued by the conduits in our sample and the aggregate value of the collateral in the portfolio backing the issuances; (b) the average amount of ABCP notes issued by the conduits in our sample and the average value of the collateral in the portfolio backing the issuances. Our sample covers about 50% of the ABCP market in the months before the crisis. We exclude SIVs and CDO conduits because of their different operations compared to ABCP conduits. The number of players increases over time, and in particular repo conduits entered the market after 2005.

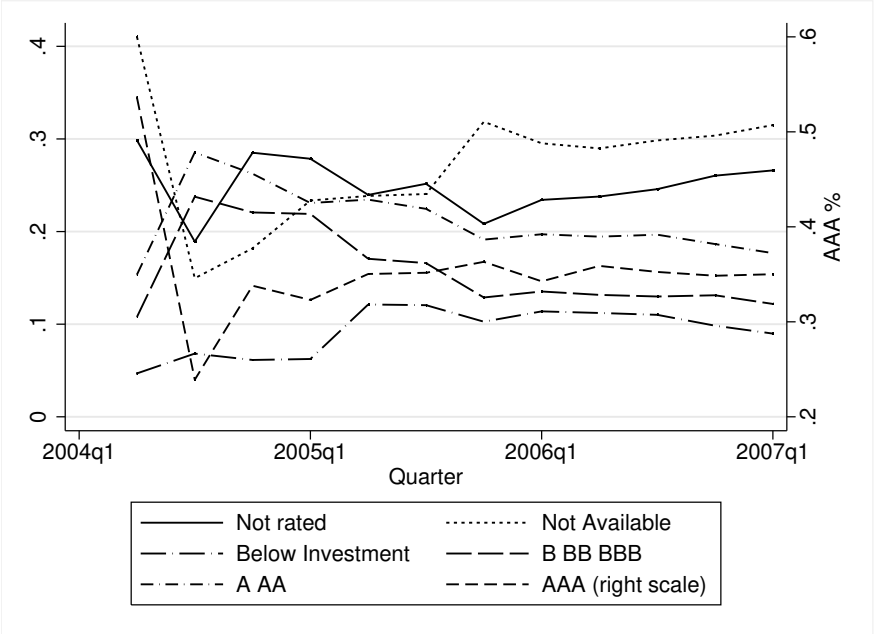


(a) ABCP outstanding and Financing Limit around the federal funds rate increase in June 2004 - Average in mil$

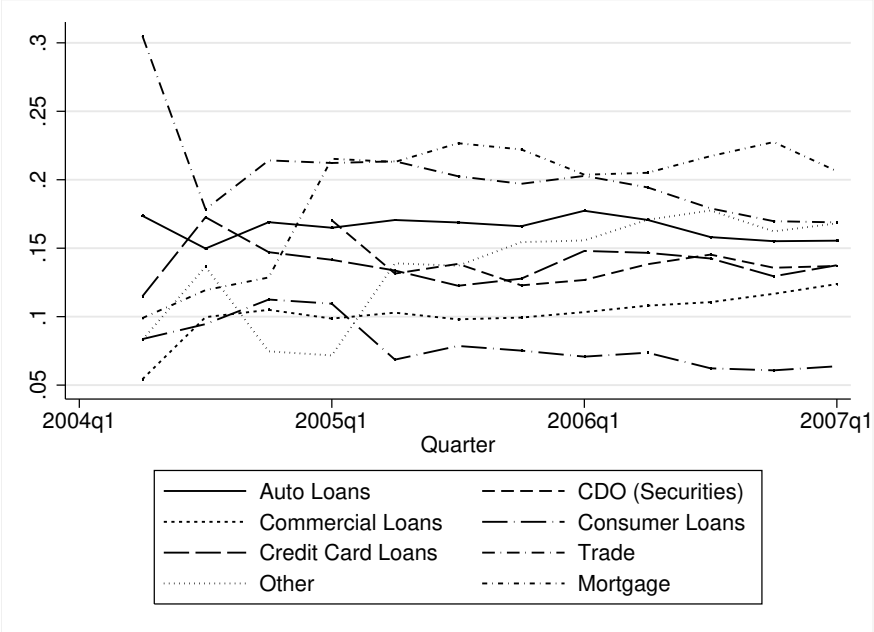


(b) ABCP outstanding for US and Non-US sponsored conduits around the FED rate increase in June 2004 - Average in mil$

Figure 4: ABCP conduits' behaviour around the federal funds rate increase in June 2004.
The Figure presents (a) ABCP market around the Fed decision to increase the interest rate in June 2004 (red line); (b) the amount outstanding of ABCP notes for the sub-samples of conduits sponsored by US banks and Non-US banks. The figure (a) shows the negative impact of the change in the interest rate on the ABCP market but not a reduction in the amount of collateral in the portfolio. The figure (b) shows a parallel pre-trend between the two sub-samples before the shock.



(a) Portfolio Composition by Rating of Collateral



(b) Portfolio Composition by Type of Collateral

Figure 5: Portfolio Composition of ABCP Conduits over the period 2004q2 to 2007q1.
The Figure presents (a) the evolution of the percentage of holdings of the portfolio of the conduits in terms of rating category; (b) the evolution of the percentage holdings of the portfolio of the conduits in terms of collateral types.

Appendix A Variables description

Table A.1: Variables Definitions

Variables	Description	Frequency
Conduit variables		
$log(ABCP)$	Log of Amount of ABCP notes outstanding (mil \$) issued by the conduit and backed by the portfolio. The conduits portfolio consists of transactions/sellers collateralized by underlying assets. In a typical ABCP conduit, maturing CP is paid down with the proceeds of newly issued CP. During the revolving phase, an ABCP conduit typically acquires and retires transactions at the same time as it issues and retires CP (Liabilities).	Monthly
$\Delta\ log(ABCP)$	Net Financing proxied by the change in log (ABCP).	Monthly
$Log\ (Finan.Limit)$	Log of Aggregate Financing Limit (mil \$). It is the maximum amount of ABCPs notes that an ABCP conduit is authorized to issue by a rating agency. It is defined as the sum of the financing limit of each transaction/collateral in the portfolio. Actual ABCP amount outstanding could be significantly less than the authorized amount. ABCP may be issued up to the authorized amount only if sufficient credit enhancement and liquidity support are available (Assets).	Monthly
Capacity	Capacity of Utilization. It is defined by S&P as the ratio between the amount of ABCP outstanding and the Aggregate Financing limit of the conduit.	Monthly
PF Turnover	Portfolio Turnover is equal to the difference between the number of transactions entering the portfolio and the transactions of seller exiting the portfolio divided by the total number of seller at a given time.	Monthly
Net	Net Amount of Collateral Entering. The difference between the total financing limit of the transactions/collateral entering the portfolio minus the total financing limit of the existing transaction exiting the portfolio. All new transactions entering the conduits are subject to review by the rating agency.	Monthly
Net %	Net Amount of Collateral Entering divided by the Aggregate Financing Limit of the portfolio.	Monthly

Table A.1: Variable Definitions - Continued

Variables	Description	Frequency
Conduit variables		
Liquidity provider	Log of the Number of Liquidity Providers. Typically the sponsor of the conduit is the liquidity provider. Some conduit may have more than one liquidity providers. Liquidity support is required by the rating agency for potential repayment shortfalls caused by asset and liability timing mismatches.	Quarterly
US Sponsor	A dummy equal to 1 if the sponsor of the conduit is a bank headquartered in US. The sponsor is identified at the parent-company level.	-
Non-US Assets	A dummy equal to 0 if the conduit is listed by S&P as a US conduits and 1 if it is listed as an EMEA (Europe, Middle East, Africa) ABCP conduit. A US-conduit has its assets predominately originated in US, while a EMEA conduit has its assets mainly originate in Europe.	-
High Rating	A dummy equal to 1 if the short-term rating assigned to the conduit is A-1+, 0 otherwise (A-1, A-2, A-3). The vast majority is A-1+ and A-1. The rating of the conduit is typically aligned with the short-term rating of the sponsor providing the liquidity support. When the rating of the conduit is not available, we use the short-term rating of the sponsor. In evaluating these programs, Standard & Poor's Ratings Services analyses the risks associated with credit, liquidity, interest rates, foreign currencies, legal issues, structural features, cash flows, and, where appropriate, the financial viability of the asset originator.	Monthly
Rating Date	The date the rating is assigned to the ABCP program for the first time. Ratings agencies verify the administration and selection of assets, on inception and frequently thereafter.	-
No of TAF loans	Log of the total number of loans a sponsor of a conduit has borrowed under the Term Auction Facility established by the Federal Reserve in December 2007 - after the ABCP collapse in August - and ended in 2010. The TAF helped promote the distribution of liquidity when unsecured bank funding markets were under stress. Only depositary institutions were eligible. Data from the Federal Reserve System.	Monthly

Table A.1: Variable Definitions - Continued

Variables	Description	Frequency
Conduit types		
Arbitrage	A Securities/Credit Arbitrage is a limited-purpose, bankruptcy-remote vehicle that buys fixed income securities for the purpose of regulatory capital relief, yield arbitrage and increasing funds under management.	-
Repo	Repo conduits is limited-purpose, bankruptcy remote vehicle that issue ABCP whose maturity is matched and secured against A-1 / P-1 rated banks. The conduit issues ABCP and re-invests the cash proceeds under a Repo with an A-1 / P-1 bank with a matched or shorter maturity than the CP. The collateral is held in a Tri-Party account, and is marked-to-market on a daily basis, and held at market standard haircuts (over-collateralised).	-
Multi-seller	A multi-seller conduit is a limited-purpose, bankruptcy-remote vehicle that serve the financing needs of several unaffiliated originators by combining their assets into one diverse, non-fungible portfolio supporting CP issuance.	-
Single-seller	A single-seller conduit is a limited-purpose, bankruptcy-remote vehicle that provides funding to a single seller in exchange for interests in its pool of receivables. Single-seller programs are popular among large credit-card issuers, major auto manufacturers and mortgage originators. Single-seller programs are established to benefit an individual asset originator by providing a way to finance its lending activities.	-
Hybrid	A type of conduit set up as hybrid to hold both pools of receivables as multi-seller conduits as well as highly rated ABS as securities arbitrage conduits.	-
Portfolio Composition by Rating of Collateral (AAA, AA, A ,..)		
AAA%	Percentage of AAA collateral in the portfolio.	Quarterly
Portfolio Composition by Type of Collateral (Trade receivables, Auto loans, Mortgage, CDO,..)		
Trade receivables %	Percentage of Trade receivables in the portfolio.	Quarterly

Table A.1: Variable Definitions - Continued

Variables	Description	Frequency
Macro variables		
Fed rate	Effective Federal Funds Rate, Percent Change. Source: Federal Research Economic Data.	Monthly
Tbill-OIS	T-bill-OIS is the spread of 3-month Treasury bills over 3-month overnight indexed swap (OIS) rate. Source: Federal Research Economic Data and Bloomberg.	Monthly
US GDP	US Gross Domestic product, Percent Change of. Source: Federal Research Economic Data.	Quarterly
US CPI	US Consumer Price Index, Percent Change of (Index 1982-1984=100). Source: Federal Research Economic Data.	Monthly
VIX	S&P500 Volatility Index (basis points, %). Chicago Board of Option Exchange. The VIX Index is a widely used indicator of financial market distress. S&P Global Fixed Income Research.	Monthly
Credit Trend	Trailing 12-month change in credit quality. It is computed as average number of notches changes for structured finance securities (ABS, CDO, MBS, RMBS). S&P Capital IQ.	Monthly
USD/EUR rate	USD / Euro Foreign Exchange rate. US Dollars to One Euro. Source: Federal Research Economic Data.	Monthly