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# Shadow Banking and the Funding of the Nonfinancial Sector

Joshua Gallin

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## Introduction

The financial and economic upheaval of the past few years has provided a harsh reminder of the dangers of overreliance on short-term funding. The financial crisis also revealed how little regulators, supervisors, and market participants themselves know about the extent to which such funding was, and continues to be, provided by what is now commonly known as the shadow banking system. Recent research has improved our understanding of the role played by elements of the shadow banking system. Pozsar et al. (2010) gives an overview of the shadow banking system, Pozsar (2011) provides information on investors' pools of cash, and Ricks (2011) examines the growth of private money claims. Others have examined particular instruments used in shadow banking, such as repurchase agreements (Gorton and Metrick 2010), asset-backed commercial paper (Covitz, Liang, and Suarez 2009; Acharya, Schnabl, and Suarez 2011), auction rate securities and variable-rate demand notes (Han and Li 2010), and money market mutual funds (McCabe 2010).

In this chapter I describe a way to use data from the Financial Accounts of the United States<sup>1</sup> (FA) and other readily available sources to provide rough

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1. The Federal Reserve Board's Z.1 statistical release, previously named the Flow of Funds Accounts of the United States, was renamed the Financial Accounts of the United States for the June 2013 publication.

“top-down” measures of the size of the domestic shadow banking system.<sup>2</sup> In particular, I estimate the amount of debt financing of the *nonfinancial* sectors of the US economy that is dependent on the shadow banking system. I loosely define shadow-bank funding of the nonfinancial sector as funding provided to households, nonfinancial businesses, and federal, state, and local governments that have a “runnable” link in their intermediation chain. My definition of a runnable link is that the financial intermediary relies significantly on short-term funding that is not insured by the Federal Deposit Insurance Corporation (FDIC) and that the intermediary does not have direct access to the Federal Reserve’s Discount Window.

I examine shadow-bank funding of the nonfinancial sector rather than the financial sector to focus on the direct effects on economic activity. A shadow banking system that is just a network of “side bets” with few direct links to the real economy or that primarily funds the traditional banking system might require very different supervision and regulation than one that is inextricably linked to real economic activity. Although it may be self evident to most that the rise and collapse of shadow banking had dire effects on real economic activity, there is actually little agreement on how best to measure the size of the shadow banking system. The purpose of this chapter is to add to our ability to measure this hard-to-measure sector.

The main results are as follows: In the lead-up to the financial crisis of 2008, the domestic shadow banking system was a significant, but not dominant supplier of funding to the nonfinancial sectors of the economy. For example, nonfinancial-sector debt stood at about \$34 trillion in the fourth quarter of 2008. Of that debt, I estimate that about \$10 trillion was provided by the traditional banking system (either as direct loans or through holdings of securities) and \$12 trillion was provided through traditional nonbank sources such as insurance companies, pension funds, and long-term mutual funds—sources that are not typically thought of as runnable. In contrast, only about \$4 trillion was provided through short-term funding outside the traditional banking system. Thus, despite the well-deserved notoriety garnered by the shadow banking system, it did not account for a particularly large portion of nonfinancial-sector funding.

My estimate of the size of the shadow banking system is much smaller than that provided by Pozsar et al. (2010). There are two main reasons for the difference. First, I focus on the net debt financing of the nonfinancial sector, and therefore ignore the “grossing up” of shadow banking liabilities that occurs in long intermediation chains. Second, I do not equate all nonbank intermediation, particularly that provided by the government-sponsored

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2. For the remainder of the chapter I drop the word “domestic” when referring to the shadow banking system unless the distinction with the foreign shadow banking system is explicitly needed.

enterprises (GSEs) and issuers of private-label, asset-backed securities, with shadow banking.

Although I find that the shadow banking system was not large compared to traditional banking in terms of the level of financing extended to the nonfinancial sector, I do find that funding from the shadow banking system dropped significantly after 2008. This contraction was, at least in an arithmetic sense, the *entire* reason for the slowdown in the growth rate of nonfinancial-sector debt over this period. In other words, the sharp contraction of the shadow banking system had enormous effects on nonfinancial-sector debt, and thus presumably on real economic activity. These results are consistent with those in Krishnamurthy, Nagel, and Orlov (2014), but are more broad than their results, which focused specifically on repo and asset-backed commercial paper.

To estimate the size of the shadow banking system, I begin with the observation that every dollar of credit-market debt provided to the nonfinancial sector represents one end of a financial intermediation chain. My aim is to trace intermediation chains from nonfinancial-sector borrowers to what I call terminal funders. These are not the households and foreign entities that are the “ultimate” providers of funding (with the financial system as the intermediary). Rather, these terminal funders are one or two links away from such ultimate funders. I define five categories of terminal funders: traditional banks, which include commercial banks, credit unions, and thrifts that reside in the United States; foreign entities, which are entities that are not domiciled in the United States; long-term funders, which are domestic non-bank entities such as insurance companies and pension funds that are typically not runnable; the government, which includes federal, state, and local governments (including the Federal Reserve); and short-term funders, which are domestic and runnable nonbank-providers of short-term financing.

Short-term funders notionally include entities such as money market mutual funds (money funds), unregistered liquidity funds, local government investment pools, and cash-collateral reinvestment pools from securities lending programs. I also define intermediate funders such as broker-dealers, government-sponsored agencies, finance companies, and private securitizers that are links between terminal funders and nonfinancial-sector borrowers. I then use data from the FA to estimate each terminal funder’s holdings of nonfinancial-sector debt. The calculations often require “drilling down” through layers of FA data to determine how various sectors themselves are funded. The decomposition of nonfinancial-sector debt into that which is held by the five terminal funders provides a new perspective on the relative size of the shadow banking system.

Because shadow banks can provide funding to traditional banks or foreign entities, my definition of short-term funders is narrower than those that include shadow-bank funding of other terminal funders. For example,

money market funds, which are clearly runnable (McCabe 2010), provide significant funding to traditional commercial banks and foreign entities. To provide a very rough measure of shadow-bank funding of the traditional banking system, I use Call Report data to estimate the share of bank liabilities that are short term and uninsured, and therefore, potentially runnable.

Fender and McGuire (2010), McGuire and von Peter (2009), and Baba, McCauley, and Ramaswamy (2009) show that foreign financial institutions, especially those in Europe, faced a short-term dollar funding squeeze during 2008 and 2009, in part because they relied heavily on US money market mutual funds. Their work suggests that an important portion of foreign financing of the domestic nonfinancial sectors should also be attributed to the shadow banking system. However, a decomposition of financing provided by foreign entities to traditional and shadow banking is beyond the scope of this chapter.

The chapter ends with a brief discussion of how even an imperfect measure of the size of the shadow banking system could be useful as a tool for macroprudential supervision of the financial system. Macro measures could provide a perspective that can complement more microstudies, such as Covitz, Liang, and Suarez (2009) and McCabe (2010), that focus on the instruments and markets that make up the shadow banking system. To use a metaphor proposed by Eichner, Kohn, and Palumbo (2010), a macro measure of the shadow banking system can provide a “grainy satellite photo” that prompts market watchers to take a closer look at particular instruments or structures. For example, evidence that nonfinancial sectors are highly dependent on the shadow banking system for funding should raise warning flags about the risks to economic activity. Indeed, although funding from the shadow banking system to the nonfinancial sectors has dropped significantly since 2008, the fact that the shadow banking system remains an important provider of financing to households, nonfinancial businesses, and governments (not to mention domestic and foreign banks and broker-dealers) should raise warning flags about risks to economic activity that arise from reliance on this inherently fragile source of funding.

#### **4.1 Defining and Measuring the Shadow Banking System in a Model Financial System**

Figure 4.1 provides a highly stylized model of a financial system. The non-financial sector has borrowers with mortgage liabilities that are ultimately funded by savers in the nonfinancial sector. That is, the nonfinancial sector is the ultimate borrower and the ultimate lender, and the financial system provides the intermediation. The financial sector contains a traditional commercial bank, a mortgage securitizer, a broker-dealer, a pension fund, and a money fund. Arrows indicate financial obligations; the arrow heads indicate the direction of the obligation and the line style (solid, dotted, etc.) indicates

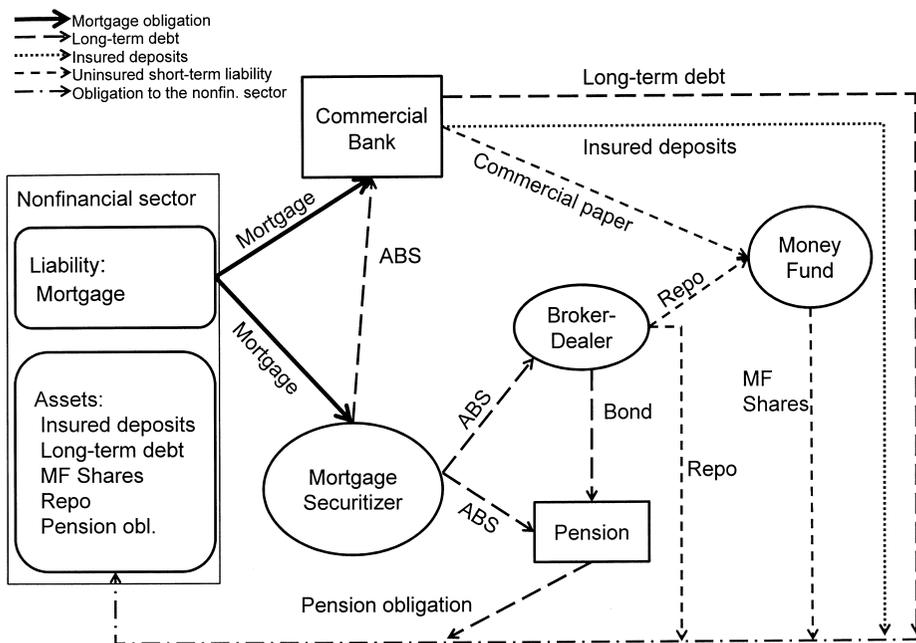


Fig. 4.1 A model financial system

type. For example, the nonfinancial sector has a mortgage loan that it owes to the traditional bank and to the mortgage securitizer (which need not have originated the mortgage); the broker-dealer has a short-term obligation (a security repurchase agreement, or repo) to the money fund and a long-term obligation (a bond) to the pension fund; and the money fund has a short-term obligation (money-fund shares) to the nonfinancial sector. Note that the use of derivatives is outside the scope of this chapter.

There are multiple ways to define and measure the shadow banking system, even in this simple model. Shadow banking is often defined as the conduct of maturity transformation outside the traditional banking system (Gorton and Metrick 2010; Gibson 2010; Ricks 2011). At least two measures of the shadow banking system could arguably satisfy this definition. First, one could interpret “outside the traditional banking system” as excluding any liabilities issued by a traditional bank. In this case, for the model in figure 4.1, one would add together the broker-dealer’s repo and money-fund shares outstanding because the broker-dealer funds long-term bonds with short-term repo, the money fund finances short-term commercial paper and repo using potentially shorter-term shares, and neither the broker-dealer nor the money fund is a bank. Second, one could interpret “outside the traditional banking system” to mean excluding insured deposits. In this case, one

would add bank commercial paper to the first measure.<sup>3</sup> Note that both these approaches involve some degree of double counting because the commercial paper and a portion of the repo back the money-fund shares.<sup>4</sup>

Others use broader definitions of the shadow banking system. For instance, in measuring the size of the shadow banking system, Pozsar et al. (2010) include all the asset-backed securities issued by the GSEs and private-label securitizers. In the context of the schematic in figure 4.1, this would entail including in a measure of the shadow banking system all the asset-backed securities (ABS) issued by the mortgage securitizer.<sup>5</sup>

The approach I take in this chapter differs subtly from those in the literature. I am interested in measuring the fraction of nonfinancial-sector debt that is funded by intermediation chains that are runnable. I call an intermediation chain runnable if it involves, at any link, short-term funding outside the traditional commercial banking system. However, I am not interested (in this chapter) in measuring the gross amount of shadow banking liabilities or the total liabilities of all entities that have some connection to the shadow banking system.<sup>6</sup> Rather, I seek to measure the amount of funding of the nonfinancial system that depends on a runnable source of funding. That is, I am interested in measuring the degree to which borrowing of nonfinancial entities depends quite directly on the inherently fragile shadow banking system.

If key information about counterparties and loan terms for the model financial system in figure 4.1 were recorded at issuance and resale, we could in principle follow intermediation chains with relative ease from the nonfinancial borrower to the terminal funder *and* identify the form, prevalence, and degree of maturity transformation in the traditional and shadow banking systems. Of course, such comprehensive data do not exist, and “tagging and tracking” all financial instruments is costly and currently politically infeasible.

Suppose instead that we had FA-like data for the simple financial system in figure 4.1. The actual FA are an integrated set of national financial

3. This is implicitly the approach Ricks (2011) uses to estimate “gross private money-claims outstanding.”

4. Such double counting is more prevalent in a more complicated financial system (not shown) where, for example, the broker-dealer runs a matched-book in repo. In that case, the total amount of repo in the system would increase without any additional funding of the nonfinancial sector. Indeed, long intermediations chains or significant rehypothecation will increase some measures of the shadow banking system without resulting in more funding to the nonfinancial sector.

5. A paper by the Financial Stability Board (2011) points out that there is “no clear commonly agreed definition” of shadow banking. That paper suggests that monitoring of the shadow banking system should start with a very broad definition that includes all nonbank credit intermediation and then narrow the focus to nonbank intermediation that includes maturity or liquidity transformation.

6. Nor am I interested here in every type of nonbank maturity transformation. For example, five-year loans for very long-lived commercial real estate assets are a form of maturity transformation that is subject to significant roll-over or renewal risk, but is not runnable.

accounts and balance sheets. The accounts include measures of financial assets and liabilities for many broad sectors of the economy, which can be classified as either financial or nonfinancial. For each sector, the FA provide sector tables that show a sector's financial assets and liabilities broken out by the various financial instrument used. For each financial instrument, the FA have an instrument table that shows which financial and nonfinancial sectors use that instrument to borrow or lend.<sup>7</sup>

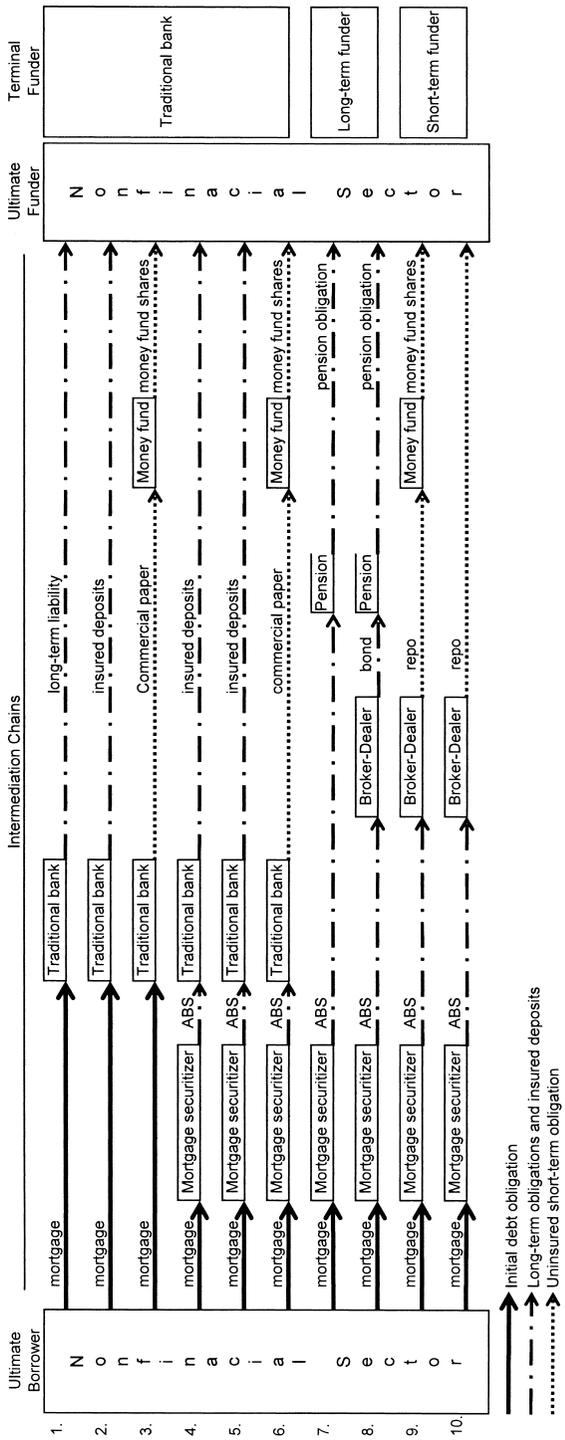
I start by defining what I call “terminal” and “intermediate” funders. The terminal funders are *not* the ultimate funders of nonfinancial debt—as mentioned, the ultimate funder is the nonfinancial sector itself. Rather, terminal funders are one or two links away from the ultimate funder on the intermediation chain. In this example, there are three types of terminal funders: the traditional bank, the long-term funder, and short-term funders. The traditional bank in this case is simply the commercial bank. The traditional bank has whole-loan mortgages and ABS as assets that it funds with a long-term liability to the nonfinancial sector, insured deposits held by the nonfinancial sector, and commercial paper held by the money fund. The pension fund is the long-term funder. Its assets are the ABS and the (unsecured) corporate bond, and its liabilities are the pension obligations to the nonfinancial sector. Of course, a pension fund may engage in frequent trades and may choose to quickly dump assets that it no longer wants. However, it is not typically thought of as being subject to runs.

The short-term funders are defined by activities rather than entities, and are therefore not depicted as a box in the figure. Rather, a short-term funder is any nonbank provider of financing using short-term, uninsured, and therefore runnable, methods. In this example, the financing from the short-term funders is the sum of the direct repo between the broker-dealer and the nonfinancial sector and the money fund shares. Alternatively, it can be thought of as the sum of all short-term, uninsured instruments in the financial system (the repo, the commercial paper, and the money fund shares) netted out to eliminate double counting.

The “intermediate” funders in this case are the mortgage securitizer and the broker-dealer. As intermediate funders, the holdings of nonfinancial-sector debt by the mortgage securitizer and the broker-dealer are apportioned to the terminal funders as described below, based on how these two entities are themselves funded.

In practical terms, my approach requires following intermediation chains in figure 4.1 from the nonfinancial borrower to a terminal funder, and stopping there; thus the name. The model financial system in figure 4.1 has ten intermediation chains. The individual chains are shown in figure 4.2, and can

7. The FA presents full balance sheets for the household and nonfinancial business sectors (corporate and noncorporate). The accounts do not contain full balance sheets for the financial sectors, and therefore lack estimates of financial-sector net worth or equity.



**Fig. 4.2 Taxonomy of intermediation chains for the model financial system**

be thought of as an unraveling of the intermediation chains shown in figure 4.1. The dollar amount of mortgage obligations held by the commercial bank is simply allocated to the traditional bank (figure 4.2, lines 1 through 3). Mortgage obligations held by the mortgage securitizer must be followed further along various intermediation chains. To do so, we would look at FA data on holders of ABS. The commercial bank's holdings of ABS are, of course, allocated to the traditional bank (figure 4.2, lines 4 through 6) and the pension-fund holding of ABS are allocated to the long-term funder (figure 4.2, line 7).

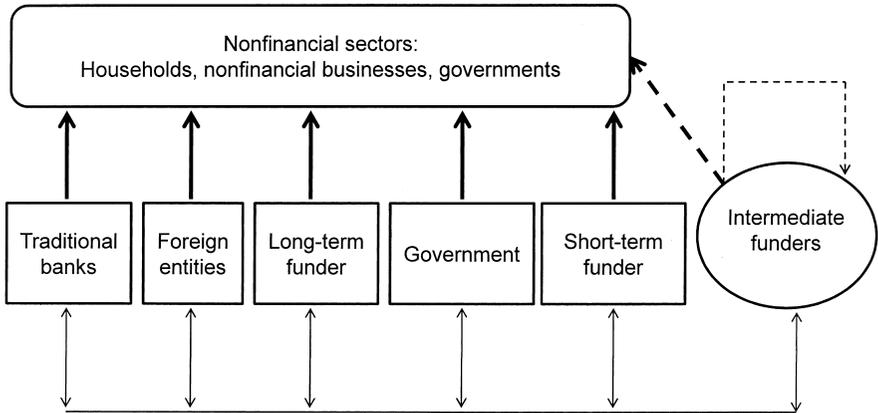
For the ABS held by the broker-dealer, we must continue along the intermediation chains. At this point we would look at the sector table in the FA for broker-dealers. To the extent that the broker-dealer funds its balance sheet using an (unsecured) corporate bond, we would allocate that amount to the long-term funder (figure 4.2, line 8). To the extent that the broker-dealer funds itself using repo, we would allocate that amount to the short-term funder (figure 4.2, lines 9 and 10). Thus, each dollar of nonfinancial debt gets allocated to one (and only one) of the three terminal funders.<sup>8</sup>

The method described above is designed to estimate how much debt of the nonfinancial sector is funded by each terminal funder regardless of how that terminal funder is, itself, funded. The portion attributed to the short-term funder is one measure of the importance of the shadow banking system, and can be compared directly to the portion attributed to the other terminal funders. However, the method ignores the extent to which traditional commercial banks are, themselves, funded by runnable sources. A question then is, should we include the intermediation chain depicted in line 6 of figure 4.2 in the traditional banking system or the shadow banking system?

There is no clear dividing line between the traditional and shadow banking systems. A traditional bank can raise funds through insured deposits or through noninsured "hot money," which includes short-term funding such as commercial paper and jumbo CDs that could be runnable. Moreover, banks can sponsor supposedly off-balance sheet entities such as asset-backed conduits and money market mutual funds that are runnable and whose assets and liabilities end up, in the event of a crisis, on the sponsor's balance sheet (Acharya, Schnabl, and Suarez 2011; McCabe 2010).<sup>9</sup> By allocating to my measure of the traditional bank funder all financing provided to the nonfinancial sector by the commercial banks, I make the division between shadow and traditional banking at the point where the commercial bank legal entity ends: all funding provided by the traditional bank is considered distinct from the shadow banking system and all funding provided

8. Note that the approach abstracts from equity.

9. Indeed, elements of the shadow banking system such as asset-backed conduits were arguably a form of regulatory arbitrage that allowed traditional commercial banks to increase their use of short-term funding without affecting how their balance sheet looked (Acharya, Schnabl, and Suarez 2011).



**Fig. 4.3 Funding of nonfinancial-sector debt**

by off-balance sheet entities is considered distinct from the traditional banking system. Although my main focus here is on this narrow definition of the shadow banking system, I present supplemental results on a broader concept of shadow banking that includes hot money funding of traditional banks.

#### **4.2 The Estimation Method Applied to the Actual Financial System**

Figure 4.3 presents a schematic of the actual financial system that has more sectors but less detail. The nonfinancial sectors are households, nonfinancial businesses, and governments and are represented by the large box in the figure. In addition to the three terminal funders I defined in the previous section (the traditional bank, long-term funder, and short-term funder), I add two more: foreign entities, which includes entities domiciled abroad even if they are subsidiaries of US firms, and the government, which includes the federal and state and local governments and the Federal Reserve.<sup>10</sup>

I am interested in allocating all funding of the nonfinancial sector to the five terminal funders. Funding can be direct. For example, a household can owe a mortgage loan to the traditional bank, a nonfinancial firm could issue a long-term bond to a foreign entity or a long-term funder such as an insurance company, or a municipal government could issue a variable-rate demand obligation that is purchased by a short-term funder such as a money fund. This direct funding is represented by the thick arrows in figure 4.3. Funding of nonfinancial borrowers can be provided indirectly through intermediate funders (the thin arrows and then the thick dotted arrow). Consider an example in which a bank originates a mortgage and then sells it to

10. Domestic subsidiaries of foreign-owned firms are not considered foreign entities for the purposes of this chapter and government pension plans are classified as long-term funders.

**Table 4.1** Definitions of terminal and intermediate funders (for use in estimating direct funding in step 1)

Funding source	Flow of Funds sector
<b>Terminal funders</b>	
<b>Traditional banks</b>	Commercial banks Savings institutions Credit unions
<b>Government</b>	Federal government Monetary authority
<b>Foreign entities</b>	Rest of the world
<b>Long-term funders</b>	Households and nonprofits Nonfinancial businesses Property-casualty insurance companies Life insurance companies Private pension funds State and local government employee retirement funds Federal government retirement funds Mutual funds Closed-end and exchange-traded funds State and local governments
<b>Short-term funders<sup>a</sup></b>	Money market mutual funds
<b>Intermediate funders</b>	Government-sponsored enterprises Agency- and GSE-backed mortgage pools Private-label issuers of asset-backed securities Finance companies Real estate investment trusts Security brokers and dealers Funding corporations

<sup>a</sup>This designation is for the purpose of identifying direct funding in step 1. It does not mean that money market mutual funds are the only kind of short-term funder.

a private-label issuer of ABS. The ABS issuer funds the purchase by issuing a bond. Just as in the previous section, the portion of that bond issuance that is purchased by, say, a pension, is then said to come from a long-term funder, but through the intermediate funder.<sup>11</sup> The asset-backed bond could also be purchased by another intermediate funder such as a broker-dealer, and funded with a repurchase agreement made with a money fund. In that case, the funding comes from the short-term funder but through two intermediate funders.

The terminal funders are defined in table 4.1. The definitions for the traditional bank, government, and foreign entities are straightforward and are based on the FA's banking sectors, government sectors, and the rest-of-the-

11. I cannot literally determine which portion of each type of asset is funded by different types of liabilities. In most cases this is not even a sensible question. Rather, I assign shares based on the composition of a sector's liabilities.

world sector. However, choosing the sectors to be defined as long-term funders clearly requires judgment calls. I chose sectors such as insurers and pensions that typically do not rely upon short-term funding and are generally not considered runnable. Note that I included mutual funds (excluding money market mutual funds), closed end funds, and exchange-traded funds in the long-term funder category. Although these types of funds are highly liquid, their liabilities are not like money claims (Ricks 2011), and I therefore do not consider them runnable in the same sense as instruments such as commercial paper and repo.<sup>12</sup>

Note also that I include money funds in the short-term funder category. This does not mean that money funds are the only short-term funder. As I mentioned above, the short-term funder category is largely characterized by activities rather than by the entities themselves. The classification of money funds captures only the *direct* funding of the nonfinancial sector by the short-term funder. In practice, most financing from the short-term funder category comes indirectly through the runnable financing of intermediate funders.

As shown in line 1 of table 4.2, total credit market debt of the nonfinancial sector was \$40 trillion in the fourth quarter of 2012. The upper part of the table shows the debt of the major nonfinancial sectors and the lower part of the table shows the instruments used to borrow funds.<sup>13</sup>

Given these definitions, the estimation procedure is as follows:

1. For each of the identified instruments in table 4.2, use the appropriate FA instrument table to calculate the share of the dollar amounts of each instrument to be allocated to each terminal funder and each intermediate funder. Apply those shares to the dollar amounts for that instrument to allocate funding to the terminal funders and the intermediate funders.

2. For each intermediate funder, use the liabilities structure reported in the appropriate FA sector table to estimate the share of the dollar amounts identified in (1) that should be allocated to each terminal funder and, if relevant, each intermediate funder. Apply those shares to the dollar amounts identified in (1) for intermediate funders to allocate funding to the intermediate funders and the terminal funders.

3. Repeat (2) as necessary. For private-label ABS issuers, real estate investment trusts (REITs), finance companies, broker-dealers, and funding corporations, use the liability structure reported in each sector's FA table to allocate funding to the five terminal funders.

12. Mutual funds, closed-end funds, and exchange-traded funds can employ leverage, some of which might create short-term liabilities, and other long-term funders such as insurance funds invest cash collateral from securities-lending programs. I leave a more complete treatment of these sectors to future work.

13. See appendix figures 4A.1 and 4A.2 for time series of the subcomponents.

**Table 4.2** Credit market debt owed by domestic nonfinancial sectors (by debtor sector, end of period 2012:Q4)

	Billions of dollars	Percent
1. Total	40,098	—
By sector		
2. Households	12,831	32.0
3. Nonfinancial business	12,694	31.7
4. State and local governments	2,980	7.4
5. Federal government	11,594	28.9
By instrument		
6. Commercial paper	130	0.3
7. Treasury securities	11,569	28.9
8. Agency- and GSE-backed securities	25	0.1
9. Municipal securities	3,714	9.3
10. Corporate bonds	5,795	14.5
11. Depository loans n.e.c.	1,751	4.4
12. Other loans and advances	1,385	3.5
13. Mortgages	12,949	32.3
14. Nonmortgage consumer credit	2,779	6.9

Source: Financial Accounts of the United States.

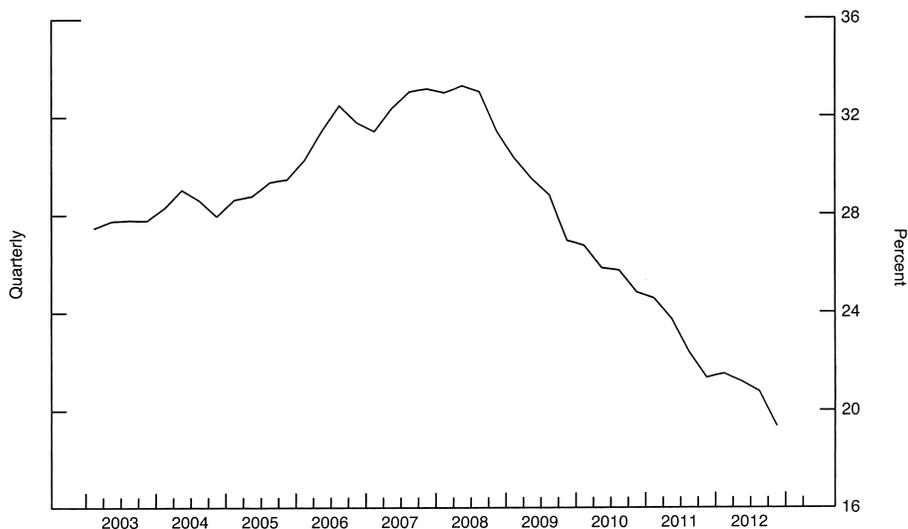
The appendix provides a more detailed example for mortgages and the full set of data and calculations are available by request from the author.

To identify the extent to which traditional banks are funded using runnable sources, I use Call Reports data to define “short-term money” at banks as the sum of large-time deposits with maturity less than one year, federal funds purchased and securities sold under agreements to repurchase, deposits in foreign offices, trading liabilities (excluding revaluation losses on derivatives), accounts payable, dividends declared but not yet payable, and other borrowed money with maturity less than one year.<sup>14</sup>

Figure 4.4 shows uninsured short-term liabilities at traditional banks as a share of their total assets. This share provides an admittedly rough estimate of the share of traditional bank funding that is provided by runnable sources.<sup>15</sup> The product of this share and the estimate of traditional bank funding from step 1 provide an estimate of the shadow-bank funding that works through the traditional banking system. The remainder represents an estimate of traditional bank funding that is funded by insured deposits and long-term liabilities—that is, an estimate of the most traditional of traditional banking.

14. This measure excludes advances from Federal Home Loan Banks.

15. Note that even if all such funding were removed from a traditional commercial bank, the bank would still have access to financing from the discount window.



**Fig. 4.4 Uninsured short-term liabilities as a share of bank assets**

*Source:* Call Reports. The data are plotted through 2012:Q4.

*Note:* Uninsured short-term liabilities is the sum of: large-time deposits with maturity less than one year, federal funds purchased and securities sold under agreements to repurchase, deposits in foreign offices, trading liabilities (excluding revaluation losses on derivatives), accounts payable, dividends declared but not yet payable, and other borrowed money with maturity less than one year (not including FHLB advances).

### 4.3 Results

Table 4.3 summarizes step 1 of the estimation method by providing snapshots of total debt of the nonfinancial sectors and the holders of that debt in 2006, 2008, 2010, and 2012.<sup>16</sup> For these four years, two-thirds to three-quarters of nonfinancial-sector debt was held directly by one of the five terminal funders (line 2). The vast majority of that debt was held directly by traditional banks (line 3), foreign entities (line 4), and long-term funders (line 5).<sup>17</sup> Short-term funders (line 6) have historically not been important *direct* holders of debt issued by nonfinancial entities. This is not surprising given that shadow banking is typically characterized by long intermediation chains. To the extent that shadow banking funds nonfinancial-sector debt, we should expect that funding to run through the financial sectors that make up the intermediate funders. Taken together, these intermediate funders held about one-third of nonfinancial-sector debt (line 8). Of this portion, the majority was held by the GSEs (line 9) and issuers of private-label ABS

16. These dates were chosen to focus on the run-up to the financial crisis and the immediate aftermath. A more complete time series can be found in appendix figure 4A.3.

17. These direct holdings mainly took the form of whole loans, corporate bonds, and government securities.

**Table 4.3** Holders of nonfinancial-sector debt (end of period, 2012:Q4)

	2006	2008	2010	2012
1. <b>Grand total (billions of dollars)</b>	<b>30,059</b>	<b>34,528</b>	<b>36,913</b>	<b>40,098</b>
<b>Contributions (percent)</b>				
2. <b>Direct from a terminal funder</b>	<b>65.3</b>	<b>65.6</b>	<b>71.3</b>	<b>74.1</b>
3. Traditional bank	25.9	24.3	22.3	21.8
4. Foreign	10.4	12.6	15.5	17.2
5. Long-term	20.7	19.6	24.5	24.8
6. Short-term	2.4	3.8	2.4	2.4
7. Government	6.0	5.3	6.6	7.9
8. <b>From an intermediate funder</b>	<b>34.7</b>	<b>34.4</b>	<b>28.7</b>	<b>25.9</b>
9. GSE	15.7	17.2	17.4	16.2
10. Private-label ABS	12.3	10.6	5.8	4.2
11. REIT	0.5	0.2	0.1	0.1
12. Broker-dealer	0.5	1.0	0.7	0.9
13. Finance company	5.6	4.7	3.8	3.3
14. Funding corporation	0.1	0.8	0.9	1.1

Source: Financial Accounts of the United States.

(line 10), two intermediate funders that were implicated in the recent shadow banking debacle.

Table 4.4 shows the results of steps 2 and 3 of the estimation method for the GSEs and private-label ABS issuers.<sup>18</sup> The total amount of GSE securities outstanding increased substantially from 2006 through 2010 and edged up through 2012 (line 1). In 2006, most GSE securities were held by long-term funders (line 4), traditional banks (line 2), and foreign entities (line 3). Short-term funders were a decidedly minor source of funding for the GSEs in 2006, but had more than doubled their funding share by the end of 2008. That said, traditional banks, foreign entities, and long-term funders each financed more GSE securities in 2008 than did short-term funders. Following the financial crisis, short-term funders' role in funding the GSEs collapsed and the government's role expanded dramatically as the Federal Reserve began its Large Scale Asset Purchase program.

The lower panel of table 4.4 presents terminal funders' financing of private-label ABS. It is well known that much of the shadow banking system involved the purchase (often with significant leverage) of private-label ABS. My estimates indicate that short-term funders did indeed play a significant role in this sector (line 11). However, the results also indicate that most private-label securities, and therefore the underlying nonfinancial-sector debt, were actually funded by the other terminal funders. In other words, traditional banks, insurance companies, pension funds, and the like held significant quantities of private-label ABS.

18. See appendix figures 4A.4 through 4A.8 for a time series of the allocation shares.

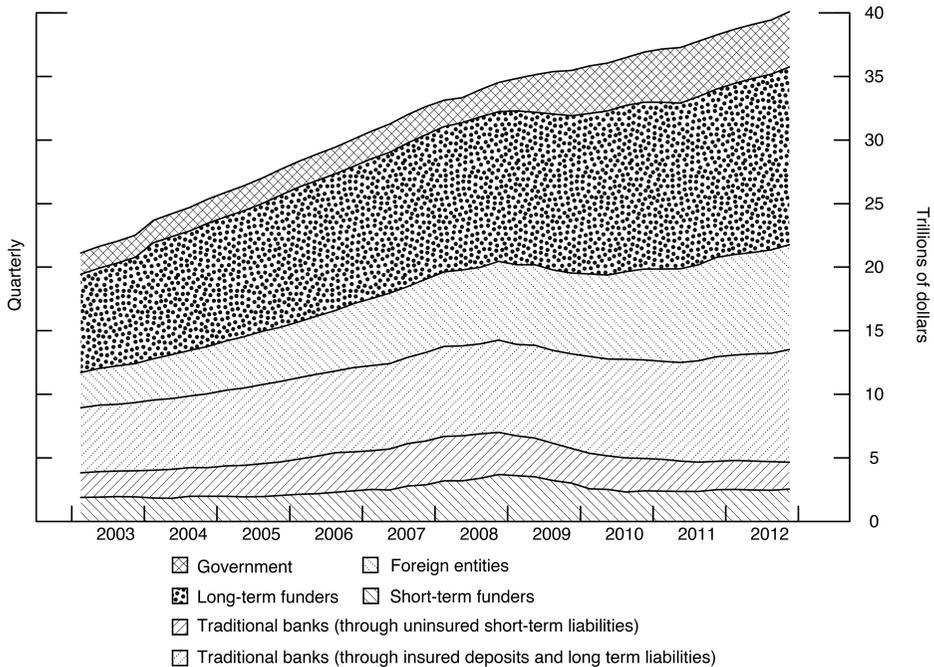
**Table 4.4** Terminal funders' holdings of GSE and private-label securities

	2006	2008	2010	2012
1. GSE securities (billions of dollars)	4,717	5,923	6,437	6,511
Percent allocation				
2. Traditional banks	24.9	20.7	24.1	26.7
3. Foreign entities	23.2	20.2	15.0	14.9
4. Long-term funders	38.5	37.8	30.2	31.7
5. Short-term funders	6.0	14.3	7.5	8.4
6. Government	7.3	7.0	23.2	18.4
7. Private-label securities (billions of dollars)	3,703	3,661	2,150	1,673
Percent allocation				
8. Traditional banks	16.9	22.5	20.7	25.1
9. Foreign entities	22.4	17.8	20.5	21.4
10. Long-term funders	31.2	32.0	34.7	36.2
11. Short-term funders	29.6	27.7	24.1	17.3
12. Government	0.0	0.0	0.0	0.0

*Source:* Financial Accounts of the United States.

That short-term funders financed only fairly modest portions of securities issued by the GSEs and by the issuers of private-label ABS is an important result of this chapter. It is fairly common to consider the GSEs and private-label securitizers—in their entirety—as part of the shadow banking system (e.g., see Pozsar et al. 2010; Bakk-Simon et al. 2012). These entities are clearly enormous nonbank intermediaries that deserve enormous scrutiny. Pricing of GSE securities and private-label ABS was in many cases prompted by unjustifiably high confidence about the securities' safety or by regulatory arbitrage, and, in any event, these securities certainly had dramatic implications for financial stability. However, a significant portion of securities issued by these sectors do not appear to have been used as inputs in the creation of runnable private money claims and therefore do not contribute significantly to my measure of shadow banking. According to this approach, securitization and shadow banking are not synonymous.

Figure 4.5 shows the results of the estimation method applied to all nonfinancial-sector debt. Short-term funders have been, and remain, a quite modest source of financing for the nonfinancial sector. As suggested by the results in tables 4.3 and 4.4, much more of the funding of the nonfinancial sectors has been provided by traditional banks, foreign entities, and long-term funders. In particular, at their peak in the fourth quarter of 2008, short-term funders provided financing for \$3.7 trillion of funding to the nonfinancial sector, while traditional banks provided \$10.6 trillion, long-term funders provided \$11.8 trillion, and foreign funders provided \$6.2 trillion. Thus, despite the justified notoriety garnered by the shadow banking system, it is, by this measure of short-term funders, remarkably small.



**Fig. 4.5 Debt of the nonfinancial sector, by terminal funder**

*Source:* Financial Accounts of the United States. The data are plotted through 2012:Q4.

As mentioned above, my measure of short-term funders does not include the portion of funding for traditional banks that comes from short-term and uninsured debt such as commercial paper and large time deposits. Such hot money is likely less sticky than traditional insured deposits (and long-term liabilities) and is potentially runnable. However, even if one were to consider this portion of traditional bank funding as part of the shadow banking system, shadow banks would still provide a quite modest portion of funding for the nonfinancial sectors.

Although short-term funders and hot-money funding at banks together were not major sources of funding for the nonfinancial sectors, they played outsized roles in the *changes* in the debt of the nonfinancial sector. Nonfinancial-sector debt increased a cumulative 15 percent from 2006:Q4 to 2008:Q4 (line 1 of table 4.5). Of this increase, short-term funders contributed about 4.25 percentage points (line 2), making them the largest single contributor.<sup>19</sup> Traditional banks, foreign entities, and long-term funders all contributed importantly to this increase.

In the two years following the onset of the financial crisis, the cumulative

19. Appendix table 4A.3 shows each terminal funder's cumulative growth rate.

**Table 4.5** A decomposition of the growth rate of nonfinancial-sector debt

	2006:Q4– 2008:Q4	2008:Q4– 2010:Q4	Difference
	Percent change		
1. Total	14.9	6.9	–8.0
	Percentage point contributions		
2. Short-term funders	4.3	–3.7	–8.0
3. Traditional banks	3.0	–0.8	–3.8
Funded by uninsured, short-term liabilities	0.8	–2.2	–3.0
Funded by insured deposits and long-term liabilities	2.2	1.4	–0.7
4. Foreign entities	3.8	2.7	–1.1
5. Long-term funders	3.2	4.0	0.8
6. Government	0.6	4.7	4.1

*Source:* Financial Accounts of the United States.

growth rate of nonfinancial-sector debt was halved (to about 7 percent). The dramatic step-down in the growth rate of nonfinancial-sector debt was driven, at least in an arithmetic sense, by the sharp turnaround in financing from short-term funders: short-term funders subtracted 3.7 percentage points from the cumulative growth rate over this period. Indeed, the “swing” in the contribution of short-term funders from a strong positive to a strong negative accounts for the entire 8 percentage point decline in the growth rate of nonfinancial-sector debt (the column labeled “difference”). In contrast, the swing for traditional banks (–3.8 percentage points) was much more modest, and was itself almost entirely driven by the swing in funding provided by uninsured short-term liabilities. The swings in the contributions of foreign entities and long-term funders (lines 4 and 5) were essentially offsetting.

Financing provided by the government skyrocketed after 2008 as the US Treasury Department and the Federal Reserve System instituted a wide variety of programs in response to the financial crisis and the recession. These programs greatly boosted government funding of nonfinancial-sector debt, which had been minimal prior to the crisis (line 6).

Thus, a key feature of the provision of credit to the nonfinancial sector in the run-up to the 2008 financial crisis and in its aftermath was the rise and decline of financing from the shadow banking system. A second key feature was that government entities stepped in to provide a significant portion of the credit that had been, at least in an adding-up sense, supplied by short-term funders.

Table 4.6 summarizes changes in the funding of nonfinancial-sector debt from 2008 to the end of 2012. Debt growth has picked up somewhat over that period (line 1). Note that short-term funders contributed about 4 percentage points to the acceleration of nonfinancial-sector debt. Meanwhile, the

**Table 4.6** A decomposition of the growth rate of nonfinancial-sector debt

	2008:Q4– 2010:Q4	2010:Q4– 2012:Q4	Difference
	Percent change		
1. Total	6.9	8.6	1.7
	Percentage point contributions		
2. Short-term funders	–3.7	0.4	4.1
3. Traditional banks	–0.8	1.8	2.6
Funded by uninsured, short-term liabilities	–2.2	–1.2	1.0
Funded by insured deposits and long-term liabilities	1.4	3.0	1.6
4. Foreign entities	2.7	3.0	0.3
5. Long-term funders	4.0	2.3	–1.6
6. Government	4.7	1.1	–3.6

*Source:* Financial Accounts of the United States.

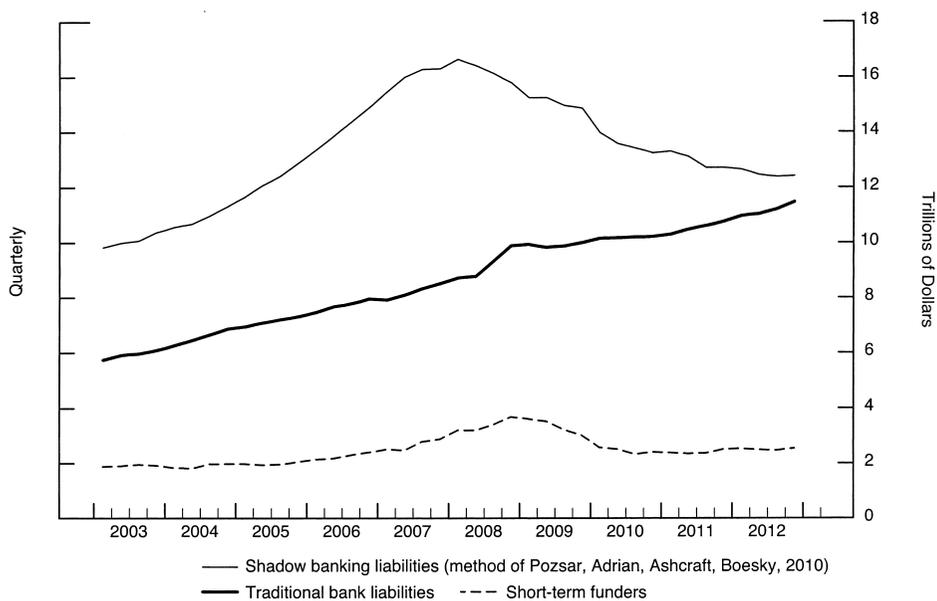
contribution of long-term and government funders dropped (lines 5 and 6). Domestic shadow-bank funding of the nonfinancial sector increased from 2010 to 2012, but remained well below the level seen in late 2008.

#### 4.3.1 Comparison to Other Measures of Shadow Banking

This is the first attempt of which I am aware to estimate the share of nonfinancial-sector debt that is funded by the shadow banking system. However, others have used proxies to measure the growth of the importance of the shadow banking system. For example, Gorton and Metrick (2010) used measures such as the size of broker-dealer balance sheets and the amount of repo outstanding at primary dealers to provide a rough sense of the size of the shadow banking system.

The measure of Pozsar et al. (2010) is more closely related to mine. Pozsar and colleagues use FA data to estimate the total liabilities of the shadow banking system, defined as the sum of outstanding levels of commercial paper, repurchase agreements, GSE liabilities, GSE pool securities, liabilities of private-label ABS issuers, and shares of money market mutual funds (netted to avoid counting both sides of commercial paper (CP) and repo transactions, resecuritizations of GSE securities, and other sources of double counting).

Figure 4.6 shows their measure of shadow-banking liabilities (the thin line) along with the liabilities of the traditional banking system (the thick line). That their measure of shadow-bank liabilities is above the liabilities of the traditional banking system is commonly cited evidence that the shadow banking system was as big or even bigger than the traditional banking system. The dotted line in the figure, which depicts my estimate of funding provided by short-term funders, suggests that the shadow banking system



**Fig. 4.6 Measures of shadow banking**

*Source:* Financial Accounts of the United States. The data are plotted through 2012:Q4.

was (and is) not nearly as large as traditional banking in terms of credit extended to the nonfinancial sector.

The vast numerical difference between the two measures stems mainly from two significant conceptual differences. First, the method of Pozsar et al. (2010) counts one dollar of funding multiple times if there are multiple observable links in an intermediation chain. For example, imagine a long intermediation chain for a \$100,000 home mortgage: suppose the mortgage is packaged into a GSE-backed mortgage pool security, which is then repackaged into a private-label ABS, which is then held on the balance sheet of a broker-dealer and funded through repo with a money fund. Using the method of Pozsar and colleagues, the funding of the underlying mortgage would be counted three times—as a GSE-backed security, as a private-label ABS, and as repo—and one would therefore find \$300,000 in shadow-banking liabilities. My method—which is focused on understanding how the \$100,000 is funded—would allocate only the \$100,000 to the short-term funder and the funding from intermediate institutions would not be counted.

Second, the method of Pozsar et al. includes in shadow banking a significant portion of liabilities that I allocate to other terminal funders. In particular, by including *all* the liabilities of the GSEs and of private-label ABS issuers in their measure of shadow banking, Pozsar et al. attribute to the

shadow banking system a significant amount of financing that is actually provided by the banks, insurance companies, pension funds, and mutual funds that purchase these securities.

The conceptual differences are not a matter of a clear and absolute “right” and “wrong” way to measure shadow banking. Rather, they stem from different views about what one is trying to measure. Consider the first conceptual difference, in which Pozsar et al. “gross up” the funding that occurs via long intermediation chains. If one is interested in measuring the importance of such chains, such grossing up is required. If one is interested in end-use funding of the nonfinancial sectors, one should avoid such grossing up. Both approaches are needed.

The second conceptual difference between the two measures reflects the breadth of definitions for shadow banking. The term shadow banking is typically attributed to Paul McCulley (2007). He referred to the shadow banking system as “the whole alphabet soup of levered up non-bank investment conduits, vehicles, and structures” that “fund themselves with un-insured commercial paper” and as such are vulnerable to runs.

To McCulley and others such as Gibson (2010), Ricks (2011, 2012), and myself, the key feature of these entities and activities is that they create something akin to private money, and as such are runnable. Thus, the relevant feature shared by traditional and shadow banks is money creation. The relevant difference is that traditional banks have direct access to the Federal Reserve’s Discount Window and can offer government-insured deposits. Shadow banks do not; that is why they are susceptible to runs.

Pozsar et al. and others have defined the shadow banking system more broadly to include many kinds of financial intermediation that occurs outside of banks. Some even define shadow banking as any “credit intermediation involving entities and activities outside the regular banking system.” (FSB 2011). In this view, the relevant feature shared by traditional and shadow banks is financial intermediation and the key difference is in regulatory regimes.

If one favors a broad measure of shadow banking, the measures of Pozsar et al. (and others such as Bakk-Simon et al. [2012]) are more appropriate. If one prefers a narrower definition that focuses on the creation of private money and runability, the more narrow definition used in this chapter and Rick’s (2011, 2012) approach to measuring private money claims is more appropriate.

Policymakers clearly need to focus on risk taking and regulatory arbitrage conducted by nonbank financial intermediaries. But that does not mean we must call all nonbanks shadow banks. To do so seems wasteful of a new term: Why use “shadow banking” as a synonym (or near synonym) for “nonbanking” when “nonbanking” is a perfectly serviceable term? An overly broad definition of shadow banking risks diffusing the attention of policymakers and economists from the key weakness of shadow banking:

its inherent susceptibilities to runs, the resulting collapse of privately issued money, and the implications for asset prices and real economic activity.

#### 4.4 Data Limitations and Potential Remedies

The fundamental limitation of using aggregate data from the FA is that, as already mentioned, such data fall short of the ideal of comprehensive information about counterparties, security types, and contract terms for all forms of lending. Several specific and salient limitations follow from this fundamental issue. First, for some holders of corporate bonds, the FA do not separately identify holdings of private-label ABS from holdings of corporate bonds issued by the nonfinancial sectors or issued by foreign entities.<sup>20</sup> Private-label ABS holdings for traditional banks and foreign entities can be separately identified. However, estimates of private-label ABS holdings of long-term and short-term funders must be based on an assumption about the share of private-label ABS in their total holdings of corporate bonds.

Second, the FA do not have any direct data for unregistered domestic private investment pools such as hedge funds, private equity, and so-called “liquidity” funds.<sup>21</sup> Any actual assets or liabilities of such funds are assigned by my method to long-term funders because the household sector in the FA is the residual holder of most instruments.<sup>22</sup> To the extent that these private pools are funded by any of the other terminal funders, my method will misclassify this financing.

The remedies for these two limitations are, broadly speaking, more comprehensive and detailed data on balance sheets of financial firms. Various government agencies are already working toward this goal. The SEC recently began collecting more detailed data on the holdings of US money market mutual funds, which could help identify the extent to which foreign entities are themselves runnable. The SEC has also begun a new data collection of balance-sheet information for hedge funds and other private funds; these data should improve our ability to monitor the shadow banking system.<sup>23</sup> In addition, the Office of Financial Research (OFR) was created by Congress to, among other things, improve the quality of financial-market data so that policymakers and market participants will be better able to evaluate

20. This is actually true for all bonds issued by the financial sectors, but is particularly important for the private-label ABS sector because of its size and importance in financial intermediation.

21. Unregistered liquidity funds are similar to registered money market mutual funds but are not required to comply with rule 2a-7 and may only sell to qualified investors.

22. For example, suppose there are only two holders of United States Treasury bonds, households and banks. The methodology of the FA is to use reported bonds outstanding from the Treasury Department and bank holdings from the Call Report, and allocate the residual to the household sector. Holdings of any unmeasured sector will therefore be assigned to the household.

23. See SEC release: <http://www.sec.gov/rules/final/2012/ia-3308-secg.htm>.

firm-specific and market risks. In particular, the OFR intends to collect data on financial transactions and positions and create a “catalog of financial entities and instruments” (OFR 2012). These efforts are a promising start toward improving the quality of financial statistics.

A third limitation is that, from the perspective of the FA, the foreign sector is a black box: one cannot tell what *types* of foreign entities fund the domestic nonfinancial sectors. In particular, one cannot tell how much of that debt is held by foreign entities that are themselves runnable. To the extent that this is true, the measure of financing provided to the nonfinancial that is funded by the shadow banking system is too low.

Foreign banks, especially those in Europe, faced a short-term, dollar-funding squeeze during 2008 and 2009, in part because they relied heavily on US money market mutual funds (Fender and McGuire 2010; McGuire and von Peter 2009; Baba, McCauley, and Ramaswamy 2009). It is difficult to distinguish MMFs financing of entities domiciled abroad (which are included in my measure of foreign funding) from financing of domestic entities with foreign parents (which would be excluded from foreign funding). The SEC data on money market funds could potentially be combined with foreign flow-of-funds and banking data to better determine what portion of foreign funding is runnable. I leave this for future work.

Finally, it is worth mentioning that the data on repo in the FA have certain well-known flaws. Gorton and Metrick (2012), Krishnamurthy, Nagel, and Orlov (2014), and Krishnamurthy and Nagel (2013) point out that there is a large “statistical discrepancy” between the repo assets and liabilities reported in the FA. In particular, reported repo liabilities (cash borrowing) in the accounts is larger than reported assets (cash lending), sometimes dramatically so. For example, in 2007, repo liabilities were about \$1 trillion more than were repo assets. The discrepancy likely reflects the fact that the source data for entities such as commercial banks, broker-dealers, and REITs that are large cash borrowers in repo markets are more comprehensive than that for entities that are large cash lenders (Gorton and Metrick 2012). Because the FA rely significantly on regulatory filings, it seems likely that the cash lenders are less-regulated private investment pools such as hedge funds and private cash pools.<sup>24</sup> As mentioned above, the SEC has recently required information on such funds that may help reduce the discrepancy between repo assets and liabilities. In addition, staff at the Federal Reserve Board are working to improve the estimation of the repo data reported in the FA.

Although the repo discrepancy represents an important issue in the Financial Accounts’ coverage of a key part of the shadow banking system, the size of the discrepancy by itself does not affect the estimates presented in this chapter. Recall that steps (2) and (3) of the estimation method rely

24. This problem may not be relevant for foreign hedge funds, which may be captured in the rest-of-world sector. Domestic hedge funds, however, are not captured.

on the *liability* structure of the various sectors in the Financial Accounts. In other words, poor measurement of repo assets does not affect the method.<sup>25</sup>

#### 4.5 Conclusion

In this chapter I describe a way to use data from the Financial Accounts of the United States and other readily available sources to provide a “top-down” measure of how much debt financing of the nonfinancial sectors of the US economy is dependent on financial intermediation chains that contain at least one runnable link. I find that in the lead-up to the financial crisis of 2008, such “shadow banking” was a significant, but not dominant supplier of funding to the nonfinancial sectors of the economy: Despite the well-deserved notoriety garnered by the shadow banking system, this portion of the financial system did not account for a particularly large portion of nonfinancial-sector funding when compared to traditional bank funding and other nonbank institutions. However, I do find that funding from the shadow banking system dropped significantly after 2008. This contraction was, at least in an arithmetic sense, the *entire* reason for the slowdown in the growth rate of nonfinancial-sector debt over this period. In other words, the sharp contraction of the shadow banking system had enormous effects on nonfinancial-sector debt, and thus presumably on real economic activity.

Of course, this contraction did not occur in isolation. Runs on short-term funding drove asset fire sales that damaged the ability and desire of all sorts of entities to lend. In addition, shadow banking entities such as asset-backed commercial conduits had recourse to traditional commercial banks and thus shadow banking losses became traditional banking losses; securitization and off-balance sheet funding had not resulted in the transfer of risk (Acharya, Schnabl, and Suarez 2011).

From a policy perspective, the approach presented in this chapter offers a way to use aggregate data to track the reliance of the nonfinancial sectors on inherently fragile short-term funding markets. A high or rapidly growing reliance on such markets is suggestive evidence of systemic fragility that should raise warning flags for market participants and policymakers. Using the metaphor of Eichner, Kohn, and Palumbo (2010), aggregate short-term funding of the nonfinancial sectors provides a “grainy satellite photo” of the shadow banking system that could be augmented with stepped-up monitoring of specific markets, entities, and instruments. Indeed, such an approach toward financial-market monitoring has already been proposed by the Financial Stability Board (FSB 2011).

The measures in this chapter will be improved by ongoing efforts to im-

25. The estimation method in this chapter will suffer to the extent that hedge funds and other lightly regulated investment funds engage in significant maturity transformation. But that is a result of the fact that the Financial Accounts are missing those sectors rather than something specific about the repo discrepancy.

prove the collection of financial market statistics. For example, the SEC has improved its collection of data for money market mutual funds and in the process of collecting balance sheet and other information from private investment pools such as hedge funds. In addition, the Office of Financial Research was created by Congress to, among other things, improve the quality of financial-market data so that policymakers and market participants will be better able to evaluate firm-specific and market risks. Such improved data collections are an important element in improving our understanding of the risks to financial markets and the real economy.

## Appendix

### *Details on Measuring the Size of the Shadow Banking System*

#### Background on the Financial Accounts of the United States

The FA depend on a variety of data sources, including regulatory filings, public reports from government agencies such as the Bureau of Economic Analysis, the Department of the Treasury, and private data vendors. The quality and detail of the balance-sheet data varies by sector. The best data are for the government sectors, including the monetary authority (the Federal Reserve). Generally speaking, balance-sheet data for commercial banks and insurance companies are also of high quality because these institutions are required to report to various government agencies in significant detail about the types of assets they hold. Banks and thrifts must file quarterly Call Reports that include fairly detailed information on assets, including loans and securities such as Treasuries, agencies, municipal debt, a wide variety of ABS categories, and structured financial products (including synthetics). Beyond this fairly detailed set of securities, banks need only report “other debt securities.”<sup>26</sup> Insurance companies also must make fairly detailed regulatory filings.

Balance-sheet data for most other financial sectors is available, but more limited. Private pension funds are a good example. The main data source for the FA is schedule H of Form 5500.<sup>27</sup> This form has entries for assets such as interest-bearing cash, US government securities, and corporate debt instruments. However, a significant fraction of private pension fund assets are held in the form of trusts and pooled separate accounts, for which the pensions funds currently provide no additional detail. The FA assumes that the asset allocation in these accounts is identical to that held outside the

26. However, this catch-all category is split between foreign and domestic sectors.

27. These filings are made with the IRS, the Department of Labor, the Employee Benefit Security Administration, and the Pension Benefit Guaranty Corporation.

accounts. Source data for other financial sectors such as broker-dealers, mutual funds, and finance companies have similar shortcomings that prevent sufficiently detailed breakdowns of assets and liabilities. More information on the sources and methods used in the FA can be found at the Financial Accounts Online Guide (<http://www.federalreserve.gov/apps/fof/>).

### An Example Using Home Mortgages

#### *Estimate the Share of Funding by Each Instrument to be Allocated Directly to Each Funder*

For each of the nine instruments listed in table 4.2, the FA has a table that shows who holds the instrument. For example, table 4A.1 shows FA data on holders of home mortgages, which totaled almost \$10 trillion in 2012:Q4. The bold lines in the table show direct holdings of the terminal funders (lines 2, 7, 10, 11, and 18) and the intermediate funders (line 19). Indented under each of these categories are the FA sectors that I have assigned to each funding category. Note that most mortgages are not held directly by the terminal funders. Indeed, line 19 shows that the intermediate funders held almost 70 percent of mortgages at the end of 2012. Of those, most are held by the GSEs (either at the actual GSE entity or in off-balance sheet pools) and to a lesser extent at private-label ABS issuers.

In some cases the total amount outstanding for an instrument will not equal the amount outstanding from the nonfinancial sector because financial and foreign sectors issue that security. For example, REITs can issue mortgage debt and foreign entities can issue dollar denominated corporate bonds. We do not always have estimates of who holds the security that had been issued by the nonfinancial sector, and in those cases I typically assume that all funders hold equal proportions of the financial, nonfinancial, and foreign issuance.

#### *Estimate Funding of Intermediate Funders*

Estimating the funding of the intermediate funders requires the most assumptions. I treat GSEs (including mortgage pools) separately from the other intermediate funders because the data for GSEs are of higher quality. Table 4A.2 shows the terminal and intermediate funders of GSEs, which is done through agency- and GSE-backed securities. Using these data, I treat GSEs almost the same as I treat the nonfinancial sectors. The one difference is that GSEs own some GSE debt, so I must gross up all the other categories to estimate the amount of funding for the GSE sector that comes from outside the sector. Thus I am implicitly assuming that all GSEs hold other GSE debt in equal proportions.

What remains is to estimate how the other five intermediate funders fund themselves. The data gaps are widest here because we do not have high-quality data on what instruments these intermediaries use to fund them-

**Table 4A.1** Home mortgages outstanding (end of period, 2012:Q4)

	Billions of dollars	Percent
1. Total	9,924	—
2. <b>Traditional banks</b>	<b>2,836</b>	<b>28.6</b>
3. US chartered depository institutions	2,488	25.1
4. Foreign banking offices in United States	2	0.0
5. Banks in US-affiliated areas	20	0.2
6. Credit unions	326	3.3
7. <b>Government</b>	<b>104</b>	<b>1.0</b>
8. State and local governments	78	0.8
9. Federal government	26	0.3
10. <b>Foreign entities</b>	—	<b>0.0</b>
11. <b>Long-term funders</b>	<b>103</b>	<b>1.0</b>
12. Household sector	59	0.6
13. Nonfinancial corporate business	31	0.3
14. Property-casualty insurance companies	—	0.0
15. Life insurance companies	7	0.1
16. Private pension funds	2	0.0
17. State and local govt. retirement funds	4	0.0
18. <b>Short-term funders</b>	—	<b>0.0</b>
19. <b>Intermediate funders</b>	<b>6,880</b>	<b>69.3</b>
20. GSEs and agency- and GSE-backed mortgage pools	5,811	58.6
21. ABS issuers	924	9.3
22. Finance companies	133	1.3
23. REITs	12	0.1

Source: Financial Accounts of the United States.

selves and to the extent we do know the instruments, we do not have good data on who holds them. My assumptions are as follows:

*Private-label ABS issuers.* The FA identify only two sources of funding for this sector, commercial paper and bonds. Unfortunately, the FA generally do not identify holders of ABS separately from total corporate and foreign bonds. For depository institutions and credit unions the FA do identify holdings of private-label MBS. I supplement these data with data from the Call Report to calculate bank holdings of nonmortgage ABS. I estimate foreign funders' holdings of ABS using data from the Treasury International Capital System. I do not have a good estimate of holdings of private-label ABS by long-term funders. This is an area of ongoing research. One starting point is to assume that long-term funders hold private-label ABS in proportion to their holdings of all corporate bonds. Instead, I calculated the proportion of all corporate and foreign bonds held by long-term funders and scaled down by 40 percent. This likely creates an upward bias to my estimate of the share financed by the short-term funders, which is calculated as the residual. I made this scaling assumption to ensure that the short-term share was positive in all periods (figure 4A.4). Indeed, in the extreme

**Table 4A.2 Agency- and GSE-backed securities (end of period, 2012:Q4)**

	Billions of dollars	Percent
<b>1. Total</b>	<b>7,544</b>	<b>—</b>
<b>2. Traditional banks</b>	<b>1,926</b>	<b>25.5</b>
3. US-chartered depository institutions	1,668	22.1
4. Foreign banking offices in the United States	32	0.4
5. Banks in US-affiliated areas	3	0.0
6. Credit unions	198	2.6
7. Holding companies	25	0.3
<b>8. Government</b>	<b>1,329</b>	<b>17.6</b>
9. Federal government	0	0.0
10. Monetary authority	1,003	13.3
11. State and local governments	325	4.3
<b>12. Foreign entities</b>	<b>1,077</b>	<b>14.3</b>
<b>13. Long-term funders</b>	<b>2,031</b>	<b>26.9</b>
14. Household sector	73	1.0
15. Nonfinancial corporate business	20	0.3
16. Property-casualty insurance companies	124	1.6
17. Life insurance companies	348	4.6
18. Private pension funds	223	3.0
19. State and local government retirement funds	201	2.7
20. Federal government retirement funds	7	0.1
21. Mutual funds	1,035	13.7
<b>22. Short-term funders</b>	<b>344</b>	<b>4.6</b>
23. Money market mutual funds	344	4.6
<b>24. Intermediate funders</b>	<b>838</b>	<b>11.1</b>
25. Government-sponsored enterprises	315	4.2
26. ABS issuers	1	0.0
27. REITs	352	4.7
28. Brokers and dealers	170	2.2

Source: Financial Accounts of the United States.

I could assume that long-term funders hold no private-label ABS. Even in this extreme (and false) case, short-term funders would remain a fairly small terminal funder of nonfinancial debt.

*REITs.* The short-term funder share equals the share of REIT credit market debt that is in the form of either repurchase agreements or commercial paper, the traditional bank share equals the share of REIT credit market debt that is bank loans, the foreign entity share is set to zero, and the long-term funder share is the residual (figure 4A.5).

*Finance companies.* The short-term funder share equals the share of finance company credit market debt that is in the form of repurchase agreements, the traditional bank share equals the share of finance company credit market debt that is bank loans, the foreign entity share is set to zero, and the long-term funder share is the residual (figure 4A.6).

**Table 4A.3** A decomposition of the growth rate of nonfinancial-sector debt

	2006:Q4– 2008:Q4	2008:Q4– 2010:Q4	Difference
	Percent change		
1. Total	14.9	6.9	–8.0
2. Short-term funders	53.6	–34.7	–88.3
3. Traditional banks	9.2	–2.6	–11.8
Funded by uninsured, short-term liabilities	7.9	–22.9	–30.8
Funded by insured deposits and long-term liabilities	9.8	6.8	–3.0
4. Foreign entities	22.9	15.2	–7.7
5. Long-term funders	8.9	11.6	2.7
6. Government	8.1	70.4	62.3
	2008:Q4– 2010:Q4	2010:Q4– 2012:Q4	Difference
	Percent change		
7. Total	6.9	8.6	1.7
8. Short-term funders	–34.7	5.5	40.2
9. Traditional banks	–2.6	6.5	9.1
Funded by uninsured, short-term liabilities	–22.9	–16.9	6.0
Funded by insured deposits and long-term liabilities	6.8	14.2	7.5
10. Foreign entities	15.2	15.5	0.2
11. Long-term funders	11.6	6.5	–5.1
12. Government	70.4	10.7	–59.6

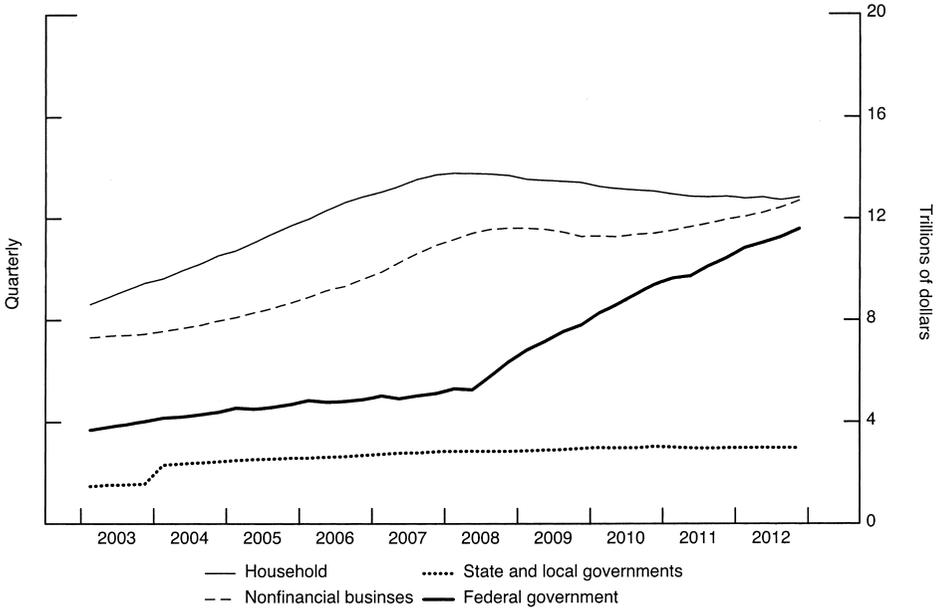
Source: Financial Accounts of the United States.

*Broker-dealers.* The short-term funder share equals the share of broker-dealer credit market debt that is in the form of repurchase agreements or security credit, the traditional bank share and the foreign entity share are set to zero, and the long-term funder share is the residual (figure 4A.7).<sup>28</sup>

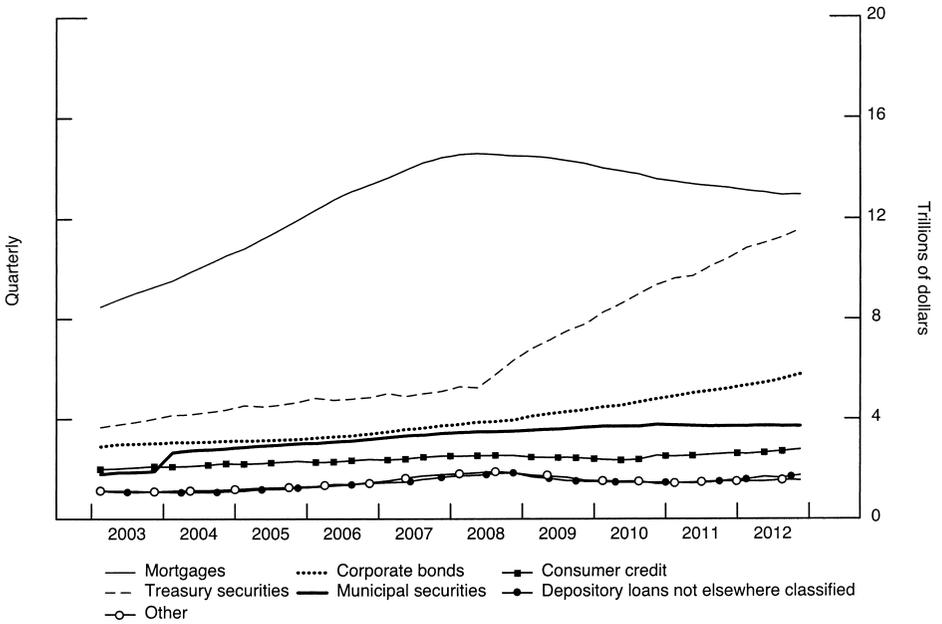
*Funding corporations.* The long-term funder share equals the share of funding corporation credit market debt that is in the form of corporate bonds or government funding facilities,<sup>29</sup> the traditional bank and foreign entity shares are set to zero, and the short-term funder share is the residual (figure 4A.8).

28. The government facilities include the Federal Reserve's Primary Dealer Credit Facility and Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility.

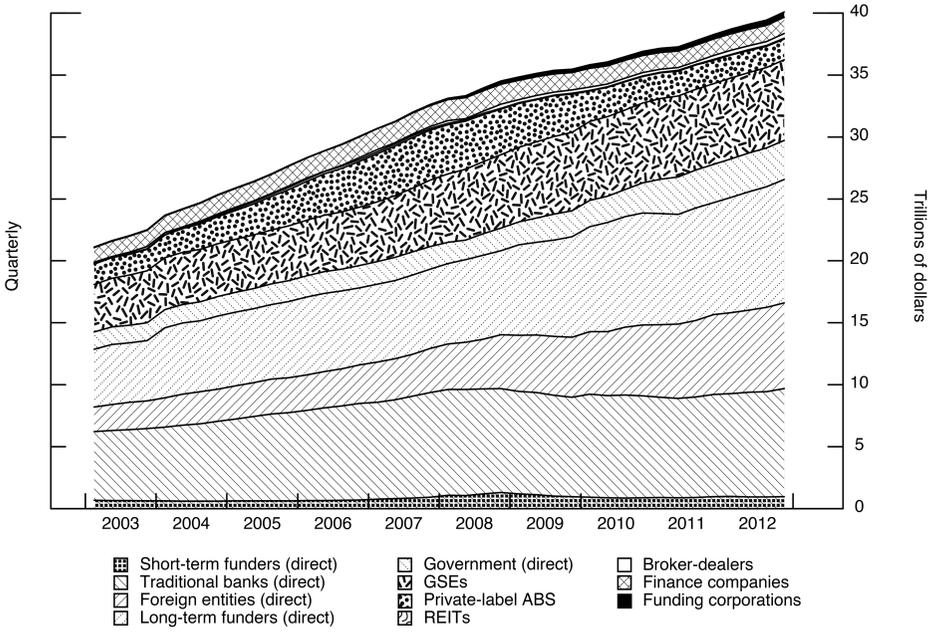
29. This includes loans extended by the Federal Reserve to Maiden Lane LLC, Maiden Lane II LLC, Maiden Lane III LLC, the Commercial Paper Funding Facility LLC, American International Group (AIG), and loans extended by the federal government to the Term Asset-Backed Securities Loan Facility and to funds associated with PPIP.



**Fig. 4A.1 Credit market debt owed by nonfinancial sectors (by sector)**  
*Source:* Financial Accounts of the United States. The data are plotted through 2012:Q4.

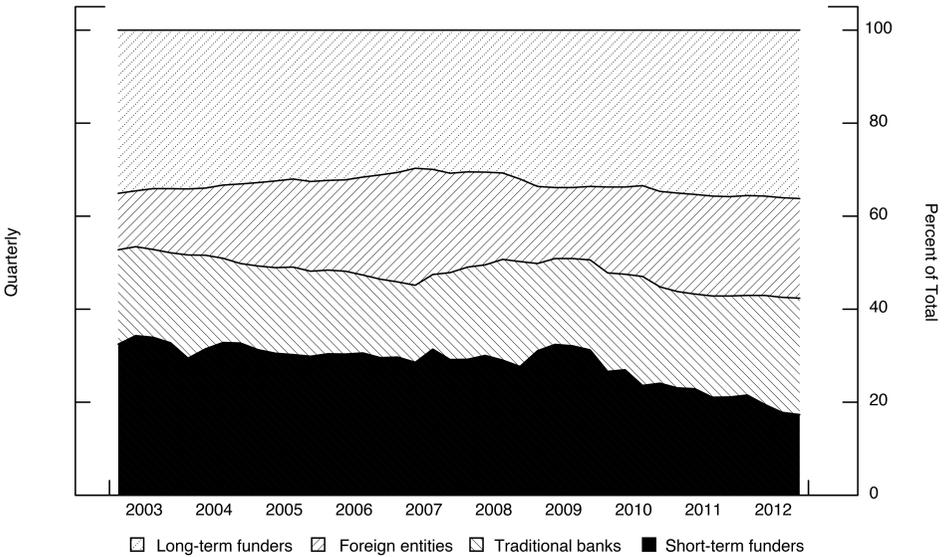


**Fig. 4A.2 Credit market debt owed by nonfinancial sectors (by instrument)**  
*Source:* Financial Accounts of the United States. The data are plotted through 2012:Q4.



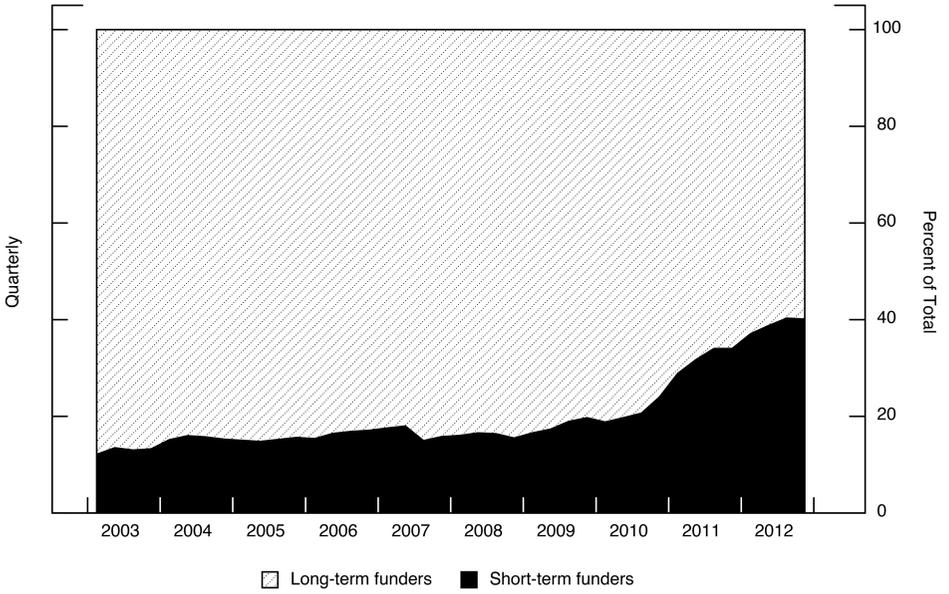
**Fig. 4A.3 Debt of the nonfinancial sector, by terminal funder (directly) and intermediate funder**

Source: Financial Accounts of the United States. The data are plotted through 2012:Q4.



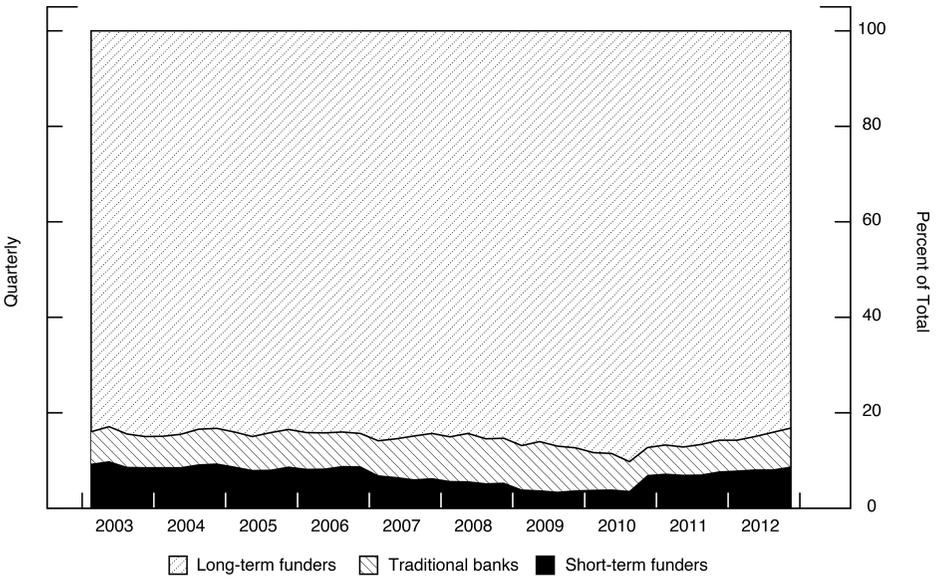
**Fig. 4A.4 Estimated allocation shares: Private ABS**

Source: Financial Accounts of the United States. The data are plotted through 2012:Q4.



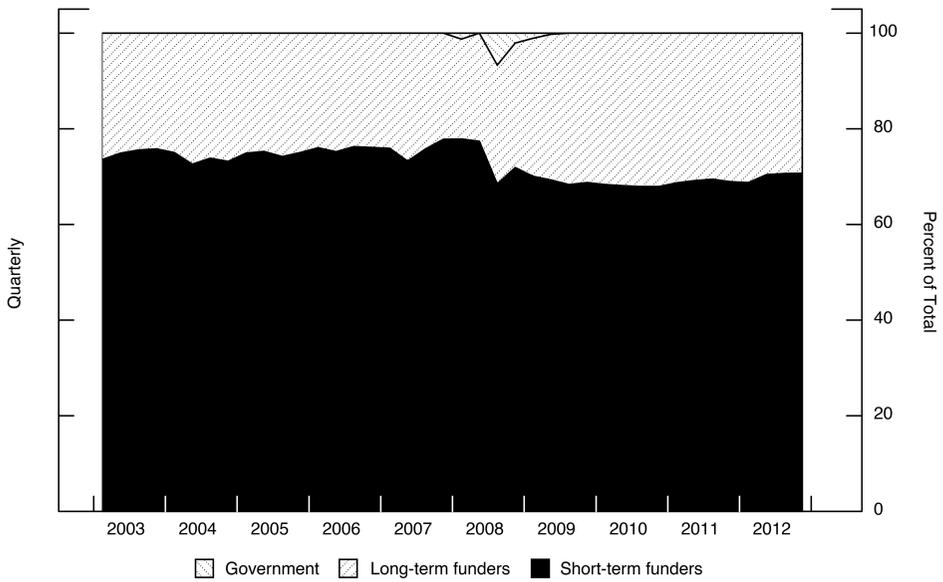
**Fig. 4A.5 Estimated allocation shares: REIT**

Source: Financial Accounts of the United States. The data are plotted through 2012:Q4.



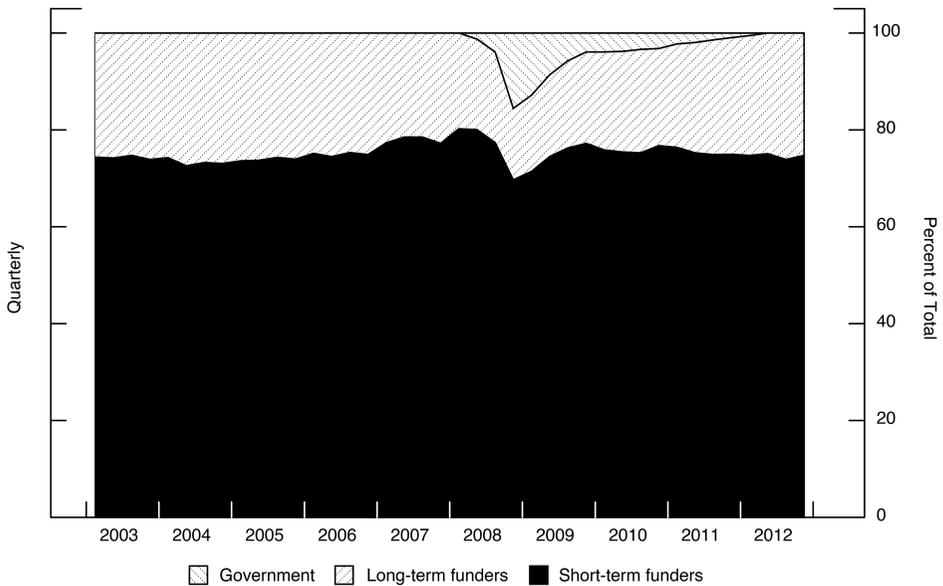
**Fig. 4A.6 Estimated allocation shares: Finance companies**

Source: Financial Accounts of the United States. The data are plotted through 2012:Q4.



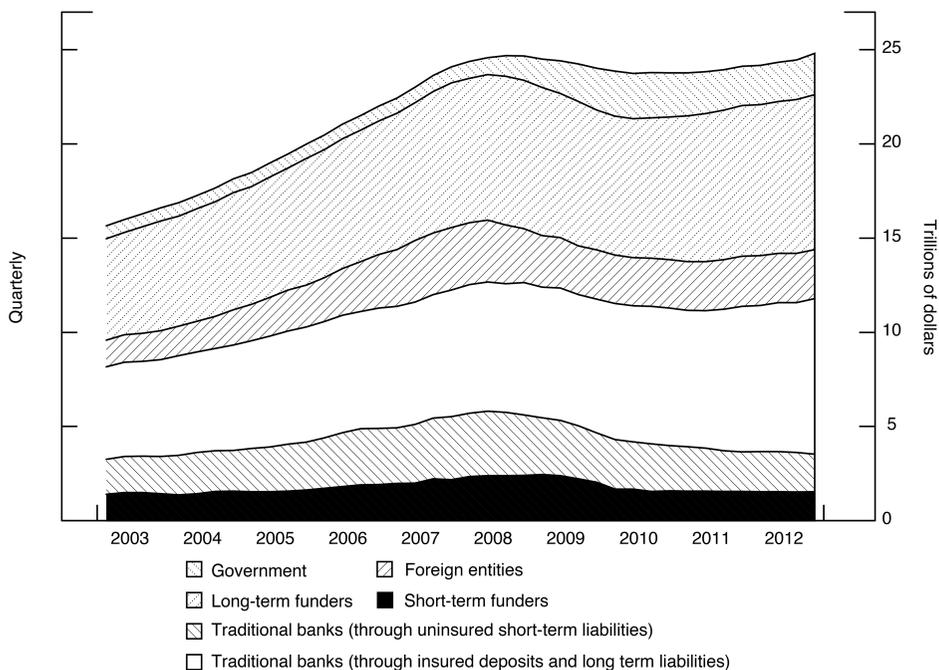
**Fig. 4A.7 Estimated allocation shares: Brokers and dealers**

*Source:* Financial Accounts of the United States. The data are plotted through 2012:Q4.



**Fig. 4A.8 Estimated allocation shares: Funding corporations**

*Source:* Financial Accounts of the United States. Data are plotted through 2012:Q4.



**Fig. 4A.9 Debt of the private nonfinancial sector, by terminal funder**

Source: Financial Accounts of the United States. Data are plotted through 2012:Q4.

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