Securitization Without Risk Transfer[1]

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Abstract

We analyze asset-backed commercial paper conduits which played a central role in the early phase of the financial crisis of 2007-09. We document that commercial banks set up conduits to securitize assets worth $1.3 trillion while insuring the newly securitized assets using guarantees. The guarantees were structured to reduce bank capital requirements, while providing recourse to bank balance sheets for outside investors. Consistent with such recourse, we find that during the first year of the crisis, asset-backed commercial paper issuance fell and spreads increased, especially for conduits with weaker guarantees, riskier banks, and lower quality assets; that banks with more exposure to conduits had lower stock returns; and that losses from conduits remained with banks rather than outside investors. These results suggest that banks used this form of securitization to concentrate, rather than disperse, financial risks in the banking sector while reducing their capital requirements.

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Securitization was traditionally meant to transfer risks from the banking sector to outside investors and thereby disperse financial risks across the economy. Since the risks were meant to be transferred to outside investors, securitization allowed banks to reduce regulatory capital, except on pieces they retained, typically the first-loss piece in order to ensure they had some "skin in the game". However, in the period leading up to the financial crisis of 2007-09, banks increasingly devised securitization methods that allowed them to concentrate risks on their balance sheets, and yet did not hold much capital against these risks, a practice which eventually led to the largest banking crisis since the Great Depression. In this paper, we analyze one form of securitization, namely asset-backed commercial paper conduits (henceforth, conduits), as an example of how banks exposed themselves to such under-capitalized risks.

Conduits are special purpose vehicles set up primarily by large commercial banks. Conduits exhibit a significant maturity mismatch between assets and liabilities as they mostly hold medium- to long-term assets, which are financed by issuing short-term asset-backed commercial paper. Conduits are thus similar to regular banks in many ways and form an integral part of financial intermediation that has over time come to be called "shadow banking". Put simply, shadow banking is that part of the intermediation sector that performs several functions that we traditionally associate with commercial and investment banks, but which runs in the "shadow" of the regulated banks in that it is off-balance sheet and less regulated.[5] As shown in Figure 1, before the financial crisis, asset-

[5] Adrian et al (2010) document that shadow banking assets grew from an amount close to zero in 1980 to somewhere between $15 to $20 trillion by 2008. In 2007, conduits represented about 25% of total assets newly transported to shadow banking. In terms of the stock of assets, as of July 2007, conduits held over $1.2 trillion, compared to securities lending of $0.6 trillion, broker-dealer repo of $2.5 trillion, and financial commercial paper of $0.8 trillion.

backed commercial paper grew from US$650 billion in January 2004 to US$1.3 trillion in July 2007. At that time, asset-backed commercial paper was the largest short-term debt instrument in the United States. For comparison, the second largest instrument was Treasury Bills with about $940 billion outstanding. However, the rise in asset-backed commercial paper came to an abrupt end in August 2007.

On August 9, 2007, the French bank BNP Paribas halted withdrawals from three funds invested in mortgage-backed securities and suspended calculation of net asset values. Even though defaults on mortgages had been rising throughout 2007, the suspension of withdrawals had a profound effect on the asset-backed commercial paper market.[6] As shown in Figure 2, the interest rate spread of overnight asset-backed commercial paper over the Federal Funds rate increased from 10 basis points to 150 basis points within one day of the announcement. Subsequently, the market experienced the modern-day equivalent of a bank run and asset-backed commercial paper outstanding dropped from $1.3 trillion in August 2007 to $833 billion in December 2007. Apparently investors in asset-backed commercial paper, primarily money market funds, became concerned about the credit quality and liquidation values of collateral backing asset-backed commercial paper and stopped refinancing the maturing asset-backed commercial paper.

[6] The announcement read: "[T]he complete evaporation of liquidity in certain market segments of the US securitization market has made it impossible to value certain assets fairly regardless of their quality or credit rating […] Asset-backed securities, mortgage loans, especially subprime loans, don't have any buyers […] Traders are reluctant to bid on securities backed by risky mortgages because they are difficult to sell […] The situation is such that it is no longer possible to value fairly the underlying US ABS assets in the three above-mentioned funds." (Source: "BNP Paribas Freezes Funds as Loan Losses Roil Markets," Bloomberg.com, August 9, 2008).

Our main conclusion in this paper is that, somewhat surprisingly, this crisis in the asset-backed commercial paper market did not result (for the most part) in losses being transferred to outside investors in asset-backed commercial paper. Instead, the crisis had a profoundly negative effect on commercial banks because banks had insured outside investors in asset-backed commercial paper by providing guarantees to conduits, which required banks to pay off maturing asset-backed commercial paper at par. Effectively banks had used conduits to securitize assets without transferring the risks to outside investors.

We establish this finding of securitization *without* risk transfer using a hand-collected panel dataset on the universe of conduits from January 2001 to December 2009. We document and describe the structure of the guarantees that effectively created recourse from conduits back to bank balance sheets. These guarantees were explicit legal commitments to repurchase maturing asset-backed commercial paper in case conduits could not roll their paper, not a voluntary form of implicit recourse.[7] The guarantees were mostly structured as "liquidity enhancements", a design that would reduce their regulatory capital requirements to at most a tenth of capital required to hold for on-balance sheet assets. For the majority of conduits, the guarantees were structured to cover the assets' credit and liquidity risks and absorb all possible losses of outside investors. Hence, this form of securitization practically retained the risks of the securitized assets risk with banks rather than outside investors. For a minority of conduits, the guarantees did not cover all of the assets' liquidity and credit risks and required banks to cover only a share of the losses.

[7] However, there was some scope for implicit recourse in the case of weaker credit guarantees.

Consistent with the motive for setting up conduits being one of "regulatory arbitrage", we find that most guarantees were structured as liquidity enhancements. We show that sponsoring institutions other than commercial banks (which among financial institutions are subject to the most stringent capital requirements) were far less likely to use such structures. Also, we note that the growth of asset-backed commercial paper stalled in 2001 after U.S. bank regulators discussed an increase in capital requirements for conduit guarantees (following the failure of Enron which had employed conduit-style structures to create off balance-sheet leverage) and picked up again after regulators decided against the increase in 2004. We also note that banks based in countries such as Spain and Portugal that do not allow such regulatory arbitrage do not sponsor conduits.

Next, we examine the effect of guarantees on the conduit's ability to roll over maturing asset-backed commercial paper. We use a novel conduit-level data set to study daily issuances and spreads of asset-backed commercial paper both before and after the start of the financial crisis. We show that starting August 9, 2007, conduits experienced substantial widening of spreads and a decline in asset-backed commercial paper outstanding (or in other words, a decrease in their ability to roll over maturing asset backed commercial paper). We show that conduits with weaker guarantees had a larger decline in outstanding and a larger increase in spreads after the start of the financial crisis. The result is robust to controlling for observable asset categories, which suggest that the strength of the guarantee does not simply proxy for the quality of conduit assets. We further find that the results are stronger for riskier banks (as measured by credit default swap spreads). These results suggest that the lack of risk transfer, as measured by

the strength of guarantees, is central to conduits' ability to roll-over asset-backed commercial paper after the start the financial crisis.

We then examine the extent of realized risk transfer by analyzing whether investors could rely on the guarantees offered by financial institutions during the crisis. We take the perspective of an investor that was holding asset-backed commercial paper at the start of the crisis and examine whether the investor suffered losses by not refinancing maturing asset-backed commercial paper. Using announcement data from Moody's Investors Services, we identify all conduits that defaulted on asset-backed commercial paper in the period from January 2007 to December 2008. We find that all outside investors covered by strong guarantees were repaid in full. We find that investors in conduits with weak guarantees suffered small losses. In total, only 2.5% of asset-backed commercial paper outstanding as of July 2007 entered default in the period from July 2007 to December 2008. Hence, about 97.5% of losses on conduit assets remained with sponsoring banks. Assuming loss rates of 5% to 15%, we estimate that commercial banks suffered losses of $68 billion to $204 billion on conduit assets.

Lastly, we examine the impact of conduit exposure on bank stock returns. To identify the impact of conduit exposure separately from other bank observables, we focus on a narrow event window around the start of the financial crisis on August 9, 2007. An increase in conduit exposure (measured as the ratio of asset-backed commercial paper to bank equity) from 0% to 100% (e.g., Wells Fargo to Citibank) reduced stock returns by 1.5 percentage points in a three-day window around the start of the financial crisis. The effect of conduit exposure on stock returns increases to 2.9 percentage points when we expand the event-window to one month. The result is robust to using alternative

measures of conduit exposure and controlling for a large set of observable bank characteristics. We also show that there is no relationship between conduit exposure and stock returns in the pre-crisis period.

We note that the lack of ex-post risk transfer to conduit investors coupled with the ex-ante structure of guarantees that allowed close to zero capital requirements is highly suggestive of leverage-seeking or capital-reducing incentives on parts of commercial banks. Equally important, the lack of risk transfer suggests that any explanation of the financial crisis must explain why banks chose to concentrate under-capitalized risks in this manner. In particular, it is not sufficient, and in fact is likely inadequate, to simply assert that banks created "safe" assets, which were sold to uninformed outside investors, and that these assets turned out to be risky.

We emphasize that all of our evidence on the performance and effects of conduits is necessarily ex post. It is possible that ex ante it was efficient for individual banks to build up leveraged exposures through conduits. It is equally possible that ex ante the risks of guarantees were ignored by bank management due to poor risk management that did not keep pace with that of financial engineering, or ineffective corporate governance, or simply short-termism – phenomena that may have been the result of deeper underlying causes such as increased competition in banking activities, resulting erosion of margins and franchise values, and the moral hazard due to government guarantees such as deposit insurance and the too-big-to-fail doctrine. Investigating these underlying causes is an important question for future work.

The remainder of this paper is organized as follows. Section 2 presents the related literature. Section 3 discusses the institutional background. Section 4 provides

our theoretical framework. Section 5 presents the data and discusses our empirical results. Section 6 analyzes the incentives of banks to set up conduits. Section 7 concludes.

2. Related literature

Gorton and Souleles (2005), Gorton (2008), Brunnermeier (2009), and Kacperczyk and Schnabl (2009) provide examples of maturity transformation outside the regulated banking sector. Our focus, in contrast to theirs, is to provide an in-depth analysis of the structure of asset-backed commercial paper conduits: how risk transfer was designed to take place through conduits and how it materialized and contributed to the start of the financial crisis of 2007-09.

Ashcraft and Schuermann (2008) present a detailed description of the process of securitization of subprime mortgages, of which conduits were one component. Nadauld and Sherland (2008) study the securitization by investment banks of AAA-rated tranches – "economic catastrophe bonds" as explained by Coval et al. (2008) – and argue that the change in the SEC ruling regarding the capital requirements for investment banks spurred them to engage in excessive securitization. Nadauld and Sherland (2008) view the banks as warehousing these risks for further distribution whereas Shin (2009) argues that banks were concentrating highly-leveraged risk exposures (given the low capital requirements) by so doing.

Our view in this paper is more along the lines of Shin (2009), Acharya and Richardson (2009), and Acharya and Schnabl (2009a), that banks were securitizing without transferring risks to outside investors, and in particular, conduits were a way of

taking on systemic risk of the underlying pool of credit risks. In an analysis focused on the economic causes of the increasing propensity of the financial sector to take such risks (in one class of conduits – the "credit arbitrage" vehicles), Arteta et al. (2008) provide evidence consistent with government-induced distortions and corporate governance problems being the root causes (see also the arguments in Calomiris (2009)). Beltratti and Stulz (2009) examine bank stock returns during the financial crisis and find that stricter country-level capital regulation is correlated with better bank performance during the crisis. Covitz et al. (2009) use data on asset-backed commercial paper and show that the decline in securitized assets was driven by both market-wide factors and program fundamentals.

Our results on the difficulty in rolling over asset-backed commercial paper and the rise in their spreads are somewhat akin to the analysis of the run on the repo market by Gorton and Metrick (2009). They document that a counterparty risk measure for the banking sector as a whole, the "LIB-OIS" spread, explained over time the variation in the credit spreads of a large number of securitized bonds and the rise in repo haircuts, that is, the difference between the market value of an asset and its secured borrowing capacity. However, there are important differences between our "laboratory" and theirs. While conduits resemble repo transactions to some extent, the presence of explicit guarantees to conduits by sponsoring financial institutions establishes a direct linkage between the ability to issue commercial paper and the guarantee provided by the sponsor. We can therefore test directly for the impact of the guarantees on commercial paper issuance and spreads using variation across and within conduit sponsors over time, rather than relying on market-wide measures of banking sector health.

3. Institutional Background

3.1. Conduit structure

Figure 3 illustrates the typical conduit structure. A conduit is set up by a sponsoring financial institution (henceforth, sponsor). The sole purpose of a conduit is to purchase and hold financial assets from a variety of asset sellers. The conduit finances the assets by selling asset-backed commercial paper to outside investors such as money market funds or other "safe asset" investors.

Conduits typically exhibit a significant maturity mismatch. Most of the conduit assets are medium- to long-term assets with maturities of three to five years. Most of the conduit liabilities are asset-backed commercial paper with a maturity of 30 days or less. Conduits regularly roll over their liabilities and use proceeds from new issuances of asset-backed commercial paper to pay off maturing asset-backed commercial paper.

Most conduits minimize their credit risk by holding a diversified portfolio of high quality assets. Typically, they are restricted to purchasing AAA-rated assets or unrated assets of similar quality. Some conduits exclusively purchase unrated assets originated by their sponsoring financial institutions. Other conduits mostly purchase securitized assets originated by other financial institutions. Many conduits combine the two strategies by purchasing both securitized and unsecuritized assets from several financial institutions.

Outside investors consider asset-backed commercial paper a safe investment for three reasons. First, the pool of conduit assets is used as collateral to secure the asset-backed commercial paper. Second, the conduit's sponsor provides guarantees to the

conduit, which ensures that the sponsor repays maturing asset-backed commercial paper in case the conduit is unable to pay off the maturing paper itself. Third, asset-backed commercial paper is very short-term, so that investors can easily liquidate their investment by not rolling over maturing asset-backed commercial paper.

Conduits can generate significant risks for the sponsor. The sponsor's guarantee typically covers the conduit's roll-over risk, which is the risk that a conduit cannot refinance maturing commercial paper, possibly because of a deterioration of conduit asset values. In that case, the sponsor has to assume the losses from lower asset values, because under the guarantee sponsors are required to repurchase assets at par. In exchange for assuming this risk, the sponsor receives the conduit profits.

From an incentive perspective, the use of guarantees to align risks and rewards within the sponsor is consistent with the optimal allocation of control rights under asymmetric information. Sponsors often use conduits to purchase assets originated by their customers, their own origination department, or other close parties, and may be better informed about asset quality than outside investors. The use of guarantees thus avoids the incentive problem inherent in other forms of securitization, in which the asset originator transfers most of the risks associated with the assets to outside investors. Instead guarantees ensure that sponsors have strong incentives to screen the conduit's asset purchases (e.g. see Ramakrishnan and Thakor (1984), Calomiris and Mason (2004) and Keys et al. (2009)).

The guarantees are also important because they ensure that asset-backed commercial paper qualifies for the highest available rating from accredited national rating agencies. The high ratings are important because the main purchasers of asset-backed

commercial paper are money market funds, which are legally restricted to invest in securities with such ratings (Kacperczyk and Schnabl (2009)). Hence, the key issue with guarantees is whether the recourse of conduits to sponsor bank balance sheets is recognized as balance sheet risk and capitalized adequately.

3.2. Type of guarantees

Conduit sponsors use four different types of guarantees which provide different levels of insurance to outside investors. The four types of guarantees, ranked from strongest to weakest, are full credit guarantees ("full credit"), full liquidity guarantees ("full liquidity"), extendible notes guarantees ("extendible notes"), and guarantees arranged via structured investment vehicles ("SIV"). We briefly describe the structure of each guarantee.

Full credit guarantees are guarantees that require the sponsor to pay off maturing asset-backed commercial paper independent of the conduit's asset values. As discussed in more detail below, from a regulatory perspective, full credit guarantees are considered equivalent to on-balance sheet financing because they expose banks to the same risks as assets on the balance sheet. In practice, these guarantees are infrequently used by financial institutions that have to satisfy bank capital requirements but are more common among financial institutions that follow other forms of capital regulation.

Full liquidity guarantees are similar to full credit guarantees with the main difference being that the sponsor only needs to pay off maturing asset-backed commercial paper if the conduit assets are not in default. Hence, there is a possibility that full liquidity guarantees expire before the asset-backed commercial matures. However, full

liquidity guarantees are structured to make this event highly unlikely. As discussed in detail below, the key idea is to define asset default as a function of a slow-moving variable such that the asset-backed commercial paper expires prior to the date at which the assets are declared in default. Indeed, as we show below, throughout the entire financial crisis there is not a single instance in which a full liquidity guarantee expired before the assets were declared in default.

Extendible notes guarantees are similar to full liquidity guarantees with the main difference being that the conduit issuer has the discretion to extend maturing commercial paper for a limited period of time (usually 60 days or less). By extending the maturity of the commercial paper, it is more likely that the conduits assets are in default before the commercial paper matures. From the viewpoint of an outside investor, extendible notes guarantees are therefore riskier than full liquidity guarantees. This guarantee was used by financial institutions with lower financial strength and by conduits with ex-ante higher quality assets.

SIV guarantees are also similar to full liquidity guarantees with the main difference being that SIV guarantees only cover a share of the conduit liabilities (usually around 25%). However, conduits with SIV guarantees also issue longer-maturity debt such as medium-term notes and subordinated capital notes. Since SIV guarantees do not cover all conduit liabilities, we consider SIV guarantees as providing partial insurance to outside investors. SIV guarantees were primarily used by commercial banks and other financial institutions to cover higher quality assets.

The partial transfer of risk, as in the case of extendible notes and SIVs guarantees, is consistent with security design models. In contrast, lack of any risk transfer, as in the

case of full credit and full liquidity conduits is at odds with such models unless the underlying assets are mostly all of low quality, an unlikely scenario especially when these conduits were set up.

4. Theoretical Framework

The economic rationale for imposing capital requirements on banks comes from the premise that individual banks do not internalize the costs their risk-taking impose on other parts of the economy, in particular, other banks and the real sectors. For example, Diamond and Rajan (2000) explain why the market discipline provided by demandable debt may have to be counteracted with bank capital when bank assets contain aggregate risk. Acharya (2001) focuses on collective risk-shifting by banks in the form of herding to exploit their limited liability options and higher capital requirements on aggregate risky assets can serve as a way to counteract this incentive. Indeed, Gordy (2003) provides the foundation for the Basel I capital requirement framework based on the assumption that each bank is holding a diversified portfolio of economy-wide loans, thereby holding aggregate risk, and the job of the Basel I capital weights is to ensure that the resulting aggregate risk does not erode bank capital beyond a desired likelihood.

In effect, capital requirements increase the bank cost of capital with the intention of preventing them from undertaking certain risks that would otherwise seem privately attractive to banks. For instance, banks inherently perform maturity transformation, which is to borrow short and lend long. However, both on their (uninsured) liabilities and asset side, they are typically exposed to aggregate risk. To the extent that banks make profits by earning interest margins on the asset side over and above their cost of

financing, they have a private incentive to raise leverage to reduce the cost of financing and undertake greater aggregate risk so as to earn higher risk premiums. In a world with imperfectly imposed capital requirements, banks would thus have incentives to "arbitrage" regulation and devise ways of synthesizing leveraged exposures to aggregate risks. In this paper, we examine this regulatory arbitrage hypothesis to explain the structure and performance of asset-backed commercial paper conduits. In particular, we test three hypotheses.

The first hypothesis is that commercial banks set up conduits to minimize regulatory capital requirements. In particular, commercial banks set up more conduits, and more so, with guarantees. This is because (i) banks taking deposits may have a natural advantage in providing guarantees (e.g., lines of credit), as argued by Kashyap, Rajan and Stein (2002), or because commercial banks have access to federal deposit insurance which causes economy's savings to move into bank deposits during times of aggregate stress, as documented by Gatev and Strahan (2005) and Pennacchi (2006); and, (ii) commercial banks are subject to strictest capital requirements in the financial sector and thus have greater benefits from regulatory arbitrage. Conversely, sponsors other than commercial banks set up conduits with weaker or no guarantees, and must substitute for absence of guarantees by choice of better assets, so that ex ante conduits with different guarantees reflect similar levels of risk or costs of borrowing.

The second hypothesis is that, ex post, when asset quality deteriorates and there is credit and liquidation risk to assets, conduits experience a "run" from their short-term credit providers, experiencing reduced ability to roll over debt and at higher spreads. The cost of redeeming debt that could not be rolled over and higher spreads are borne by

conduit sponsors. The impact of asset quality deteriorates is larger for (i) weaker guarantees; (ii) weaker sponsor banks; and (iii) assets affected worst by the economic shock.

The third hypothesis is that no realized losses are passed on to creditors of conduits that are guaranteed, with some losses passed on to creditors of other conduits. Banks with greater exposure to conduits (relative to their size) experience worse stock returns once the run on conduits is initiated.

Put together, these hypotheses amount to establishing that a significant part of the conduit activity is a form of securitization without risk transfer, that is, a way for banks to concentrate aggregate risks rather than disperse them, and do so in an under-capitalized manner.

5. Empirical Analysis

5.1. Data and Summary Statistics

We use several different data sources for the analysis in this paper. We start by collecting ratings reports for asset-backed commercial paper conduits that cover all conduits rated by Moody's Investors Service for the period from January 2001 to December 2009. During this period, Moody's Investors Service issued reports on 938 conduits. The rating reports are typically three to five pages and contain information on conduit sponsor, conduit type, conduit assets, credit guarantees, and a verbal description of the conduit. Moody's Investors Service publishes the first report when a conduit receives its first rating and subsequently updates the reports annually. For some larger conduits, Moody's Investors Service also publishes monthly monitoring reports.

Monthly reports are typically one page and comprise information on conduit size, guarantees, and conduit assets. In addition, Moody's Investors Service publishes a quarterly spreadsheet that summarizes basic information on all active conduits.

Our dataset is the universe of conduits collected from Moody's Investors Service's quarterly spreadsheets. We augment the dataset with information collected from the ratings reports. Some conduits have more than one observation because they have funding operations in both U.S. dollars and Euro. Since the funding operations belong to the same conduit, we merge these observations. We drop asset-backed commercial paper issued by collateralized debt obligations because their credit guarantees are not comparable to the rest of the sample (292 out of 9536 observations).

We merge this data set with a proprietary data set on all asset-backed commercial paper transactions conducted in the United States from January 2007 to February 2008. The data set contains 777,758 primary market transactions by 349 conduits over 292 trading days. The data are provided by the Depository Trust and Clearing Corporation (DTTC), the agent that electronically clears and settles directly- and dealer-placed commercial paper. For each transaction, DTCC provides the identity and industry of the issuer, the face and settlement values of the transaction, and the maturity of the security.

Using the DTCC data, we compute prices and quantities for asset-backed commercial paper. We compute overnight spreads as the yield on asset-backed commercial paper minus the federal funds target rate. We calculate the conduit-level weekly growth as the percentage change in asset-backed commercial paper. We merge the DTCC data set with the Moody's Investors Service data set.

We then use the Moody's rating reports to identify the sponsoring institution that is providing guarantees to the conduit. We first identify the type of sponsor (e.g., commercial bank, mortgage originator, structured finance group, monocline, etc.). If the sponsoring institution is a commercial bank, we look for the sponsor in the bank data set Bankscope. If we cannot identify a sponsor via Bankscope, we conduct an internet search. We match the sponsor to the consolidated financial company (e.g., we match conduits sponsored by Citibank South Dakota to Citigroup).

We construct a data set of the 300 largest banks as of January 2007 using the Bankscope database. If a consolidated company and its subsidiaries have more than one entry in Bankscope, we only keep the consolidated company. We use the ISIN identifier to match Bankscope data to share price data and stock return data from Datastream. If a bank does not have an ISIN identifier, we verify with the company website that the bank is not listed on a stock exchange. This data set allows us to compare banks that sponsor asset-backed commercial paper conduits with banks that do not sponsor asset-backed commercial paper conduits.

Finally, we use Moody's Investors Service Weekly Announcement Reports of rating downgrades from January 2007 to December 2008. We identify all conduits that were downgraded or were withdrawn during the analysis period. For all such conduits, we search for an affirmative statement by Moody's Investors Service that all outside investors were repaid prior to the downgrade or withdrawal. If there is no such affirmative statement we use announcements by the sponsor or other rating agencies to determine whether investors were repaid. If we do not find an affirmative statement that all investors were repaid, we assume that the conduit entered default. We note that this

coding procedure may overestimate the extent of investor liquidation because investors may have been repaid without an affirmative announcement by either the sponsor or the rating agencies.

Panel A of Table 1 shows the ten largest conduits ranked by asset-backed commercial paper outstanding as of January 1, 2007. Most conduits hold highly rated assets originated in the United States or the United Kingdom. If a conduit hold assets that are not rated, the Moody's reports usually state that the conduit holds assets of similar quality as highly rated assets. The main asset classes are residential mortgages and asset-backed securities.

Panel B of Table 1 shows the ten largest sponsors ranked by total asset-backed commercial paper outstanding as of January 1, 2007. In the United States, the largest sponsor is Citigroup with conduit assets of $92.7 billion. For comparison, Citigroup's regulatory capital (Tier 1 Capital) is $90 billion. In Europe, the largest sponsor is ABN Amro with $68 billion of conduits assets. ABN Amro's regulatory capital $31.2 billion (ABN Amro later merged with Royal Bank of Scotland). Most sponsors are large commercial banks based in the United States and European countries.

Panel A of Table 2 provides summary statistics for all conduits authorized to issue asset-backed commercial paper as of January 1, 2007. Panel A shows that there are 301 conduits with total commercial paper outstanding of $1,236 billion. The average conduit size is $4.1 billion with a standard deviation of $5.1 billion. About 61% of asset-backed commercial paper is covered by full liquidity guarantees, 13% is covered by full credit guarantees, 18% is covered by extendible notes guarantees, and 7% is covered by SIV guarantees.

In terms of assets, we use Moody's classification for a conduit's main asset types. About 31% of conduits assets are invested primarily in asset-backed securities. Moody's rating reports suggest that this asset category includes mortgage-backed securities, collateralized debt obligations, and collateralized loan obligations. About 5% of conduits assets are invested primarily in loans. Moody's rating reports suggests that most loans are mortgage loans that are warehoused for future securitization. Some conduits also own student loans, auto loans, corporate loans, and consumer loans. About 35% of conduit assets are invested in receivables. Moody's reports suggest that most receivables are trade receivables and credit card receivables. About 22% of conduits assets are invested in a mix of asset-backed securities, loans, and receivables. The remaining 7% of conduit assets are invested in other asset classes, which include repurchase agreements and government guaranteed loans.

We understand from the Moody's rating \reports that almost all conduits are hedged against currency and interest rate exposure. The most common way for conduits to hedge their currency exposure is by matching the currency of the assets with the currency of the liabilities. Consistent with our earlier observation that most assets are originated in the United States, we find that 75% of asset-backed commercial paper is issued in U.S. dollars. About 18% is issued in Euro and the remainder is issued in Yen, Australian dollars, and New Zealand dollars.

Panel B of Table 2 presents summary statistics for all sponsors as of January 1, 2007. We define a sponsor as a single consolidated company and aggregate asset-backed commercial paper at the holding level. In total, there are 127 sponsors, each of which, on average, sponsors $9.7 billion of asset-backed commercial paper. The largest sponsor

type is commercial banks, which sponsor $911 billion of asset-backed commercial paper. The second largest type is structured finance groups which sponsor $156 billion in asset-backed commercial paper. Contrary to commercial banks, structured finance groups usually do not have the financial resources to provide guarantees. Instead they purchase guarantees from other financial institutions. Unfortunately our data do not contain information to identify the provider of guarantees to conduits of structured finance groups. There is some evidence from industry publications that investment banks are large providers of guarantees to structured finance groups. Other large sponsor types are mortgage lenders ($76 billion), investment managers ($18 billion) and investment banks ($11 billion).

In terms of geography, the majority of conduits are sponsored by financial institutions based in the United States with $491 billion of asset-backed commercial paper. A large number of sponsors are based in Germany and the United Kingdom with asset-backed commercial paper of $204 billion and $195 billion, respectively. The remaining $347 billion are sponsored by financial institutions based in other countries, including financial institutions based in Australia, Belgium, Canada, France, Netherlands, and Japan.

5.2. Capital Requirements

Bank regulation requires banks to hold a certain amount of capital against its investments. One way to reduce one's capital requirements is to transfer the risks of investments to outside investors. Over the last two decades, securitization has emerged as one of the main risk transfer mechanism for banks. Bank regulators have recognized

such risk transfer and modified bank capital regulation to reduce capital requirements accordingly. However, our analysis suggests that banks used asset-backed commercial conduits for securitization without transferring risks to outside investors. To explain the mechanics of such securitization, we first describe the capital regulation of asset-backed commercial paper conduits. Since almost all conduits were sponsored by banks based in the United States and European countries, we focus on bank regulation in these countries. We start by describing bank capital regulation in the United States.

Historically, bank regulators in the United States made a clear distinction between full credit and full liquidity guarantees. Full credit guarantees were considered to cover credit risk and thus considered equivalent to on-balance sheet financing. As a result, assets covered by full credit guarantees required the same regulatory capital charges as assets on the balance sheet. In contrast, full liquidity guarantees were considered to cover liquidity risk, which did not require regulatory capital. Similarly, extendible notes guarantees and SIV guarantees were considered weaker forms of full liquidity guarantees and did not have capital charges either. As a result, there was a sharp discontinuity between the regulatory requirements of full credit guarantees and the regulatory requirements of other types of guarantees.

In response to this regulation, banks developed guarantees which were classified as full liquidity guarantees but effectively covered credit risk. The guarantees were structured as follows. The sponsor committed to repurchase assets at par value from the conduit if the conduit was unable to pay off maturing debt *and* the assets in the conduit were not in default. The banks were careful to make the guarantee conditional on asset default because otherwise regulators classified such guarantees as full credit guarantees.

The most important aspect of this guarantee was to define asset default such that assets almost never defaulted before the asset-backed commercial paper was due. In practice, most sponsors defined asset default as downgrades below investment grade (rated assets) or increases in delinquency rates above pre-specified thresholds (unrated assets). Given the requirement that most assets were highly rated, or of similar quality, it was unlikely that assets entered default quickly. The reason was that rating agencies usually provided ample warnings prior to downgrades (rated assets) and delinquency rates only moved slowly (unrated assets). Moreover, asset-backed commercial paper was very short-term with a median maturity at issuance of overnight and a median maturity of outstanding asset-backed commercial paper of less than 30 days.

Hence, even though it was possible that assets entered default prior to the expiration of the asset-backed commercial paper, it was highly unlikely. Instead, outside investors could simply stop rolling over asset-backed commercial paper upon adverse news about the credit or liquidity risk of conduit assets. In fact, the guarantees were mostly likely to be drawn in the states of the world in which assets were expected to suffer losses. As a result, full liquidity guarantees effectively covered the assets' credit risk without requiring banks to hold regulatory capital.

A number of industry publications describe the benefits of circumventing capital requirements by using this type of guarantees. For example, a publication by Moody's Investor Services (2003) on the fundamentals of asset-backed commercial paper describes conduits as follows: "If a bank were to provide a direct corporate loan, even one secured with the same assets, it would be obligated to maintain regulatory capital for it. An ABCP program permits the sponsor to offer financing services to its customers

without using the Sponsor's balance sheet or holding incremental regulatory capital (p. 15)"

In 2001, the Financial Accounting Standards Board (FASB) in the United States started a review of guarantees to conduits. FASB initiated this review because of the bankruptcy of the energy company Enron. Enron had used off-balance sheet vehicles for concealing its true leverage and these off-balance sheet vehicles were structured similarly to asset-backed commercial paper conduits. This review of conduits generated considerable concern in the banking industry. For example, in July 2002 Moody's Investor Services (2002a) reports under the headline "FASB reacts to Enronitis" that FASB is proposing the consolidation of asset-backed commercial paper conduits on bank balance sheets. In October 2002, Moody's published a special report titled "The FASB Consolidation Proposal: The End of ABCP as we know it?" which suggests that sponsors may have difficulties with consolidation because it would raise regulatory capital requirements and might lead banks to violate their debt covenants.

In January 2003, FASB issued a directive for the consolidation of conduits under Interpretation No. 46 (FIN 46). In response, Forbes (2003) reported that "FASB Puts Banks in a Bind" because conduit consolidation would negatively affect bank balance sheets. The article quotes the FASB chairman as saying that "If you have risk and reward related to the operation, we thought it was enough to say it ought to be on your books". However, the FASB proposal was considered unclear with respect to certain implementation issues and several banks requested more guidance from FASB.

In May 2003, Standard & Poor's (2003) reports that a "Panelist from OOC acknowledges […] Regulatory Relief at S&P seminar". The Standard & Poor's report

states that a representative of the Office of the Comptroller of the Currency (OCC) acknowledged that his agency and other regulatory bodies are putting together an approach that would reduce capital requirements required under the FASB proposal. However, the relief would only last until the end of 2003 or March 2004. In December 2003, FASB issued a new directive called FIN 46R ("R" for revision) which clarified the consolidation issues. The new directive effectively required commercial banks to consolidate asset-backed commercial paper conduits.

However, in July 2004, a consortium of bank regulators, namely the Office of the Comptroller of the Currency, the Federal Reserve Board, the Federal Deposit Insurance Corporation, and the Office of Thrift Supervision (henceforth, the Agencies), issued a new rule for computing capital requirements of asset-backed commercial paper conduits. The official press release (Federal Reserve Board, 2004) by the Agencies states that "[t]he final rule will permanently permit sponsoring banks, bank holding companies, and thrifts (collectively, sponsoring banking organizations) to exclude from their risk-weighted asset base those assets in ABCP programs that are consolidated onto sponsoring banking organizations' balance sheets as a result of FIN 46R". Hence, the bank regulator effectively issued an exemption of capital requirements for asset-backed commercial paper conduits. Under the exemption, assets in conduits were not considered assets for the purpose of calculating capital requirements. Instead, bank regulators required that banks had to hold capital at a conversion factor of 10% against the amount covered by full liquidity guarantees. This implied that regulatory charges for conduit assets were 90% lower than regulatory charges for on-balance sheet financing (Gilliam (2005)).

Consistent with the regulatory arbitrage motive, Figure 3 shows that the growth of asset-backed commercial paper conduits stalled in late 2001, around the time when FASB started its review of conduits. From late 2001 to late 2004, asset-backed commercial paper outstanding is flat after several years of significant growth. However, starting in late 2004, at the time bank regulator issued their exemption, growth in asset-backed commercial paper picks up again. This time-series evidence indicates that lower capital requirement played an important role in the decision to set up conduits.

In Europe, the history of capital requirements for asset-backed commercial paper conduits was slightly different. Before 2004, most European countries had similar capital requirements for guarantees as in the United States. Full credit guarantees were considered to cover credit risk and required the same regulatory charges as on-balance sheet financing. Full liquidity guarantees were considered to cover liquidity risk and had no capital charges.

The main difference between the United States and Europe was that European banks started to adopt International Financial Reporting Standards (IFRS) in the early 2000s. IFRS, contrary to U.S. General Accepted Accounting Principles (GAAP), do not recognize asset transfers to conduits as a true sale. As a result of this regulation, European banks were required to consolidate conduits on their balance sheets. However, most European regulators did not change capital requirements in accordance with IFRS. Hence, for the purpose of computing regulatory requirements and risk weighted assets, conduits were considered off-balance sheet and European banks did not have to hold regulatory capital against conduit assets.

Another difference between the United States and European countries was that European bank regulators were in the process of adopting the Basel II framework (U.S. commercial banks were still operating under Basel I). Under the Basel II standardized approach, the capital requirements for conduit assets covered by full liquidity guarantees increase from 0% to 20% relative to on-balance sheet financing. Moreover, Basel II assumes lower risk weights for highly rated securities, which reduces the level of regulatory charges for both off-balance sheet and on-balance sheet financing. At the start of the financial crisis, several European banks had adopted Basel II rules, while others were still operating under Basel I. Importantly, both Basel I and Basel II rules allowed for "regulatory arbitrage" of capital requirements, although the benefit of regulatory arbitrage was smaller under Basel II than under Basel I.

We note that two European countries, Spain and Portugal, differed in their regulation of capital requirements from other European countries. These countries required sponsors to hold the same amount of regulatory capital for assets on balance sheets and for assets in asset-backed commercial paper conduits. Consistent with the regulatory arbitrage motive, we find that Spanish and Portuguese banks did not sponsor asset-backed commercial paper conduits (Acharya and Schnabl, 2009b).

We also note that the incentive to use guarantees for circumventing capital requirements was particularly strong for commercial banks. Commercial banks were considered to have the strictest capital regulation of all financial institutions because of their special status as deposit-taking institutions. Commercial banks should therefore derive the largest benefits from using guarantees to reduce capital requirements.

Consistent with this motive, Table 3 shows that commercial banks are the main sponsors of asset-backed commercial paper. They sponsor asset-backed commercial paper worth $911 billion, or 73.7% of total asset-backed commercial paper outstanding. Also, commercial banks are more likely than other financial institutions to use full liquidity guarantees with 74% of its conduit assets covered by full liquidity guarantees. For comparison, the second-largest group of sponsors, structured finance groups, sponsor $156 billion, or 12.6% of total asset-backed commercial paper outstanding. Contrary to commercial banks, the main guarantees used by structured finance groups are full credit guarantees covering 37% of conduit assets.[8]

5.3. Impact of Guarantees on Spreads and Commercial Paper Outstanding

In this section, we examine the importance of guarantees in rolling over maturing asset-backed commercial paper after the start of the financial crisis. As shown in Figure 1, asset-backed commercial paper declined dramatically after the start of the financial crisis on August 9, 2007. By the end of year, the asset-backed commercial paper market was roughly 30 percent smaller than it was at its peak in July. Importantly for our analysis, the extent of the decrease varied substantially by type of guarantee.

To test for the importance of guarantees in rolling over asset-backed commercial paper after August 9, 2007, we exploit cross-sectional variation in types of guarantees. As discussed, full credit and full liquidity guarantees cover almost all risks associated

[8] We do not have data on the providers of guarantees to structure finance groups. However, some industry reports indicate that the main providers were large U.S. investment banks, which used internal rating models for computing capital charges (Nadauld and Sherlund, 2008). Internal rating models made less distinction between full credit and full liquidity guarantees.

with conduits assets. However, extendible guarantees are weaker guarantees because they allow conduits to extend commercial paper for a limited period of time, an option that issuers are likely to exercise when there is adverse news about conduit assets. SIV guarantees are also weaker guarantees because these guarantees only cover asset-backed commercial paper outstanding but not other liabilities such as medium term notes and capital notes.

To understand the selection of sponsors and assets into guarantees, it is important to understand the sponsor's objective. Usually, sponsors aim to put together a conduit structure (consisting of the guarantee, conduit assets, and the sponsor's financial strength) which allows the sponsor to issue highly rated asset-backed commercial paper at rates similar to the Fed Funds rate (overnight) or LIBOR (30-days). Sponsors trade off various characteristics to achieve this pricing on the asset-backed commercial paper. For example, conduits with higher quality assets are usually covered by weaker guarantees. Also, sponsors with lower financial strength tend to provide weaker guarantees and have to provide higher quality assets.

Table 4 provides summary statistics on assets and sponsor types by guarantees. For full liquidity guarantees, the main sponsor type is commercial banks covering 89.9% of asset-backed commercial paper outstanding. The three main asset types covered by full liquidity guarantees are receivables (42.6%), asset-backed securities (29.2%), and mixed assets (20.8%). For full credit guarantees, the main sponsor types are commercial banks (62.4%) and structured finance groups (36.5%). The three main asset types are mixed assets (39.4%), receivables (37.9%), and asset-backed securities (10.2%). These results suggests that conduits covered by full liquidity and full credit guarantees are

similar in terms of assets. Regarding sponsors, the main difference is that structured finance groups are more likely to provide full credit guarantees than full liquidity guarantees.

For extendible notes guarantees, we find that the main sponsor types are commercial banks (33.8%), mortgage originators (27.1%), and structured finance groups (23.6%). The main asset types are asset-backed securities (28.8%), receivables (24%), mixed assets (23%), and loans (15.6%). For SIV guarantees, the main sponsor types are commercial banks (61.8%) and structured finance groups (34.5%). SIVs only invest in asset-backed securities (91.3%) and loans (8.7%). These summary statistics suggest that financial institutions with less financial strength, such as mortgage originators, are more likely to provide weaker guarantees, in particular extendible notes guarantees. Also, extendible and SIV guarantees are more likely to cover asset-backed securities, which were considered of higher quality before the financial crisis.

We note that the average spread of overnight asset-backed commercial paper over the Fed Funds rate was only one basis point prior to the financial crisis. Importantly, there was no variation across guarantees, which suggest that, from an ex-ante perspective, outside investors perceived conduits with different guarantees to have similar risks.

To test the cross-sectional impact of guarantees formally, we compute asset-backed commercial paper outstanding and spreads of overnight asset-backed commercial paper both before and after the start of the financial crisis. We restrict our sample to the period three months before and three months after the start of the financial crisis on August 9, 2007. We choose this period because it captures the main decline in asset-backed commercial paper but excludes later events that may confound our analysis (e.g.,

Bear Stearns merger, Lehman bankruptcy). We find qualitatively and quantitatively similar results if we extend our data set to the period six months before and six months after the start of the financial crisis. We include all sponsors in our main results. For our results on sponsor quality, we restrict our sample to conduits that we can match to the sponsor's credit default swap (CDS) spread.

We first examine the impact of guarantees non-parametrically. Figure 5 shows that asset-backed commercial paper covered by extendible guarantees and SIV guarantees decreased significantly more than asset-backed commercial paper covered by full credit and full liquidity guarantees. Similarly, Figure 6 shows that the overnight spread on asset-backed commercial paper covered by extendible guarantees and SIV guarantees increased more than the spread on asset-backed commercial paper covered by full credit and full liquidity guarantees.[9] The figures indicate that there was a negative shock to the supply of funds provided by outside investors leading to a large decline in quantity and a large increase in price.

We test whether the patterns on issuance and spreads by type of guarantee are statistically significant and robust to controlling for sponsor and conduit characteristics. Our baseline specification is:

$$\log(CP_{it}) = \alpha + \beta Guarantee_j + \gamma After_t * Guarantee_j + Time_t + \varepsilon_{it}$$

where $\log(CP_{it})$ represents the natural logarithm of the face value of commercial paper outstanding of conduit *i* in week *t*. $Guarantee_j$ is a fixed effect by type of guarantee. $After_t$ is an indicator variable that equals one after the start of the crisis (after August 9,

[9] We focus on overnight spreads because most newly issued ABCP has maturities of one to four days. According to data from the Federal Reserve Board, roughly 60 percent of newly issued ABCP in the U.S. has maturities of one to four days prior to the crisis. Our results are similar when considering one-month spreads (one month is the second most frequent maturity after overnight).

2007) and zero before the crisis. $Time_t$ represent fixed effects by sponsor and by week. We also estimate regression in which we control for conduit fixed effects and sponsor-time fixed effects.

We are primarily interested in the coefficient γ on the interaction of $After_t$ and $Guarantee_j$, which captures the average change in commercial paper outstanding by guarantee after the start of the financial crisis. The omitted guarantee category is full liquidity guarantees. We cluster standard errors at the conduit level because our variable of interest varies at the conduit level and we want to allow for the correlation of error terms within conduits.

If the financial crisis makes investors more concerned about conduit risks, we expect that the interactions between indicator variables for weak guarantees and the $After_t$ indicator to be more negative than those for strong guarantees. Furthermore, if full credit and full liquidity guarantees provide the same level of protection for outside investors, we expect that the interaction between the indicator variable for full credit support and the $After_t$ dummy to be statistically insignificant. Together these hypotheses are aimed at uncovering whether guarantees were important for outside investors to roll over maturing asset-backed commercial paper upon adverse news about asset quality.

Column (1) in Table 5 reports the results of estimating our baseline specification. The significant coefficient on the interaction between the $After_t$ indicator and the dummies for programs with extendible notes and SIVs suggest that asset-backed commercial paper decreased more for conduits with weaker guarantees compared to conduits with stronger guarantees. The coefficient on the interaction between the $After_t$

indicator and the dummies for full credit programs shows that there is no statistically significant difference between full liquidity and full credit guarantees. Column (2) adds controls for time fixed effects. The time fixed effects control for a non-parametric time-trend but have no effect on the coefficients of interest. Column (3) adds controls for conduit fixed effects. The conduit fixed effects control for the average amount of asset-backed commercial paper outstanding. We find no change in the coefficients of interest. These results suggest that conduits with weaker guarantees experienced a significantly larger decline in asset-backed commercial paper outstanding.

One possible concern with these results is that guarantees proxy for the quality of the sponsor. If sponsors of full liquidity and full credit guarantees are of higher quality after the start of the financial crisis, this may bias our results. To control for time-varying sponsor quality, Column (4) adds controls for sponsor-time fixed effects. These variables control for time-varying changes at the sponsor level such as changes in the financial strength of the sponsor. Put differently, the coefficients are identified off variation within sponsors at a given point in time (e.g., comparing conduits with full credit guarantees, full liquidity guarantees, extendible guarantees, and SIV guarantees for the *same* sponsor). We find that the point estimates are robust to controlling for these fixed effects. The standard errors are larger than in Columns (1) to (3), but the effect of extendible guarantees remains marginally statistically significant. This result suggests that guarantees significantly affect the conduit's ability to roll over asset-backed commercial paper even after controlling for changes in sponsor quality.

Another possible concern is that our results may reflect differences in asset quality across conduits with different guarantees. As discussed above, conduits with

weaker guarantees are more likely to hold asset-backed securities and are less likely to hold receivables. Even though asset-backed securities may have been of higher quality ex-ante, they may be of lower quality ex-post which could bias our result. We therefore control for asset quality by including indicator variables for asset types and interactions between the $After_t$ indicator and asset type indicators.

Columns (5) to (8) report the results. Based on our baseline specification, we find that the coefficients of interest are almost unchanged after controlling for asset classes (Columns 1 and 5). We find similar results in specifications that control for time fixed effects (Columns 2 and 6), conduit fixed effects (Columns 3 and 7) and sponsor-time fixed effects (Columns 4 and 8).

We note that our asset controls have some explanatory power for changes in asset-backed commercial paper outstanding. In particular, the coefficient on the interaction of the $After_t$ indicator and loans is always negative and statistically significant. This result indicates that loans, which are primarily mortgage loans, had a negative impact on the conduit's ability to roll over asset-backed commercial paper. The coefficient on the interaction of the $After_t$ indicator and receivables is usually positive but not statistically significant. The point estimate indicates that receivables, which are primarily trade receivables and credit card receivables, had a positive impact on the conduit's ability to roll over asset-backed commercial paper.

Hence, even though our asset controls can explain a conduit's ability to roll over asset-backed commercial paper, they have little impact on the coefficients of interest. This result suggest that guarantees are an important determinant of a conduit's ability to roll over asset-backed commercial paper upon adverse news, even after accounting for

the quality of the assets. However, we caution our interpretation because we cannot perfectly control for asset quality.

We also examine whether the impact of guarantees is stronger for riskier banks. We measure the riskiness of the sponsor using the sponsor's CDS spread. We expect that the decrease in asset-backed commercial paper of conduits with weaker credit guarantees is more pronounced if the sponsor is risky. We test this hypothesis by adding sponsor CDS spreads and their two-way interactions with the dummies for type of guarantee and the $After_t$ indicator to the baseline specification. We note that this estimation uses a smaller sample because we restrict the analysis to sponsors with CDS spreads.

Table 6 reports the results. Columns (1) to (4) estimate our baseline specification using the restricted sample. We note that the results are similar to Table 5. Columns (5) to (8) add the triple interaction of the $After_t$ indicator, the $Guarantee_j$ indicators, and the CDS spread. The regressions also include all two-way interactions. Columns (5) and (6) find a negative and statistically significant effect on the interaction of sponsor CDS spreads with extendibles in the post-period. This finding suggests that the impact of weak guarantees is larger for riskier banks. However, the results become insignificant once we control for conduit fixed effects or sponsor-time fixed effects. This result suggests that the financial strength of the sponsor affects the conduit's ability to roll-over asset-backed commercial paper but the effect is not very robust.

We also estimate the impact of guarantees on overnight spreads of asset-backed commercial paper. Again, our baseline specification is:

$$Spread_{it} = \alpha + \beta Guarantee_j + \gamma After_t * Guarantee_j + Time_t + \varepsilon_{it}$$

where $Spread_{it}$ is the overnight spread (1 to 4 days of maturity) over the Federal Funds rate on new issues by conduit *i* on day *t*. All right-hand side variables have the same interpretation as in the issuance regression, but time-dependent variables are now measured daily.

Column (1) in Table 7 reports the results of estimating our baseline specification. The significant coefficients on extendible notes and SIVs suggest that spreads increase more for conduits with weaker guarantees compared to conduits with stronger guarantees. The coefficient on full credit guarantees shows that there is no statistically significant difference between full credit and full liquidity guarantees. Columns (2) and (3) show that the results are robust to controlling for time fixed effects and conduit fixed effects. Column (4) controls for sponsor-time fixed effects, such that the coefficients are estimated off variation across guarantees for the same sponsor. We find that results are robust but the point estimate on extendible is not statistically significant. Overall, these results suggest that guarantees affect the spreads on overnight asset-backed commercial paper even after controlling for changes in sponsor quality.

Column (5) to (8) control for asset classes using indicator variables for asset classes and interactions of the $After_t$ indicator and asset classes. We find that coefficients on the interaction of the $After_t$ indicator and extendibles decreases after controlling for asset classes and are not statistically significant. However, all point estimates remain positive. The coefficients on the $After_t$ indicator and SIV guarantees remain almost unchanged and are statistically significant. Moreover we find that the coefficient on the interaction of the $After_t$ indicator and the loans indicator is generally positive and the coefficient on the interaction of the $After_t$ indicator and receivables

indicator is positive. Overall, the results are suggest that spreads increase more for weaker guarantees even after controlling for asset classes.

Table 8 examines whether the impact of guarantees is stronger for riskier banks using CDS spreads. Again, we report the baseline specifications for the restricted sample in Columns (1) and (4). The results for the restricted sample are similar to Table 7. Columns (5) to (8) report specification with triple interactions of the $After_t$ indicator, the $Guarantee_j$ indicators, and the CDS spread. We include all two-way interactions. Columns (5) and (6) find a stronger effect of extendibles for riskier banks. There is no statistically significant effect for SIV guarantees. After controlling for conduit-fixed effects and sponsor-time fixed effects, the coefficients become insignificant. Overall, these results suggest that the impact of guarantees is stronger for riskier banks but the results are not very robust.

In summary, we find that after the start of the financial crisis conduits with weaker guarantees decreased issuance more and paid higher spreads than conduits with stronger guarantees. These patterns are somewhat stronger for weaker sponsors as measured by CDS prices, suggesting that quantities and prices in the asset-backed commercial paper market are correlated with the strength of the sponsoring banks. Also, the patterns suggest that the full credit guarantees and full liquidity guarantees were an important part of rendering asset-backed commercial paper risk-free for outside investors.

5.4. Losses of Outside Investors

This section examines the extent of realized risk transfer by analyzing whether outside investors in asset-backed commercial paper were fully repaid after the start of the

financial crisis. The analysis complements the analysis of the impact of guarantees on asset-backed commercial paper outstanding and asset-backed commercial paper spreads. We take the perspective of an investor that was holding asset-backed commercial paper at the start of the crisis and examine whether the investor suffered losses by not rolling over maturing asset-backed commercial paper.

We test the performance of credit guarantees using Moody's Investors Service announcement data from January 2007 to December 2008. Since all conduits are rated, Moody's Investors Service always issues an announcement if a conduit defaults on its obligation to pay off maturing asset-backed commercial paper.

Table 9 presents the results on the ex-post risk transfer. Column (1) reports asset-backed commercial paper outstanding per credit guarantee in July 2007. Columns (2) to (4) show the value-weighted percentage in three categories: conduits that were closed down and repaid all maturing asset-backed commercial paper before December 2008, conduits that remained active and repaid all maturing commercial paper up to December 2008, and conduits that failed to repay maturing asset-backed commercial paper and entered default by December 2008.

The table shows that not a single conduit covered by full credit or full liquidity guarantees defaulted by December 2008. In contrast, 7.4% of conduits covered by extendible notes guarantees and 16.7% of conduits covered by SIV guarantees defaulted by December 2008, respectively. Regarding the sponsor type, we find that conduits sponsored by structured finance firms and mortgage companies were significantly more likely to enter default than conduits sponsored by commercial banks. Overall, we note that 97.5% of outside investors in asset-backed commercial paper were fully repaid.

We do not have data on the losses on conduit assets. The losses depend on the loss rate on conduit assets and unfortunately there is no publicly available information with respect to such loss rates. However, we can use different pieces of information to form an estimate. For example, State Street (2009) announced an after-tax loss of $3.7 billion on conduit asset of $21.8 billion, which amounts to a loss-rate of 22.6% (assuming a tax rate of 25%). Also, the AAA-tranche of ABX-index suggests that the value of collateralized mortgage obligations backed by subprime mortgages dropped by up to 60 percent in months after the start of the financial crisis. The losses on conduit assets are likely to be smaller because many conduits both non-mortgage assets such as receivables. We therefore assume more conservative loss rates of 5% and 15%. Under this assumption, we estimate total losses on conduit assets of $68 billion and $204 billion, respectively. The estimated losses for outside investors are $1.8 billion and $5.2 billion respectively. Consistent with the lack of risk transfer, this analysis shows that most of the losses were borne by sponsors rather than outside investors. However, the level of the estimated losses is only suggestive because we lack the data to compute actual losses.

5.5. Effect of Conduit Exposure on Sponsor Stock Returns

This section analyzes whether banks with higher conduit exposure experienced lower stock returns during the financial crisis. The difficulty in testing this hypothesis is that the financial crisis also affected banks in other ways, some of which may be correlated with conduit exposure. Hence, if we observe that banks with higher conduit exposure have lower returns, then this result may be driven by other bank activities that negatively affect stock prices and are correlated with conduit exposure.

To address this identification issue, we focus on the start of the crisis in the asset-backed commercial paper market on August 9, 2007. We believe this provides a good setting to identify the impact of conduit exposure for two reasons. First, the financial crisis arguably started with the announcement of difficulties in the subprime mortgage market. As shown in Figures 1 and 2, starting on August 9, 2007, investors drastically reduced refinancing of maturing asset-backed commercial paper and, as a result, overnight spreads jumped from 10 basis points to 150 basis points. Hence, it is unlikely that the event study is confounded by other events that happened just prior to August 9, 2007. Second, our analysis focuses on the narrow three-day window around August 9, 2007. This short event window reduces the likelihood that the results may be confounded by other events that happen around the same time.

We start by examining observable characteristics of banks with and without conduit exposure. We restrict our sample to banks with assets of $5 billion or more as of January 1, 2007, because only these banks had the financial strength to support conduits (our results are robust to including smaller banks). We further restrict our analysis to commercial banks based in Europe and the United States and to banks for which share price data is available. We choose this restriction because some countries outside the United States and Europe (in particular Canada) allowed for differently structured credit guarantees which are not comparable.

Table 10 shows the distribution of banks by conduit exposure. We measure conduit exposure as asset-backed commercial paper outstanding relative to equity capital as of January 1, 2007. We sort banks into three groups: banks without conduits, banks with low conduit exposure, and banks with high conduit exposure. Consistent with our

main hypothesis, we find that stock returns were lower for banks with higher conduit exposure. In fact, the data suggest that stock returns monotonically decrease in conduit exposure.

To control for difference in observable characteristics, we estimate the baseline specification:

$$R_i = \alpha + \beta ConduitExp_i + \gamma X_i + \varepsilon_i$$

where R_i is the cumulative stock return of bank *i* computed over the three-day period from August 8, 2007, to August 10, 2007, $ConduitExp_i$ is bank *i*'s conduit exposure, X_i are bank *i*'s observable characteristics as of January 1, 2007, and ε_i is a bank-specific error term. We estimate this specification using robust standard errors to allow for correlation across error terms.

Table 11 presents the results. Column (1) shows that an increase in conduit exposure from 0% to 100% (e.g., Wells Fargo to Citibank) reduces the stock return during the three-day event window by 2.6 percentage points. Column (2) controls for banks size using the natural logarithm of assets and the natural logarithm of equity. The coefficient on conduit exposure decreases to 1.4 percentage points but remains statistically significant. Column (3) adds controls for the equity ratio and the result remains unchanged. Columns (4) and (5) add control variables for funding sources such as the share of deposit funding and the share of short-term debt funding and the results are unaffected. Column (6) adds indicator variables for the country of the sponsoring institution's headquarters. Again, the coefficient of conduit exposure is unaffected and remains statistically significant.

We interpret these results as evidence that banks with higher conduit exposure were more negatively affected by the crisis in the asset-backed commercial paper market. The coefficient is probably a lower bound of the impact, because investors may have underestimated the severity of the downturn or may not have been fully aware of the (relatively opaque) credit guarantees provided to conduits. Also, investors may have anticipated some of the losses because of prior announcements about losses on subprime assets.

To ensure that the results are not driven by outliers, we construct an alternative measure of exposure. We compute the mean exposure of all banks with positive exposure to conduits and divide the banks in two groups: banks with low exposure (below mean) and banks with high exposure (above mean). We estimate the baseline specification using indicator variables for banks with low exposure and bank with high exposure and in unreported results find qualitatively and quantitatively similar effects. We also drop outliers in terms of conduit exposure and banks with less than $50 billion in assets and our results are qualitatively and qualitatively unchanged.

We also examine the relation of conduit exposure and stock returns in the months prior to August 2007. For each month from January 2007 to August 2007, we estimate the same set of regressions as in Table 4 including all controls. Table 12 presents the results. We find no statistically significant relationship between conduit exposure and stock returns from January 2007 to July 2007. However, in the month of the crisis in the asset-backed commercial paper market, August 2007, we find a negative and statistically significant effect of conduit exposure on stock returns after controlling for the full set of observables. The coefficient is twice as large as the coefficient in Table 9. Again, this

finding suggests that investors revised their expectation of the negative effect of conduit exposure on stock returns upwards for several days after the start of the financial crisis. However, we caution our interpretation because the estimation is over a longer event window and therefore may be confounded by other factors.

6. Benefits to banks of securitization without risk transfer

The empirical analysis shows that banks suffered significant losses because conduits were unable to roll over maturing asset-backed commercial paper. This raises the question of how large was the benefit to banks from by setting up conduits.

We can assess the benefits to banks by quantifying how much profit conduits yielded to banks from an ex-ante perspective using a simple back-of-the-envelope calculation. Assuming a risk weight of 100% for underlying assets, banks could avoid capital requirements of roughly 8% by setting up conduits relative to on-balance sheet financing. We assume that banks could finance debt at close to the riskless rate, which is consistent with the rates paid on asset-backed commercial paper before the start of the financial crisis. Further assuming an equity beta of one and a market risk premium of 5%, banks could reduce the cost of capital by 8%*5%=0.004 or 40 basis points by setting up conduits relative to on-balance sheet financing.

It is difficult to estimate the profits generated by conduits because only a few banks report revenues from conduits. For example, Deutsche Bank reports in its annual report in December 2007 that conduits generated fees of Euro 6 million relative to a total commitment of Euro 6.3 billion. Similarly, Bank of New York Mellon reports in December 2006 revenues of $3 million relative to a commitment of $3.2 billion (Arteta et

al., 2008). Assuming that conduits have no costs and revenues are equal to profits, banks earned about 10 basis points on conduit assets.

Comparing this cost and benefit of conduits, it seems clear that conduits would not have been profitable if banks had been required to hold equity against their assets in conduits. In fact, banks would have made a loss of 30 basis points on each dollar invested. However, given that banks were not required to hold equity, they could earn a "profit" of 10 basis points. Conduits were thus a relatively low-return activity but offered a way for banks to attract money-market savings and increase bank size without increasing regulatory capital.

Table 13 lists the 30 largest conduit sponsors. We find that missing capital - the additional capital if conduit asset had been on bank balance sheet - was on average 6.1% of total equity or about $68 billion in total across banks. This is not necessarily a large amount of equity capital, but it masks considerable heterogeneity across banks as the proportion of missing capital ranges from 1.7% to 79.9% of capital levels. The bank with the largest exposure, Sachsen Landesbank, was the first large bank to be bailed out on 17 August 2007 because it was unable to provide the guarantees it had extended to its conduits. Other banks with large exposure such as Westdeutsche Landesbank and ABN Amro (later bought by Royal Bank of Scotland) also suffered large losses due to recourse from conduits and had to be bailed out. Hence, for some smaller banks the conduit activities were in fact large enough to wipe out the entire bank capital. For lager banks, conduit activities were small enough to withstand the losses on conduit assets, but these banks were weakened as the financial crisis continued.

In summary, we point out that an ex-ante capital requirement of 8% against conduit assets would not have been sufficient to cover all possible losses from conduits when the assets declined in value. However, the key observation is that a full capital charge would have been sufficient to discourage banks from setting up conduits in the first place.

7. Conclusion

In this paper we analyze asset-backed commercial paper conduits and show how the structure of risk-sharing in these conduits implies recourse back to bank balance-sheets. We find that outside investors who purchased asset-backed commercial paper had little loss even when collateral backing the conduits deteriorated in quality, supporting our main finding that conduits were a form of securitization without risk transfer. We also find that the stock price deterioration of banks at the start of the financial crisis was linked to the extent of their conduit exposure relative to equity capital. Once the crisis broke out, asset-backed commercial paper spreads rose and issuance fell, and more so where guarantees were weaker and sponsoring banks were weaker.

Our analysis makes it clear that from an economic standpoint conduits are "unregulated" banks that operate in the shadow banking world, but with recourse to regulated entities, mainly commercial banks, that have access to government safety net. Our results also indicate that when these unregulated banks do not have such recourse (extendible notes and SIVs), they struggle to survive a systemic crisis. While some may interpret this finding to justify the accordance of government safety net to all those parts of the shadow banking world that perform maturity mismatch like banks, the bigger

lesson in our view is that the shadow banking world needs to be brought under the purview of prudential regulations.

In particular, the structure of credit guarantees to asset-backed commercial paper conduits was designed by commercial banks to arbitrage regulatory capital requirements. Such possibilities – whereby government-insured banks effectively operate at higher leverage by putting assets off-balance sheet but granting them recourse – deserve regulatory scrutiny, especially when they operate at a scale that conduits did. Regulation should either treat off-balance sheet activities with recourse as on-balance sheet for capital requirement and accounting disclosure purposes, or, require that off-balance sheet activities do not have recourse to bank balance sheets. The current treatment appears to be a recipe for disaster, from the standpoint of transparency as well as capital adequacy of the financial intermediation sector as a whole.

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Figure 1: Asset-backed Commercial Paper Outstanding

This figure shows total asset-backed commercial paper outstanding in the U.S. market from January 2001 to April 2010. The figure is based on weekly data published by the Federal Reserve Board.

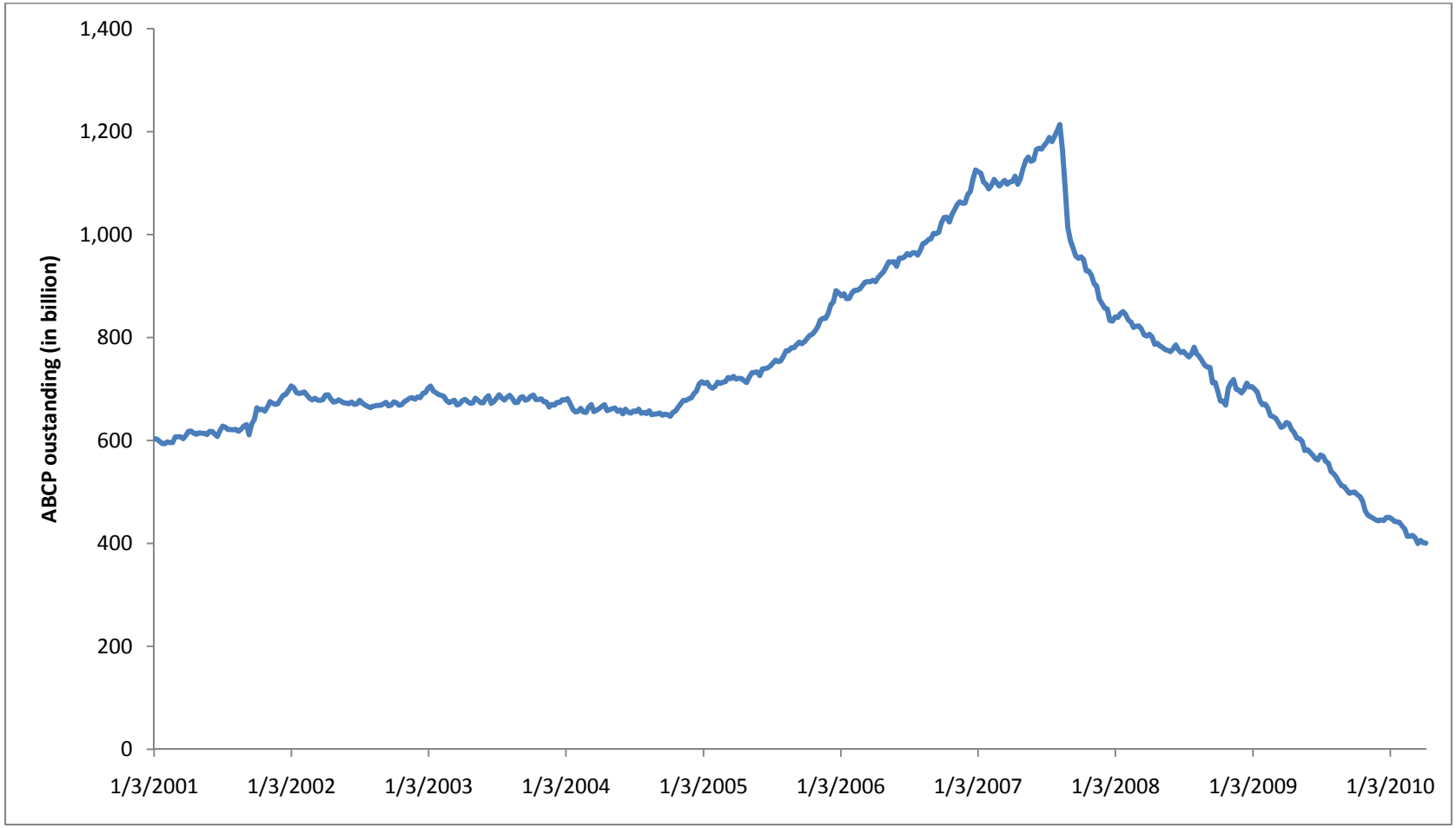

Figure 2: Asset-Backed Commercial Paper Spread

This figure shows the spread of overnight asset-backed commercial paper over the Federal Funds rate from January 2007 to August 2008. The figure is based on market data published by the Federal Reserve Board.

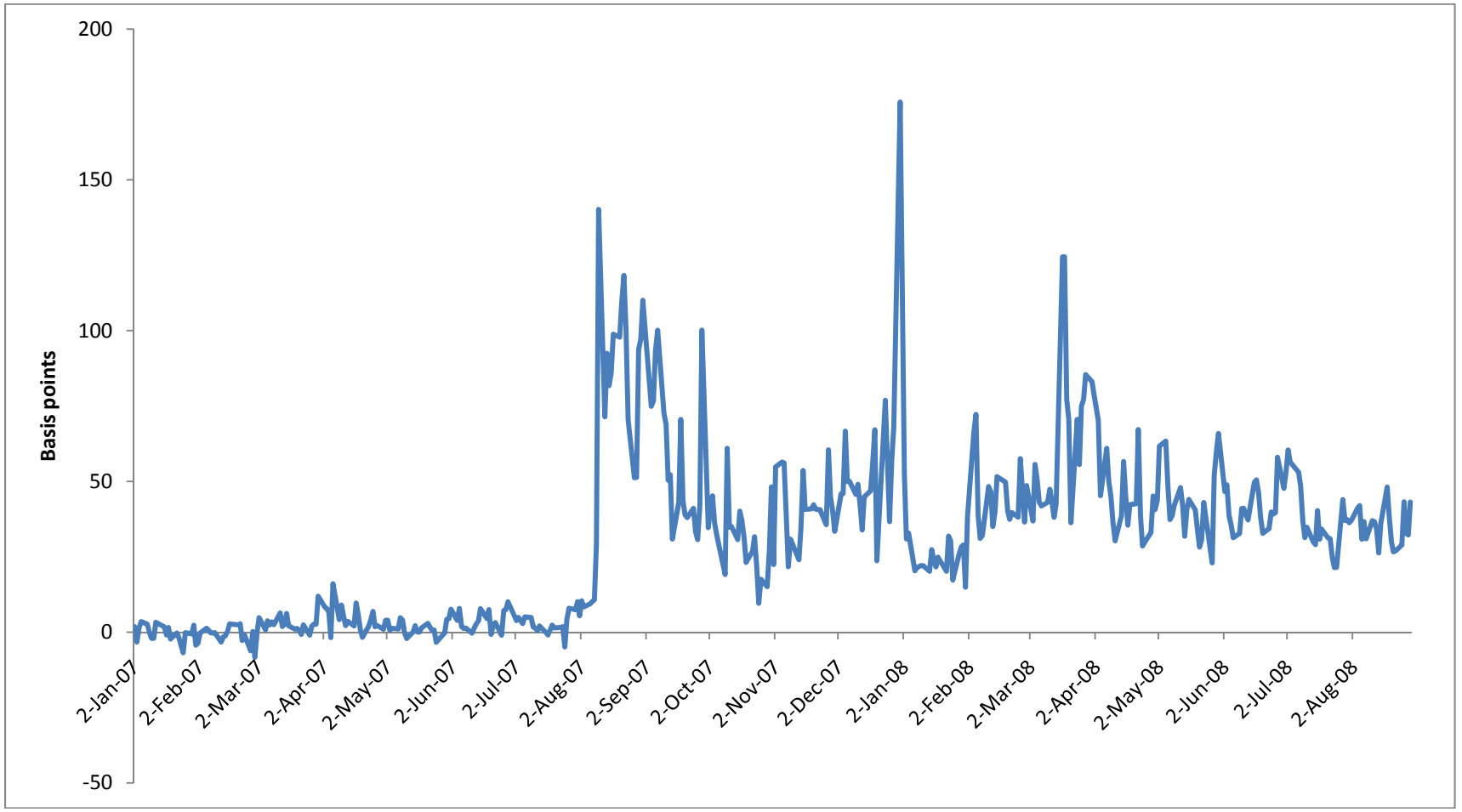

Figure 3: Conduit Structure

This figure illustrates how a conduit is related to its sponsors, outside investors, and asset sellers.

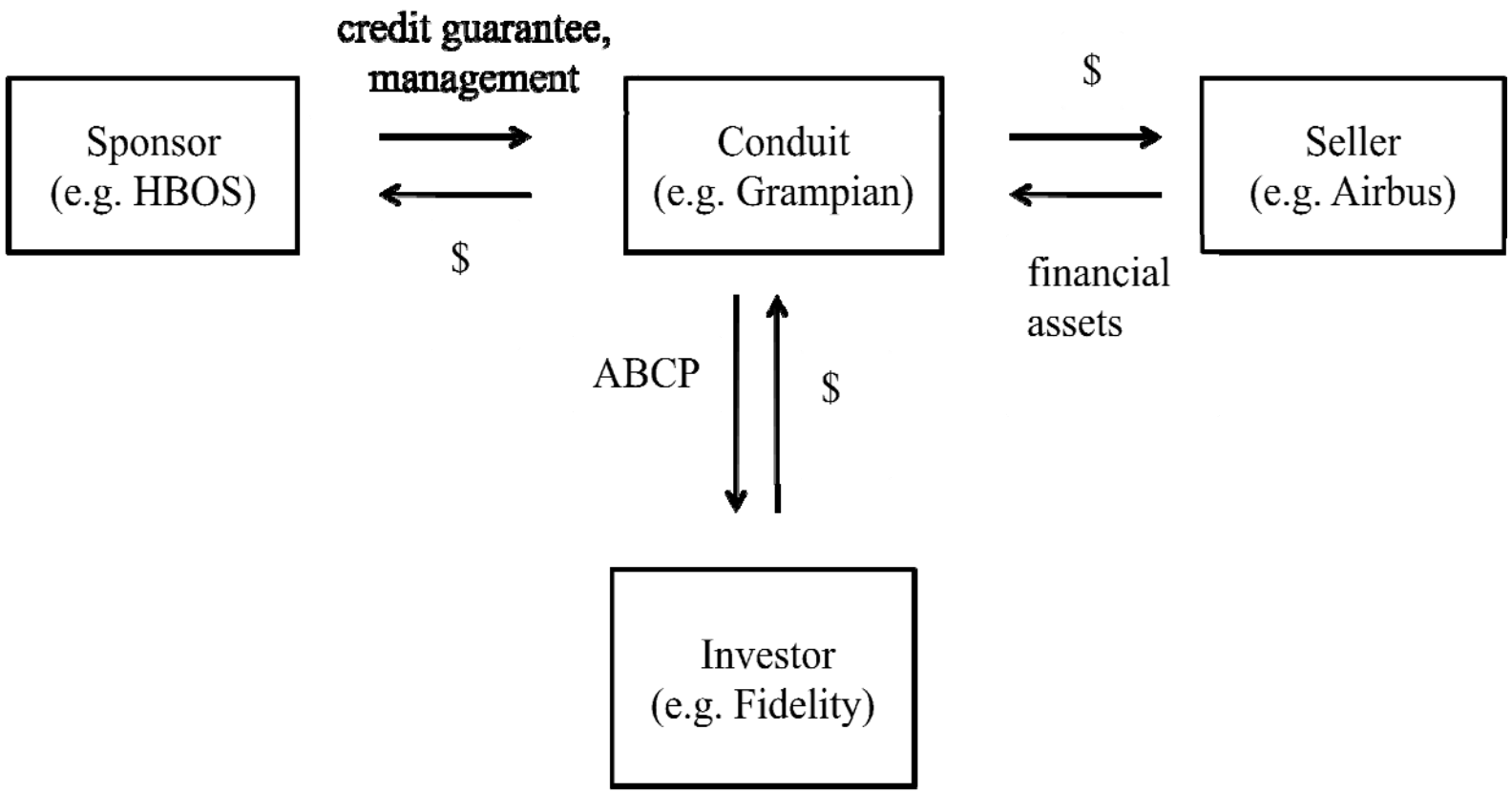

Figure 4: Capital regulation and ABCP outstanding

This figure shows total ABCP outstanding from January 2001 to December 2006. The figure also shows the timeline of regulatory decisions on regulatory capital required for guarantees provided to conduits. The references for the regulatory decisions are in the text.

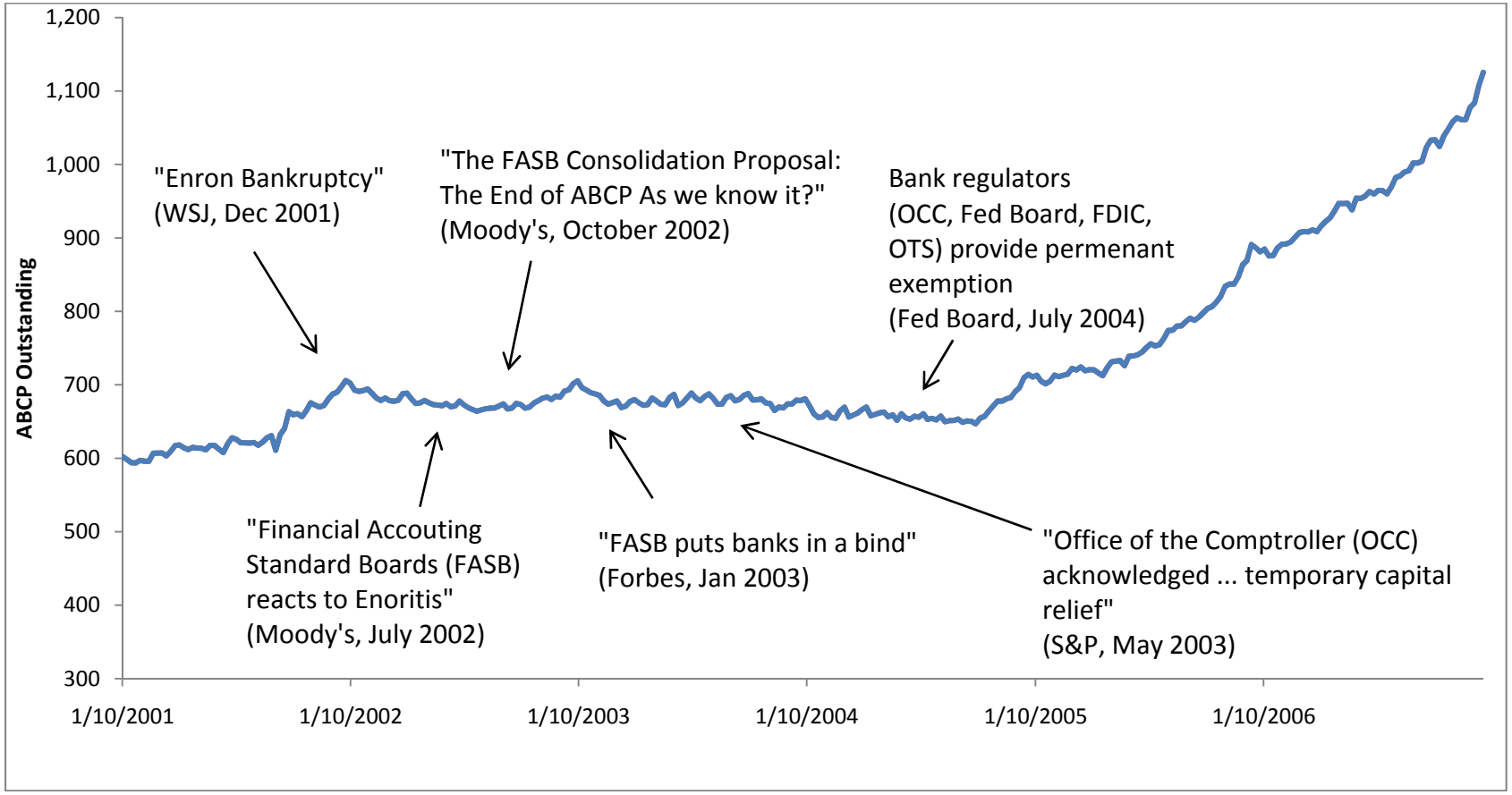

Figure 5: Asset-backed Commercial Paper Outstanding by Credit Guarantee

This figure shows the natural logarithm of asset-backed commercial paper outstanding by the type of credit guarantee three months before and three months after the BNP Paribas announcement (April 11, 2007 to December 12, 2007). Asset-backed commercial paper outstanding is normalized to zero as of one day before the BNP Paribas announcement (August 8, 2009). The figure is based on weekly data from DTCC and reports from Moody's Investors Service.

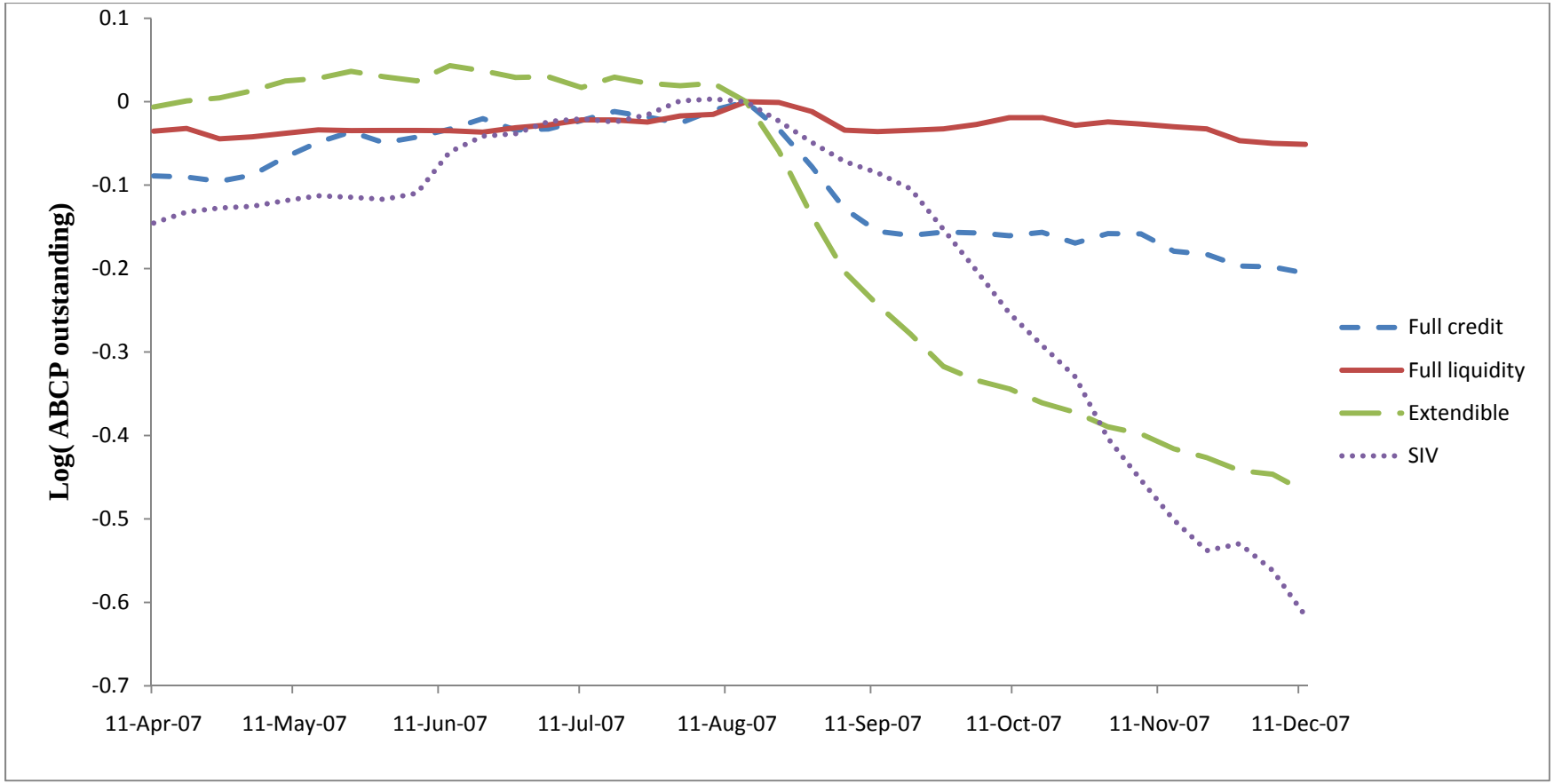

Figure 6: Asset-backed Commercial Paper Spreads by Credit Guarantee

This figure shows spreads of overnight asset-backed commercial paper over the Federal Funds rate by the type of credit guarantee three months before and three months after the BNP Paribas announcement (April 11, 2007 to December 12, 2007). The figure is based on weekly data from DTCC and reports from Moody's Investors Service.

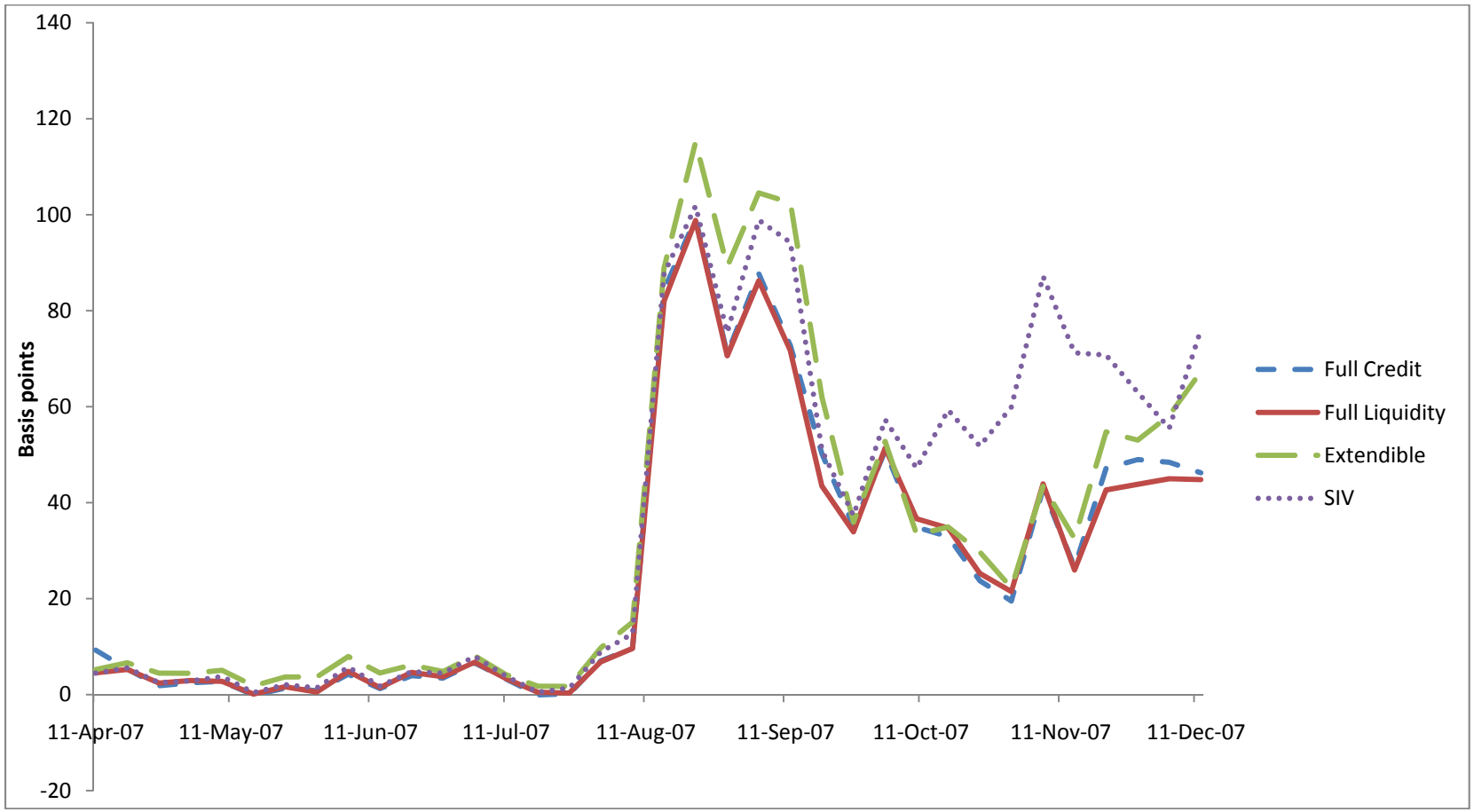

Table 1: Conduits and Sponsors

This table shows the ten largest conduits and sponsors as of 1/1/2007. The sample is restricted to bank-sponsored conduits. The information is collected from Moody's Rating Reports and Bankscope. "ABCP (bn)" denotes asset-backed commercial paper outstanding per conduit and sponsor, respectively. "Asset Origin," "Asset Rating," and "Asset Type" denote characteristics of the main asset class owned by a conduit.

Panel A: Ten Largest Conduits

Program Name	Sponsor	ABCP (bn)	Guarantee	Asset Origin	Asset Rating	Asset Type (Share %)
Grampian Funding	HBOS	37.9	Full Liquidity	United States	AAA	Residential Mortgages (36%)
Amstel Funding	ABN Amro	30.7	Full Liquidity	Netherlands	AAA	CDO/CLO (84%)
Scaldis Capital	Fortis Bank	22.6	Full Liquidity	United States	AAA	Asset backed securities (77%)
Sheffield Receivables	Barclays	21.4	Full Liquidity	n.a.	NR	Mortgages (43%)
Morrigan TRR	Hypo Public	18.9	Full Credit	n.a.	n.a.	Bonds (51%)
Cancara Asset	Lloyds	18.8	Full Liquidity	Great Britain	AAA	Residential Mortgages (43%)
Solitaire Funding	HSBC	18.5	Full Liquidity	United States	AAA	Residential Mortgages (45%)
Rhineland Funding	IKB	16.7	Full Liquidity	United States	AAA	CDO/CLO (95%)
Mane Funding	ING	13.7	Full Liquidity	n.a.	AAA	Asset backed securities (91%)
Atlantis One	Rabobank	13.5	Full Liquidity	United States	NR	Commercial Loans (100%)

Panel B: Ten Largest Sponsors

Sponsor	Country	ABCP (bn)	Assets (bn)	Tier 1 Capital (bn)	ABCP/Tier1 (%)	Tier1 Ratio (%)
Citigroup	United States	92.7	1,884.3	90.9	102.0%	8.6%
ABN Amro	Netherlands	68.6	1,300.0	31.2	219.5%	8.5%
Bank of America	United States	45.7	1,459.7	91.1	50.2%	8.6%
HBOS Plc	Great Britain	43.9	1,161.7	44.0	99.7%	8.1%
JP Morgan	United States	42.7	1,351.5	81.1	52.7%	8.7%
HSBC	Great Britain	39.4	1,860.8	87.8	44.9%	9.4%
Deutsche Bank AG	Germany	38.7	2,070.0	31.0	125.0%	8.5%
Société Générale	France	38.6	1,260.2	29.4	131.3%	7.8%
Barclays Plc	Great Britain	33.1	1,956.7	45.2	73.2%	7.7%
Rabobank	Netherlands	30.7	732.9	34.8	88.3%	10.7%

Table 2: Conduit and Sponsor Statistics

This table includes all conduits rated by Moody's Investors Service as of 1/1/2007. Panel A shows summary statistics by conduit. "Risk Transfer" refers to the guarantees provided by the sponsor. "Assets" is the main asset type as provided by Moody's Investors Service. "Currency" is the conduit's issuing currency. Panel B aggregates conduits by sponsor. "Sponsor Type" is the type of sponsoring institution. "Country of Origin" denotes the sponsor's headquarters.

Panel A: Conduits				
	Total		Per Conduit	
	# Conduits	Size (bn)	Mean	Std.
All Conduits	301	1,236.2	4.1	(5.1)
Risk Transfer				
Full Liquidity	163	752.9	4.6	(5.7)
Full Credit	55	159.9	2.9	(4.6)
Extendible Notes	55	230.9	4.2	(4.5)
SIV	28	92.6	3.3	(3.4)
Assets				
Asset-backed Securities	91	387.4	4.2	(5.9)
Loans	39	65.3	1.6	(2.4)
Receivables	88	436.7	3.5	(4.9)
Mixed asset categories	59	272.9	4.6	(5.3)
Other	24	74.0	4.9	(4.7)
Currency				
U.S. Dollar	233	973.0	4.2	(4.6)
Euro	33	220.0	6.7	(8.4)
Other	35	43.2	1.2	(1.6)
Panel B: Sponsors				
	Total		Per Sponsor	
	# Sponsors	Size (bn)	Mean	Std.
All Programs	127	1,236.2	9.7	(14.7)
Sponsor type				
Commercial Banks	67	911.4	13.6	(17.6)
Structured Finance	19	155.8	8.2	(13.7)
Mortgage Lender	18	75.5	4.2	(5.8)
Investment Manager	5	17.6	3.5	(3.3)
Investment Banks	4	11.0	2.7	(2.2)
Other	14	64.8	4.6	(6.2)
Country of Origin				
United States	67	491.8	7.3	(14.7)
Germany	15	204.1	13.6	(11.6)
United Kingdom	10	195.7	19.6	(17.0)
Other	35	344.5	9.8	(14.4)

Table 3: Asset-backed Commercial Paper by Sponsor Type and Guarantee

This table includes all conduits that were rated by Moody's Investors Service as of 1/1/2007. The 'Total' shows total asset-backed commercial paper outstanding as of 1/1/2007 per type of sponsor. The 'Guarantee' shows the breakdown of asset-backed commercial paper by type of credit guarantee.

	Total		Guarantee			
	# Sponsors	Size (bn)	Full Liquidity	Full Credit	Extendible	SIV
Commercial Banks	64	911.4	74.2%	10.9%	8.6%	6.3%
Structured Finance	19	155.8	7.0%	37.2%	34.7%	21.1%
Mortgage Lender	18	75.5	14.3%	0.0%	82.8%	2.9%
Investment Manager	5	17.6	0.0%	1.3%	98.7%	0.0%
Investment Banks	4	11.0	54.9%	0.0%	45.1%	0.0%
Other	14	64.8	74.8%	2.3%	22.9%	0.0%

Table 4: Conduits and Sponsor Statistics by Guarantee

This table reports the breakdown of asset-backed commercial paper (ABCP) outstanding by type of guarantee, sponsor, and main asset holdings for all conduits that were rated by Moody's Investors Service as of 1/1/2007. The column 'Total' shows total ABCP outstanding in dollars as of 1/1/2007 per type of guarantee: Full Liquidity, Full Credit, Extendibles, and Structured Investment Vehicles (SIVs). The column 'Spreads' shows the mean spread of overnight asset-backed commercial paper over the Fed funds rate in percentage points in the period from 1/1/2007 to 8/8/2009 per type of guarantee. The standard deviation of the overnight spread is below in brackets. The column 'Sponsor' reports, for each type of guarantee, the percent of ABCP outstanding by type of sponsor: Banks, Structured Finance groups (SF), Mortgage Finance companies, and Other. The column 'Asset' reports, for each type of guarantee, the breakdown of ABCP outstanding by asset type: Asset-Backed Securities, Loans, Receivables, Mix of the previous categories, and Other. For example 29.2% of ABCP outstanding at full liquidity conduits is accounted for by conduits that report that Asset-Backed Securities as the main asset in their portfolios..

Guarantee	Total (bn)	Spread (%)	Sponsor	%	Asset	%
Full Liquidity	752.8	0.010	Banks	89.9%	Asset-backed securities	29.2%
		(0.091)	SF	1.5%	Loans	3.7%
			Mortgage	1.4%	Mix	20.8%
			Other	7.2%	Other	3.6%
					Receivables	42.6%
Full Credit	159.9	0.025	Banks	62.4%	Asset-backed securities	10.2%
		(0.155)	SF	36.5%	Loans	0.5%
			Mortgage	1.1%	Mix	39.4%
			Other	0.0%	Other	11.9%
					Receivables	37.9%
Extendibles	230.9	0.017	Banks	33.8%	Asset-backed securities	28.8%
		(0.081)	SF	23.6%	Loans	15.6%
			Mortgage	27.1%	Mix	23.0%
			Other	15.6%	Other	8.5%
					Receivables	24.0%
SIV	92.6	0.022	Banks	61.8%	Asset-backed securities	91.3%
		(0.040)	SF	34.5%	Loans	8.7%
			Mortgage	2.4%	Mix	0.0%
			Other	1.4%	Other	0.0%
					Receivables	0.0%

Table 5: Effect of Guarantee on Asset-Backed Commercial Paper Outstanding

This table shows the effect of credit guarantees on asset-backed commercial paper outstanding. The sample covers the period April to December 2007. The dependent variable is the log of paper outstanding measured in millions of dollars at a weekly frequency. "Full Credit," "Extendible Notes," and" SIV" are indicator variables for the type of credit guarantee. The indicator variable "After" denotes dates after the crisis starting on August 9, 2007. "Receivables" ("Loans") is an indicator for variable conduits that report to Moody's Investors Service that the main type of asset in their portfolio are receivables (loans). Columns (4) to (8) include dummies for main type of asset type (Asset-Backed Securities (the omitted category), Loans, Receivables, Mix of the previous types, and Other) and their interaction with the "After" indicator. For compactness, we report the coefficient on "Receivables" and "Loans" only. Standard errors in brackets are clustered at the conduit level. * significant at 10%; ** significant at 5%; *** significant at 1%

	Log(ABCP outstanding)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Credit*After	-0.068	-0.062	0.061	-0.005	-0.026	-0.016	0.065	0.023
	(0.124)	(0.125)	(0.130)	(0.202)	(0.132)	(0.134)	(0.135)	(0.212)
Extendible*After	-0.725***	-0.748***	-0.880***	-0.681*	-0.750***	-0.775***	-0.818***	-0.683*
	(0.201)	(0.204)	(0.200)	(0.404)	(0.198)	(0.201)	(0.201)	(0.404)
SIV*After	-0.697***	-0.694***	-0.563***	-0.454	-0.575***	-0.570***	-0.451**	-0.391
	(0.156)	(0.157)	(0.157)	(0.290)	(0.168)	(0.169)	(0.176)	(0.330)
Receivables*After					0.179	0.184	0.198	0.211
					(0.175)	(0.174)	(0.155)	(0.244)
Loans*After					-0.742**	-0.789**	-0.556*	-0.507*
					(0.304)	(0.310)	(0.284)	(0.293)
After	-0.213**				-0.144			
	(0.084)				(0.158)			
Observations	7630	7630	7630	7630	7630	7630	7630	7630
R-squared	0.053	0.057	0.849	0.937	0.156	0.162	0.853	0.938
Time-fixed effects?	No	Yes	Yes	No	No	Yes	Yes	No
Sponsor-time-fixed effects?	No	No	No	Yes	No	No	No	Yes
Conduit-fixed effects?	No	No	Yes	Yes	No	No	Yes	Yes

Table 6: Effect of Sponsor Risk on Asset-Backed Commercial Paper Outstanding

This table shows the effect of sponsor risk on asset-backed commercial paper outstanding. The sample covers the period April to December 2007. The dependent variable is the log of paper outstanding measured in millions of dollars at a weekly frequency. "Full Credit," "Extendible Notes," and" SIV" are indicator variables for the type of credit guarantee. The indicator variable "After" denotes dates after the crisis starting in August 9, 2007. "CDS" is the CDS Spread of the sponsor. Columns (4) to (8) include all two-way interactions of "Sponsor CDS". Standard errors in brackets are clustered at the conduit level. * significant at 10%; ** significant at 5%; *** significant at 1%

	Log(ABCP outstanding)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Credit*After	0.032	0.036	0.068	0.037	-0.483	-0.598	-0.144	-0.147
	(0.151)	(0.152)	(0.148)	(0.211)	(0.418)	(0.432)	(0.222)	(0.294)
Extendible*After	-0.665*	-0.705**	-0.856**	-0.438	-0.464	-0.476	-0.525	-1.275*
	(0.345)	(0.356)	(0.385)	(0.438)	(0.424)	(0.433)	(0.456)	(0.746)
SIV*After	-0.577**	-0.576**	-0.489**	-0.535	-0.108	-0.174	0.233	0.19
	(0.222)	(0.224)	(0.229)	(0.336)	(0.497)	(0.486)	(0.511)	(0.724)
CDS*Full Credit*After					2.024*	2.267*	0.483	0.537
					(1.079)	(1.154)	(0.437)	(0.628)
CDS*Extendible*After					-0.983*	-1.032**	-0.529	3.023
					(0.510)	(0.510)	(0.358)	(1.737)
CDS*SIV*After					-1.733	-1.611	-1.569	-1.842
					(1.109)	(1.108)	(1.159)	(1.500)
After	-0.270***				-0.282			
	(0.085)				(0.172)			
Time-fixed effects?	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Conduit-fixed effects?	No	No	Yes	Yes	No	No	Yes	Yes
Sponsor-time fixed effects	No	No	No	Yes	No	No	No	Yes
Observations	4,448	4,448	4,448	4448	4,448	4,448	4,448	4,448
R-squared	0.141	0.147	0.844	0.909	0.153	0.362	0.849	0.912

Table 7: Effect of Guarantee on Overnight Asset-Backed Commercial Paper Spreads

This table shows the effect of guarantees on asset-backed commercial paper spreads. The sample covers the period April to December 2007. The dependent variable is the overnight asset-backed commercial paper spread over the Fed Funds rate in the primary market measured daily. The explanatory variables are defined the same way as in Table 5. Columns (4) to (8) include dummies for main type of asset type (Asset-Backed Securities (the omitted category), Loans, Receivables, Mix of the previous types, and Other) and their interaction with the "After" indicator. For compactness, we report the coefficient on "Receivables" and "Loans" only.. Standard errors shown are clustered at the conduit level. * significant at 10%; ** significant at 5%; *** significant at 1%

	Spread							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Credit*After	0.023	0.025	0.041	-0.004	-0.007	-0.004	-0.015	-0.1
	(0.055)	(0.055)	(0.058)	(0.103)	(0.054)	(0.054)	(0.054)	(0.077)
Extendible*After	0.129**	0.093**	0.135***	0.068	0.047	0.013	0.021	-0.119
	(0.054)	(0.047)	(0.050)	(0.110)	(0.063)	(0.057)	(0.061)	(0.214)
SIV*After	0.316***	0.254***	0.260***	0.315**	0.244**	0.196**	0.166	0.245**
	(0.099)	(0.082)	(0.093)	(0.132)	(0.108)	(0.091)	(0.109)	(0.107)
Loan*After					0.216	0.215	0.122	0.437***
					(0.165)	(0.165)	(0.172)	(0.105)
Receivables*After					-0.142*	-0.128	-0.164**	-0.162
					(0.076)	(0.079)	(0.077)	(0.106)
After	0.474***				0.484***			
	(0.026)				(0.072)			
Observations	14,862	14,862	14,862	14,862	14,862	14,862	14,862	14,862
R-squared	0.444	0.717	0.843	0.952	0.493	0.766	0.865	0.960
Time-fixed effects?	No	Yes	Yes	No	No	Yes	Yes	No
Sponsor-time-fixed effects?	No	No	No	Yes	No	No	No	Yes
Conduit-fixed effects?	No	No	Yes	Yes	No	No	Yes	Yes

Table 8: Effect of Sponsor Risk on Overnight Asset-Backed Commercial Paper Spreads

This table shows the effect of credit guarantees on asset-backed commercial paper spreads. The sample covers the period April to December 2007. The dependent variable is the asset-backed commercial paper spread on overnight commercial paper in the primary market measured daily. The explanatory variables are defined the same way as in Table 6. Columns (4) to (8) include all two-way interactions of "Sponsor CDS". Standard errors shown are clustered at the conduit level. * significant at 10%; ** significant at 5%; *** significant at 1%

	Overnight spread							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Credit*After	-0.098	-0.1	-0.038	-0.074	-0.03	-0.088	-0.05	-0.105
	(0.073)	(0.072)	(0.072)	(0.123)	(0.082)	(0.095)	(0.081)	(0.111)
Extendible*After	0.191	0.083	0.215**	0.186	-0.216***	-0.190***	0.016	0.26
	(0.127)	(0.089)	(0.108)	(0.148)	(0.059)	(0.051)	(0.262)	(0.434)
SIV*After	0.205*	0.163*	0.182**	0.305***	0.389***	0.256*	0.280**	0.410***
	(0.112)	(0.087)	(0.091)	(0.114)	(0.141)	(0.152)	(0.115)	(0.137)
CDS*Full Credit*After	0.466***				-0.240*	-0.016	0.054	0.229
	(0.032)				(0.122)	(0.117)	(0.180)	(0.200)
CDS*Extendible*After					0.823***	0.550***	0.328	-0.3
					(0.192)	(0.072)	(0.319)	(0.731)
CDS*SIV* After					-0.572	-0.268	-0.273	-0.254
					(0.394)	(0.320)	(0.259)	(0.263)
After	-0.270***				0.471***			
	(0.085)				(0.035)			
Time-fixed effects?	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Conduit-fixed effects?	No	No	Yes	Yes	No	No	Yes	Yes
Sponsor-time fixed effects	No	No	No	Yes	No	No	No	Yes
Observations	9510	9510	9510	9510	9510	9510	9510	9510
R-squared	0.401	0.676	0.839	0.932	0.408	0.68	0.84	0.932

Table 9: Estimated Losses for Sponsors and Outside Investors

This table shows the ex-post risk transfer by credit guarantee. "Pre-crisis" denotes total asset-backed commercial paper outstanding as of 7/1/2007. Post-crisis denotes the value-weighted share that is "Active" (conduit continues to issue), "Repaid" (conduit closed and repaid investors), and "In Default" (Conduit closed and investor not repaid). "Estimated losses" estimates the losses of sponsor and outside investors assuming a recovery rate on conduit assets of 95% and 85%, respectively.

	Pre-Crisis	Post-Crisis			Estimated Loss (bn)			
					Loss rate: 5%		Loss rate 15%	
	ABCP (bn)	Active	Repaid	In Default	Sponsor	Investor	Sponsor	Investor
All	1,395.50	76.60%	20.80%	2.50%	68.0	1.7	204.1	5.2
Risk Transfer					0.0	0.0	0.0	0.0
Full Liquidity	844	87.90%	12.10%	0.00%	42.2	0.0	126.6	0.0
Full Credit	204.2	70.90%	29.10%	0.00%	10.2	0.0	30.6	0.0
Extendibles	243.1	47.00%	45.50%	7.40%	11.3	0.9	33.8	2.7
SIV	104.1	65.70%	17.70%	16.60%	4.3	0.9	13.0	2.6
Sponsor Type					0.0	0.0	0.0	0.0
Commercial Bank	1,035.60	83.00%	16.40%	0.60%	51.5	0.3	154.4	0.9
Structured Finance	199.2	58.10%	36.40%	5.50%	9.4	0.5	28.2	1.6
Mortgage Lender	60.2	44.50%	40.20%	15.30%	2.5	0.5	7.6	1.4
Other	100.4	63.30%	24.40%	8.90%	4.6	0.4	13.7	1.3

Table 10: Event Study Summary Statistics

This table shows summary statistics by conduit exposure. We sort banks in three groups: bank with no conduit exposure, banks with low conduit exposure, and banks with high conduit exposure. We restrict the sample to commercial banks that (i) are among the 300 largest financial institutions, (ii) are located in the Europe or the United States, and (iii) have share price data available. We measure 'Stock Return' as the total stock return in the three-day window from August 8,2007, to August 10, 2007, 'Exposure' is the asset-backed commercial paper outstanding relative to equity, 'Log Assets' is the natural logarithm of assets, 'Log Equity' is the natural logarithm of equity, 'Equity Ratio' is equity as share of assets, 'Share Deposits' is deposits as share of assets, and 'Share Short-Term Debt' is short-term debt as share of assets. All variables are measured as of January 1, 2007. 'United States' is an indicator variable whether a bank is headquartered in the United States.

		Conduit Exposure		
Sample:	All	No	Low	High
	(1)	(2)	(3)	(4)
Stock return Aug 8th - Aug 10th	-0.004	0.007	-0.028	-0.046
	(0.052)	(0.055)	(0.024)	(0.026)
Conduit Exposure	0.169	0.000	0.248	1.199
	(0.532)	0.000	(0.131)	(1.155)
Log(Assets)	3.961	3.154	6.379	6.325
	(2.284)	(1.987)	(1.077)	(1.280)
Log(Equity)	1.355	0.670	3.671	3.025
	(2.043)	(1.832)	(0.877)	(1.161)
Equity Ratio	0.091	0.101	0.076	0.043
	(0.099)	(0.111)	(0.038)	(0.026)
Share Deposits	0.602	0.63	0.530	0.504
	(0.208)	(0.223)	(0.112)	(0.145)
Share Short-Term Debt	0.073	0.050	0.122	0.167
	(0.084)	(0.050)	(0.117)	(0.129)
US Indicator Variable	0.542	0.613	0.400	0.250
	(0.501)	(0.490)	(0.507)	(0.452)
N	107	80	15	12

Table 11: Effect of Conduit Exposure on Stock Returns (August 8, 2007 – August 10, 2007)

This table shows the effect of conduit exposure on stock return. We restrict the sample to commercial banks that (i) are among the 300 largest financial institutions (ii) are located in the Europe or the United States, and (iii) have share price data available. The dependent variable is the total stock return over the three-day period from August 8, 2007 to August 10, 2007. We measure 'Conduit Exposure' as asset-backed commercial paper relative to equity. Columns (2) to (6) include control variables for the ratio of short-term assets to debt, the ratio of equity to assets, log(Assets) and log(Equity). All control variables are measured as of January 1, 2007. Column (6) includes fixed effects for Germany, Great Britain, and the United States. Robust standard errors are in parentheses below coefficients. * significant at 5%; ** significant at 1%

	Dependent Variable: Stock Return					
	(1)	(2)	(3)	(4)	(5)	(6)
Conduit Exposure	-0.026	-0.014	-0.011	-0.013	-0.014	-0.015
	(0.007)**	(0.004)**	(0.003)**	(0.003)**	(0.003)**	(0.004)**
Log(Assets)		-0.007	-0.022	-0.024	-0.027	0.005
		(0.005)	(0.008)**	(0.008)**	(0.009)**	-0.015
Log(Equity)		-0.004	0.012	0.013	0.015	-0.016
		(0.007)	(0.009)	(0.009)	(0.009)	(0.015)
Equity-Assets Ratio			-0.099	-0.103	-0.137	-0.006
			(0.029)**	(0.031)**	(0.037)**	(0.065)
Share Short Term Debt				0.066	0.063	0.039
				(0.041)	(0.041)	(0.042)
Share Deposits					-0.027	-0.017
					(0.017)	(0.026)
Constant	0.000	0.033	0.079	0.082	0.111	0.036
	(0.005)	(0.015)*	(0.025)**	(0.026)**	(0.032)**	(0.042)
Country FE	N	N	N	N	N	Y
Observations	107	107	107	107	107	107
R-squared	0.068	0.277	0.289	0.297	0.303	0.359

Table 12: Conduit Exposure and Stock Return in Months before Start of Financial Crisis (January to August 2007)

This table shows the effect of conduit exposure on stock return in the months before the start of the financial crisis. We restrict the sample to commercial banks that (i) are among the 300 largest financial institutions, (ii) are located in the Europe or the United States, and (iii) have share price data available. The dependent variable is the total stock return for the month indicated at the top of each column. We measure 'Conduit Exposure' as bank-sponsored ABCP outstanding relative to equity. All columns include control variables for the ratio of short-term assets to debt, the ratio of equity to assets, log(Assets), and log(Equity), and geographic controls. All control variables are measures on 1/1/2007. Robust standard errors are in parentheses below coefficients. * significant at 5%; ** significant at 1%

	Dependent Variable: Stock Return							
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure	0.008	-0.006	0.003	-0.005	0.004	0.006	0.014	-0.029
	(0.012)	(0.005)	(0.005)	(0.009)	(0.010)	(0.008)	(0.011)	(0.009)**
Log(Assets)	-0.026	-0.03	-0.033	-0.005	-0.042	-0.012	-0.037	-0.006
	(0.024)	(0.018)	(0.023)	(0.024)	(0.021)	(0.021)	(0.032)	(0.025)
Log(Equity)	0.033	0.031	0.029	0.02	0.043	0.01	0.043	-0.002
	(0.024)	(0.018)	(0.024)	(0.023)	(0.021)*	(0.022)	(0.031)	(0.026)
Equity-Assets Ratio	-0.058	-0.117	-0.134	0.016	-0.2	0.105	-0.098	-0.058
	(0.120)	(0.082)	(0.099)	(0.112)	(0.110)	(0.078)	(0.172)	(0.115)
Share Short Term Debt	-0.036	-0.081	0.096	0.078	-0.064	0.064	0.012	0.029
	(0.044)	(0.041)	(0.050)	(0.072)	(0.090)	(0.048)	(0.071)	(0.106)
Share Deposits	-0.053	-0.013	-0.005	-0.021	-0.055	0.071	0.057	0.008
	(0.036)	(0.028)	(0.035)	(0.046)	(0.052)	(0.056)	(0.086)	(0.052)
Constant	0.08	0.092	0.168	0.04	0.149	-0.077	0.082	0.009
	(0.067)	(0.051)	(0.059)**	(0.066)	(0.059)*	(0.050)	(0.092)	(0.068)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	107	107	107	107	107	107	107	107
R-squared	0.648	0.337	0.376	0.522	0.301	0.196	0.295	0.258

Table 13: Missing Capital

This table lists the 30 largest banks sponsors of ABCP as of 1/1/2007. For each bank, we compute the required capital assuming ABCP requires a capital charge of 8%, i.e. ABCP*0.08=Total, expressed in billions of US dollars.. We also compute the 'missing capital' as a share of a bank's equity. We measure equity as Tier 1 Capital. If a bank does not report Tier 1 Capital, we multiply shareholder equity with the average Tier 1/equity shareholder ratio of banks that report both shareholder equity and Tier 1 ratio.

			Missing Capital	
Name	Tier 1	ABCP	Total	%
Citigroup Inc	90.9	92.672	7.4	8.2%
ABN Amro Holding NV	31.2	68.575	5.5	17.6%
Bank of America Corporation	91.1	45.691	3.7	4.0%
HBOS Plc	44.0	43.9	3.5	8.0%
JP Morgan Chase & Co.	81.1	42.714	3.4	4.2%
HSBC Holdings Plc	87.8	39.426	3.2	3.6%
Deutsche Bank AG	31.0	38.736	3.1	10.0%
Société Générale	29.4	38.639	3.1	10.5%
Barclays Plc	45.2	33.07	2.6	5.9%
Mitsubishi UFJ Financial Group	68.5	32	2.6	3.7%
Rabobank Nederland	34.8	30.773	2.5	7.1%
WestLB AG	9.5	29.946	2.4	25.1%
ING Groep NV	54.3	26.417	2.1	3.9%
Dresdner Bank AG	18.7	23.191	1.9	9.9%
Fortis	16.4	22.596	1.8	11.0%
Bayerische Landesbank	15.8	22.352	1.8	11.3%
Bayerische Hypo-und Vereinsbank AG	14.1	22.263	1.8	12.6%
State Street Corporation	24.1	21.855	1.7	7.2%
Crédit Agricole S.A.	6.5	19.48	1.6	24.1%
Hypo Real Estate Holding AG	4.5	18.931	1.5	33.4%
Lloyds Banking Group Plc	6.1	18.782	1.5	24.6%
Countrywide Financial Corporation	25.2	18.305	1.5	5.8%
GMAC LLC	15.4	17.539	1.4	9.1%
Royal Bank of Scotland	75.2	15.847	1.3	1.7%
Royal Bank of Canada RBC	52.3	15.602	1.2	2.4%
Bear Stearns Companies LLC	19.1	13.845	1.1	5.8%
KBC Group	22.9	12.606	1.0	4.4%
Sachsen Landesbank	1.3	12.528	1.0	79.9%
BNP Paribas	62.3	11.647	0.9	1.5%
Bank of Montreal	45.3	11.528	0.9	2.0%
Total	1,124.0	861.5	68.9	6.1%