Measuring Stress in Money Markets: The CDSS Index*

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Abstract

We develop an index that allows us to assess, in real time, the level of stress in money markets, the functioning of which is crucial for banks to fulfill their marginal funding needs and for other financial institutions to meet their liquidity needs. We estimate a dynamic factor model to synthesize information from various money market segments into a single measure—the CDSS index. Using nonlinear versions of the dynamic factor model, we identify phases of money market stress cycles during and after the recent financial crisis. We show that the crisis period has been characterized by three distinct phases—states of low, high, and extreme stress. The switches from high to low stress states generally coincide with various actions by the Federal Reserve that are intended to alleviate funding stress. In the aftermath of the crisis, using a two state model, we find that the level of stress in money markets is generally low with the exception of a brief period in mid-2010 and late-2011.

Keywords: Money Market, Dynamic Factor Models, Markov-Switching

JEL Classification: C32, E44

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* The views expressed in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System, its staff or any other person associated with the Federal Reserve System.

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I. Introduction

Until the recent financial crisis, money markets were not the focus of much attention, neither in the economics profession nor by the public in general. This fact reflected a view that these markets were deep, liquid, and efficient, and as a result functioned perfectly and could be largely ignored as a footnote to financial markets. Money markets provide liquidity funding for the global financial system by facilitating the borrowing and lending by financial institutions for short periods of time, typically for less than one year. The core of the money market consists of banks and other financial institutions borrowing from other similar financial institutions and large-scale institutional investors. Because banks meet their marginal funding needs in money markets, any stress in these markets may impair bank funding and block the flow of liquidity to the entire economy. The importance of the shadow banking sector, and the pullback from it that was a hallmark of portions of the financial crisis, further underscore the criticality of money markets. As a result, understanding the level of stress in money markets would be helpful for policy makers to guide their decision making process regarding possible market interventions in order to promote a healthy functioning of the financial system.

The financial crisis challenged the perception of perfectly functioning money markets. On August 9, 2007, money market conditions changed notably, with an increase in rates and risk spreads. The Federal Reserve and other central banks adjusted liquidity provision at that point, and those operations foreshadowed the much more significant intervention over subsequent years.

Even though money markets have become of greater interest, because these markets are segmented and have different types of instruments traded, it is somewhat difficult to summarize the overall market conditions. On the other hand, money markets are tightly integrated, as much

of the financial crisis demonstrated, so the challenge is to assess the amount of stress in money markets as distinct from other financial markets, and yet summarize across the diversity within money markets.

Indexes have been used often to aggregate information from various macroeconomic and financial variables into a single measure in order to summarize the state of markets or the economy. Many indexes have been created to monitor real economic performance, summarizing a wide set of data, such as the ADS business conditions index of Aruoba, Diebold, and Scotti (2009), or the leading, coincident, and lagging economic indexes provided by the Conference Board (see Levanon et al, 2011). [5, 6] The recognition of the critical role that financial markets play in the economy has led to the construction of financial stress indicators, for example, the Kansas City Financial Stress Index (KCFSI) of Hakkio and Keaton (2009), the St. Louis Financial Stress Index, which is calculated in a similar manner as the KCFSI, the Cleveland Financial Stress Index of Oet et al. (2011), or the index developed by Illing and Miu, 2006). [7,8] For the Euro Area, Composite indicator of Systemic Stress (CISS) is a recent index of systemic risk developed by Hollo et al. (2012). All these stress indicators are constructed based on the observation that the considered variables exhibit co-movement. For example, in the case of financial stress indicators, it is presumed that the financial markets are linked, and yet no single market variable is able to adequately capture the more abstract concept of financial market stress. That characterization is particularly apt for money markets.

Nevertheless, previous indexes focus on broader financial markets and may not give sufficient weight to money markets. By focusing solely on money markets, our index is not

[5] http://www.philadelphiafed.org/research-and-data/real-time-center/business-conditions-index/
[6] http://www.conference-board.org/data/bcicountry.cfm?cid=1
[7] http://www.kc.frb.org/research/indicatorsdata/kcfsi/
[8] http://research.stlouisfed.org/fred2/series/STLFSI

influenced by any fluctuations in general financial markets that are not necessarily related to money markets. This specific focus allows us to provide a more refined look at the conditions in money markets and possible stress therein. The narrower focus on money markets may seem justified because these markets were at the very core of the recent financial crisis. In addition, stresses in money markets were evident before they were evident in broader markets, suggesting that money markets may be good leading indicators of broader stresses. Finally, money markets are sources of funding for financial firms, especially highly leveraged financial firms. Recent research has suggested that recessions caused by financial crises may be different from other recessions, so additional insight into financial imbalances—as opposed to broader credit markets that support the nonfinancial economy—may provide useful additional information.

The financial crisis was characterized by episodes of different levels of stress. The initial spark in market stress that occurred in August 2007 receded to some degree until March 2008 when new stress emerged as Bear Stearns ran into difficulty. Markets again settled somewhat through the summer until the bankruptcy of Lehman Brothers, as well as developments in the commercial paper market, with AIG, and money market mutual funds. Although most money markets within the United States appeared to return to normal over the course of 2009, global dollar funding markets again came under stress, and in response, the Federal Reserve re-established liquidity swap arrangements in May 2010, and a coordinated network of currency swaps among central banks was established in November 2011. This pattern illustrates that money market stress, rather than being static, evolves over time and policy response evolves with it.

This paper fills an important gap in the literature by developing an index that tracks money market conditions in real time. In particular, we use a dynamic factor framework to

synthesize information from various money market segments into a single index, measuring money market conditions at a given point in time. Our results indicate that the Carpenter-Demiralp-Schlusche-Senyuz money market index (CDSS index hereafter) accurately identifies the times of elevated money market stress. Furthermore, we illustrate that when money market stress reaches extreme levels such as the recent financial crisis, non-standard policy measures are more effective in reducing the money market stress relative to standard policy via interest rate cuts. This type of information could prove to be very valuable in helping policy makers and others gauge the level of stress in funding markets, the need for possible policy interventions, and the proper policy tools to address the stress.

The remainder of the paper proceeds as follows: Section II describes the variables that are indicative of stress in money markets and that are used to construct our index. Section III presents the linear dynamic factor model and the estimation results of the money market stress index based on that model. Section IV shows the estimation results of a nonlinear factor model to model the cyclical phases of money market stress. Section V presents an analysis of the influence of money market stress on the sensitivity of bank stock returns to broader stock market returns.

II. Key Variables of Money Market Stress

Even though different segments of the money market are linked with one another and money market rates generally tend to move together, the segments have distinct characteristics depending on the type of instrument being traded and the terms of the trade. For example, borrowing in the repo market is secured, while borrowing in the federal funds market is unsecured. An increase in counterparty risk may manifest itself in a widening of the spread between secured and unsecured funding rates. In order to assess the level of strain in money

markets, one needs to monitor different rates and spreads that reflect the stress level in different market segments. Our goal is to distill information from various variables into a single measure that would reflect the general degree of stress in the money markets at any given point in time.

To construct our index, we use weekly data from December 12, 2001, to February 1, 2012, a period for which a broad set of data on money markets is available. Several motives guide our selection of variables. First, we want the index to incorporate signals from a range of money markets. Second, we want to include both liquidity measures and measures of counterparty risk. Third, we aim to construct a reasonably long time series of the indicator and we therefore rely on variables with a long history of available data.

In particular, we use the following set of variables:

- Libor-OIS spread: The spread between the three-month Libor and the three-month OIS rate likely has been one of the most closely watched barometers of the financial crisis. With OIS transactions involving only marginal counterparty risk as opposed to the lending that is meant to be reflected by Libor, the spread between Libor and the OIS rate serves as a measure for counterparty risk. Many researchers attributed the increase in this spread to the elevated levels of market and/or liquidity risk (see e.g. Taylor and Williams, 2010, McAndrews et al., 2008, Carpenter, Demiralp, and Senyuz, 2012).
- FRA-OIS spread: The spread between three-month forward rate agreements and the OIS rate reflects expectations about the Libor-OIS spread and hence can be considered as a measure of expected counterparty risk. While the previous variable measures the current counterparty risk, this variable has a forward looking nature.

- Spread between the Treasury GC repo rate and the federal funds rate: This spread between secured and unsecured funding rates widens when the risk of nonpayment increases.[9]
- TED spread: The spread between the three-month Libor and the Treasury bill rate, measures the perceived risk in lending to banks relative to investments in risk-free Treasury bills. A rising TED spread often signals a downturn in the economy, as it indicates that liquidity is being withdrawn.
- Federal funds market volume: The federal funds market is the funding market in which banks obtain funds from other banks, GSEs, or securities dealers. The trading volume in the federal funds market can be a proxy for bank funding stress. Indeed, the low transaction volume in this market was considered a major stress indicator during the financial crisis.
- Federal funds rate volatility: The intraday volatility, which is a volume-weighted measure based on total brokered federal funds transactions, can be viewed as a factor contributing to the liquidity risk in the market (see Carpenter, Demiralp, and Senyuz, 2012). Carpenter et al. illustrate that intraday volatility is highly correlated with factors associated with liquidity risk.
- Commercial paper spreads: These spreads measure the risk premium on lower quality paper relative to higher quality paper, on financial institutions relative to nonfinancial institutions, or on unsecured paper relative to asset-backed paper.
    - A2/P2 Spread: Spread between interest rates for low quality A2/P2 and high quality AA 30-day nonfinancial commercial paper (*A2/P2 - AA*).

[9] Over the course of the financial crisis, the surge in demand for relatively safe government debt caused the Treasury GC repo rates to plummet relative to the federal funds rate.

- Spread between AA unsecured financial commercial paper and AA unsecured nonfinancial commercial paper (*AAfin30 – AAnonfin30*).
- Spread between asset-backed commercial paper and AA unsecured nonfinancial paper (*SecCP - UnsecCP*).

- Fraction of unsecured financial commercial paper maturing in 1-4 days (*CPM*): Heavy reliance on CP maturing within 4 days may indicate near-term funding pressure for banking institutions that would lead to heightened and inelastic demand for such funding.
- Foreign exchange swap implied basis (*FXB*): This variable reflects the cost of obtaining dollar-denominated funding by borrowing in a foreign currency and subsequently swapping that currency into dollars.

III. Constructing the Index

3.1. The Model

In order to express all variables in the same unit, we standardize them by subtracting the sample mean and dividing them by the standard deviation. This standardization ensures that the common factor, i.e. the index has a zero mean, which allows for a natural interpretation: when the index is above zero, money markets are strained while readings below zero imply a relative calm state of the market.

We identify the common factor by estimating a dynamic factor model cast in state space form. This model serves as a signal-noise extractor. It filters out idiosyncratic noise inherent in each series and extracts a common factor, the CDSS index. In order to provide a scale for the factor, we normalize the factor loading of the first variable to 1, which has no effect on the time series properties of the index.

We first specify the measurement equation that links the observable data to unobserved state variables. Let

where

α is an 11x1 vector that includes the drift term in the factor equation,

purchase (LSAP) program that comprised of purchases of agency MBS up to $500 billion and agency debt securities up to $100 billion. The second one is the reduction of the target federal funds rate to a range of 0 to 25 basis points.

Figure 1, panel b suggests that during times of elevated money market stress, non-standard policy measures were more effective in relieving the market pressures than standard interest rate cuts. Indeed, when we compare the decline in the index following rate cuts during the crisis period, we notice that the index declined much more in response to non-standard policy. This suggests that during times of elevated market stress, non-standard measures are more effective in taming money market pressures.

The behavior of the index during the last stage of the crisis and the period until the end of 2010 is shown in panel c. The index declines after the FOMC announcement of additional purchases of agency MBS and agency debt combined with purchases of longer-term Treasury securities of up to $300 billion.

Panel d plots the index for the final sub-period from January 2010 to February 2012. The index is below zero for most of this period, except for brief episodes in mid-2010 and in late-2011. The policy response by the Federal Reserve to these episodes of elevated stress was to re-establish liquidity swap arrangements.

The maximum likelihood estimates of this model are presented in Table 1. The AR(1) coefficient of the process defined for the common factor, ϕ_1, is 0.97 indicating a high level of persistence, mainly driven by the dynamics of the index during the crisis period. All factor exposures (reported in the same order as they enter

to-one increase in the TED spread. After extracting the common factor, we model any remaining autocorrelation in the variables by defining idiosyncratic components that follow an AR(1) process. Autoregressive coefficients and standard errors for all eleven idiosyncratic components are highly statistically significant, indicating significant variable-specific dynamics for all considered series after accounting for their common dynamics.

IV. Modeling Cyclical Phases of Money Market Stress

The linear index that we constructed is a useful indicator to monitor money market stress at any point in time. However, given the dramatic changes in the time series behavior and the wide fluctuations of the index during the crisis period, it would be useful to be able to characterize the state of the markets based on the index, i.e. to allow for different mean and variance dynamics at different points in time. Before the crisis period, the index fluctuated within a narrow band with no indication of increased funding stress until August 2007. During the crisis period, there was an abrupt change to the index dynamics, unlike the prior history of the index in the past. After the financial crisis ended, the index fluctuated around its long-run average, however there have been two brief episodes when the index indicated stress in money markets.

In order to analyze the characteristics of these different episodes in more detail, we focus on two sub-samples, during which we saw increased variation in the money market: (i) the crisis period from August 2007 to June 2009, and (ii) the post-crisis period from July 2009 to February 2012. One way to capture the upward and downward movements of the index during these two periods is to allow for asymmetries in the specifications that describe the common index. Therefore, we extend the linear model described in Section III to account for potential mean and variance asymmetries. Equation (2) is now replaced by,

refer to as the "low stress" period. In the second state, the mean value rises above the zero threshold. The mean value of the index in this state is 0.13, implying "high stress" for the money market. The third state has a mean value of around 1.2, which is fairly high compared to the other two periods. Note that the variance of this state is also the highest. We refer to this state, which only prevails for nine weeks, as the "extreme stress" state. The variance of the high stress state is less than half of that of the extreme stress state, while the model cannot identify a separate variance for the low stress state.

Similar to the linear full sample model, we find evidence of significant idiosyncratic components for most of the considered variables. The sign of the estimates for all factor exposures are the same, although the magnitudes of the coefficients vary somewhat. The FRA-OIS spread, the TED spread, and the fraction of CP maturing within four days have a somewhat higher exposure to the factor during the crisis than for the full sample. Only the federal funds market volume has the same factor loading as in the linear model, although it is not significant in the nonlinear model.

The smoothed probabilities of the three-state model estimated for the crisis period are plotted in Figure 2. The beginning of the crisis is marked by a switch to a high stress state. Subsequently, the index switches between high and low stress states during the entire crisis period except for the nine-week period after the Lehman bankruptcy that is identified as a third state—the extreme stress state. Money markets enter into this state around mid-October 2008 and the level of stress remained at very high levels until mid-December of the same year. As can be seen, most of the switches from high to low stress states are associated with various Federal Reserve interventions, such as the term auction facility (TAF), the first round of large-scale asset

purchases (LSAP 1), and the reduction of the federal funds rate to its zero lower bound, suggesting that these actions have been effective in reducing the stress in money markets.

The second episode of interest, which is the post-crisis period, runs from July 2009 to February 2012. This period, which can be characterized by allowing for two states in the index specification, has been a much calmer period for money markets compared to the crisis period.

Table 3 presents the maximum likelihood estimates of the model for the post-crisis period. The mean for the first state is estimated to be below zero (-0.03), whereas the mean estimate for the second state is above zero (0.10), clearly distinguishing the high stress state from the low stress state.

Figure 3 shows the regime classification for the post-crisis period. Around late April 2010, the money market enters into a high stress period which lasted for about 7 weeks. The second high stress period identified by the model starts at the beginning of August 2011 and lasts until the beginning of January 2012. The Federal Reserve re-opened swap lines with the foreign central banks during both of these periods to alleviate stress in money markets.

V. Money Market Stress and Bank Performance

The CDSS index developed in the previous section can have many useful applications in economic analysis. For example, one might suspect that money market stress directly affects banks, and so higher levels of stress may have an effect on the perceived profitability of banks. To test such a view, one can investigate whether there is a measurable change in the sensitivity of banking sector stock prices to the three Fama-French factors (Fama and French, 1993) for different levels of the index.

The Fama-French model uses three variables to explain portfolio returns (

stock performance declines by about 15 percent. One interpretation of this result is that in times of money market crisis, when bank funding is called into question, bank stocks become dislocated from broader stock indexes because banks are more dependent on money markets than the economy as a whole. Columns II-V indicate that this result is driven by the volatility in money markets during the first wave of the crisis prior to 2009 (column III).

Another way to investigate this relationship is to estimate equation (4) in a rolling regression framework and observe how

so we infer the stress that is common across money markets. We estimate a dynamic factor model to synthesize information from various money market segments into a single index that is intended to measure money market conditions at a given point in time. Our results suggest that the CDSS index is able to identify the level of stress in money markets. The index also provides insight about the relative performances of the standard and non-standard policy measures during times of elevated stress.

We also model characteristics of the money market in two sub-samples during which the dynamics of the index have changed dramatically. In order to capture upward and downward swings in the index during the 2007 financial crises, we allow for asymmetries in the factor model. We show that the period from August 2007 to June 2009 has been characterized by three distinct phases—states of low, high, and extreme stress. The switches from high to low stress states generally coincide with various actions by the Federal Reserve that are intended to alleviate funding stress. From July 2009 to February 2012, using a two state model, we find that the stress level of the money markets is generally low with the exception of a brief period in mid-2010 and late-2011.

It is possible to think about a wide range of applications about the impact of the index in the empirical analysis. As one such application, we considered the effects of elevated money market stress on the sensitivity of banking sector stock prices to the Fama-French factors. We have shown that higher values of the index weaken the power of the market return factor in explaining bank stock performance. In other words, during periods of stress in money markets, bank stocks move less closely with the broader market index. Other potential applications of the CDSS index exist. For example, to the extent that the money market stress is priced into term money market rates through a term premium, the index can help to identify the expected path of

the future spot overnight rate by providing a proxy for at least a portion of the term premium that is priced into longer-term rates. Such an approach could be useful in looking at term Libor or Eurodollar rates. One can also use a measure of money market stress to help understand cross border flows of funding within foreign banking organizations. Preliminary results suggest that the net due to positions of foreign branches and offices show some sensitivity to money market stress. Indeed, during the financial crisis, foreign banks addressed the US dollar funding stress by borrowing from the discount window or the term auction facility (TAF) and then transferred the funds to the parent institution.

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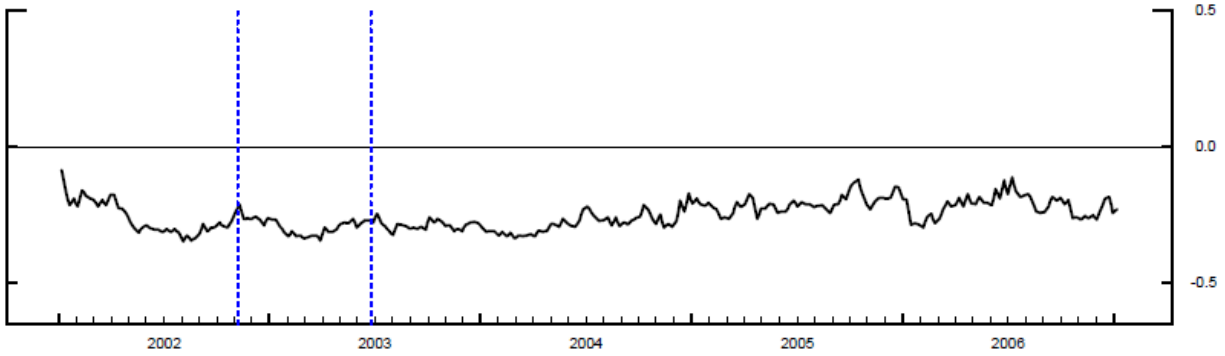
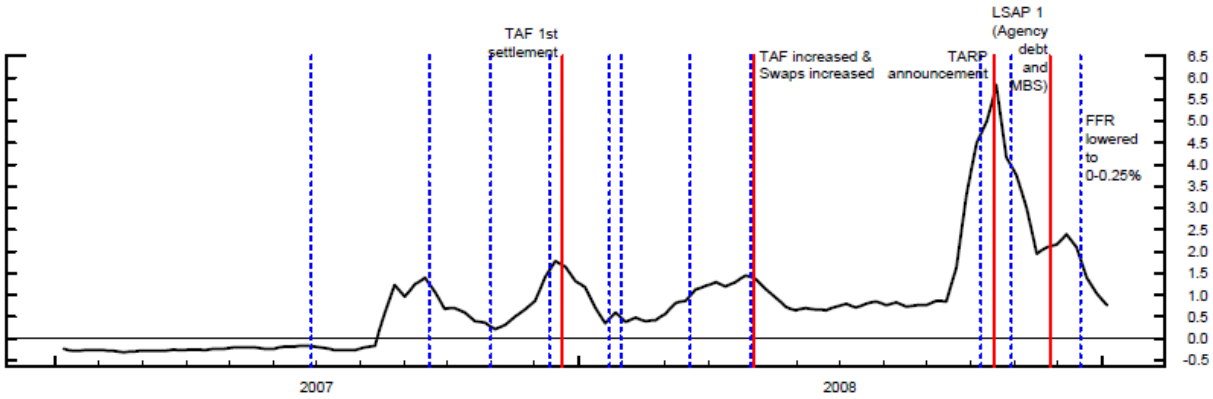
Figure 1: CDSS index

Panel a: Jan. 2002 – Dec. 2006



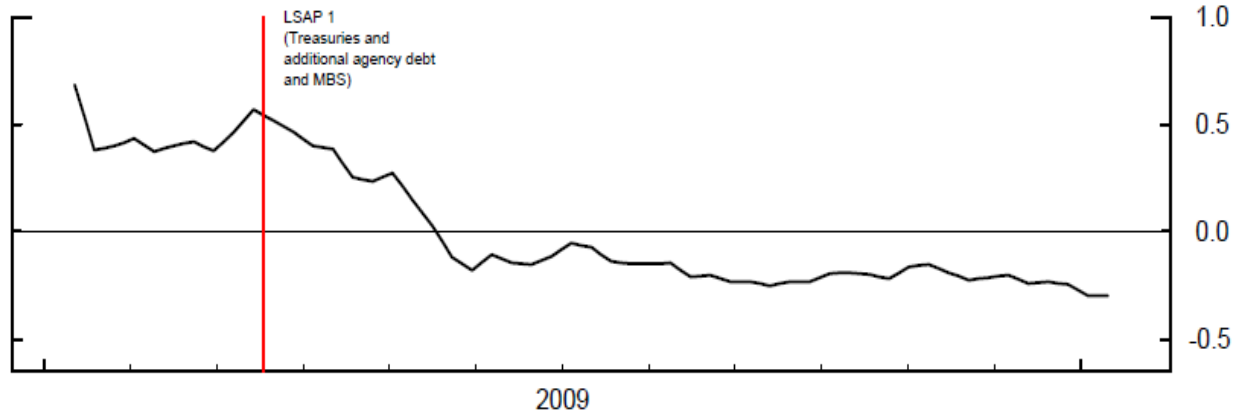
Note: Dashed blue lines indicate cuts in the federal funds rate.

Panel b: Jan. 2007 – Dec. 2008



Note: Dashed blue lines indicate cuts in the federal funds rate.

Panel c: Jan. 2009 – Dec. 2009



Panel d: Jan. 2010 – Jan. 2012

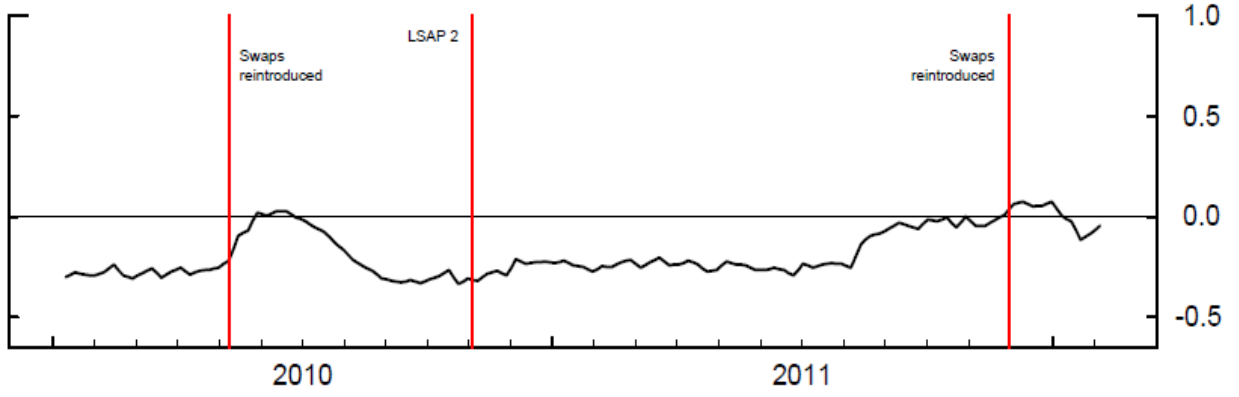
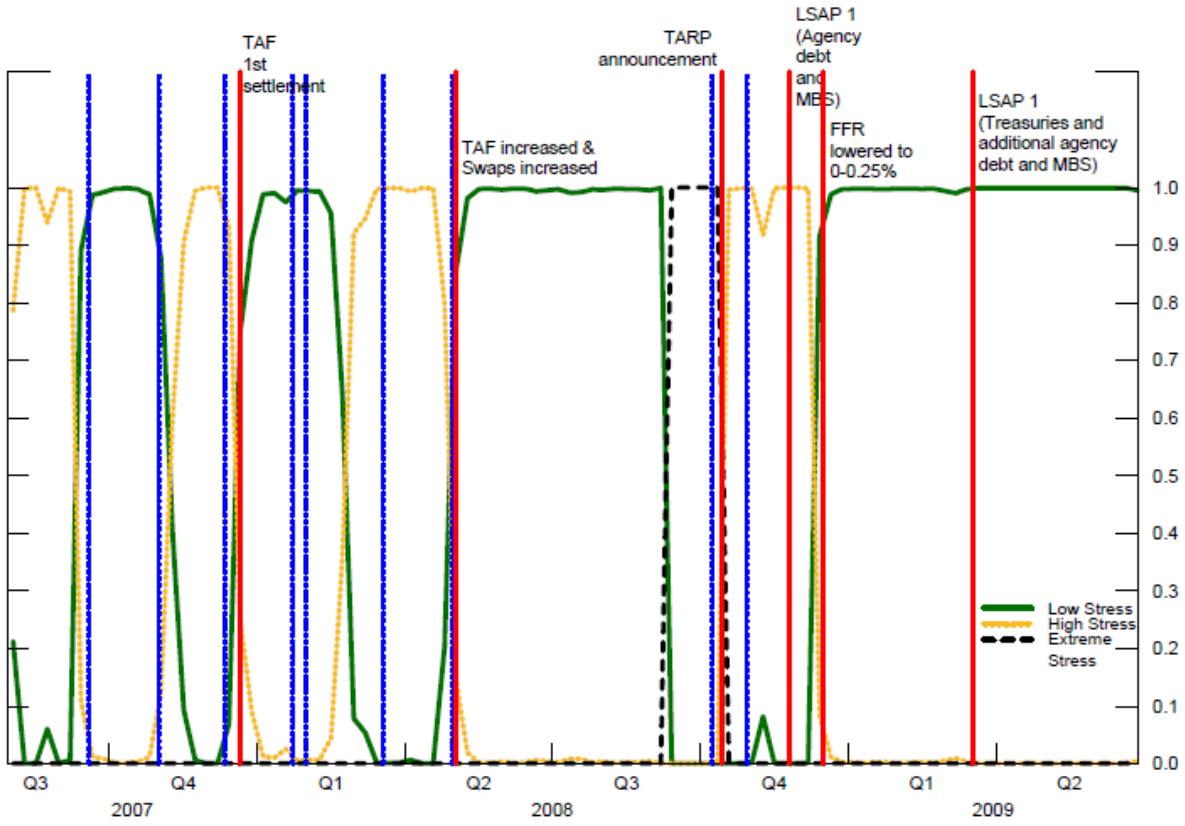


Figure 2: Phases of Stress in Money Markets: Smoothed Probabilities from a Three State Dynamic Factor Model



Note: Vertical, dashed blue lines indicate cuts in the federal funds rate.

Figure 3: Phases of Stress in Money Markets: Smoothed Probabilities from a Two State Dynamic Factor Model

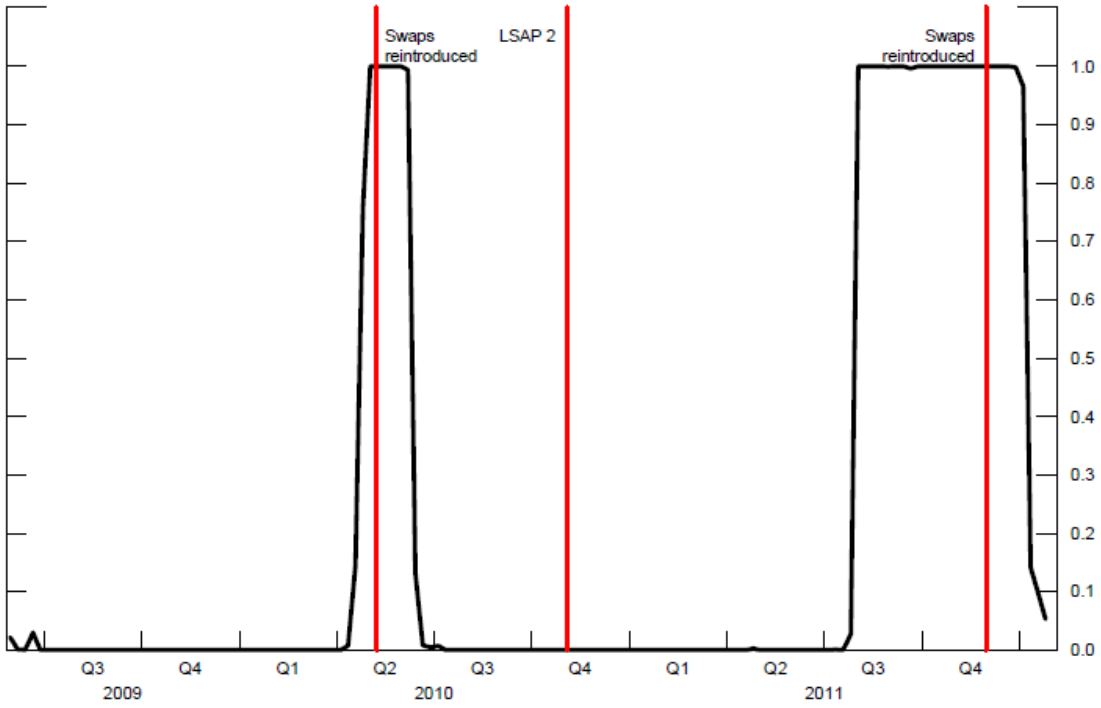


Figure 4: Rolling Regression Results of the CAPM Model and the Fama-French Three-Factor Model

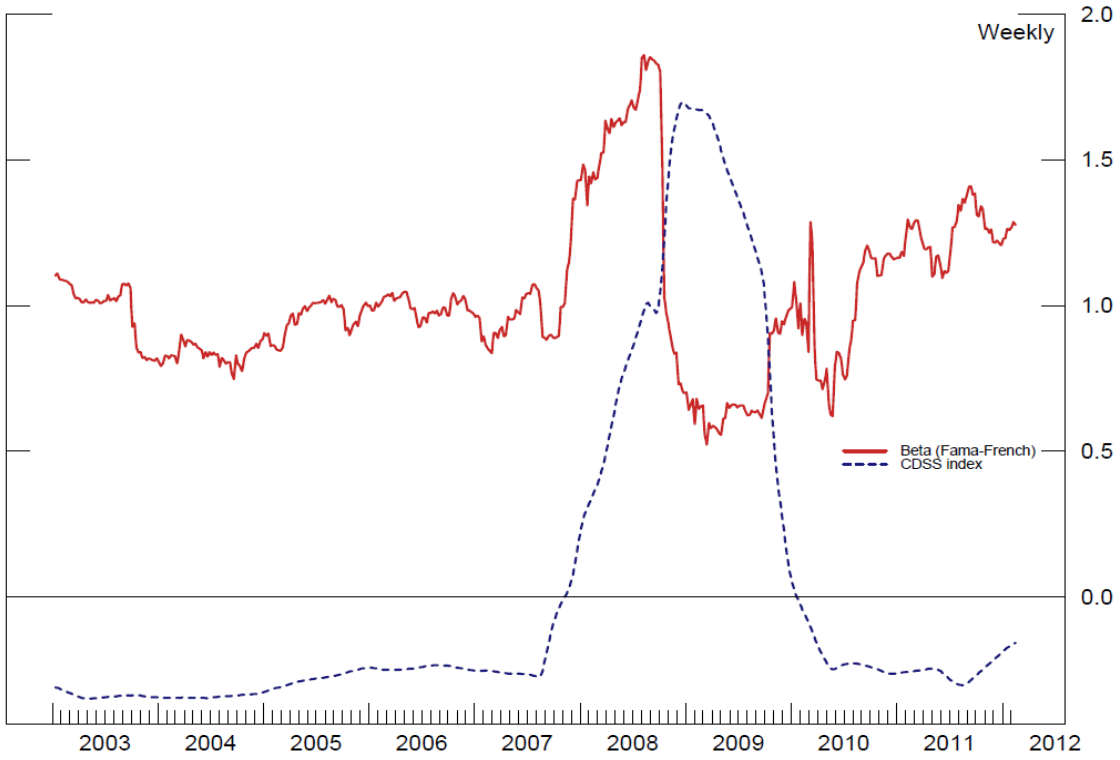


Table 1: Maximum Likelihood Estimates of the Linear Money Market Stress Model: Full Sample

Factor Equation Parameters		*Idiosyncratic standard*		*Idiosyncratic AR(1) parameters*	
	0.97		0.12		0.97
	(82.51)		(23.11)		(81.51)
	0.16		0.19		0.97
	(21.41)		(31.59)		(98.78)
Factor Loadings			0.73		0.51
	0.52		(32.21)		(13.27)
	(8.95)		0.12		0.93
	0.86		(19.63)		(47.97)
	(7.85)		0.31		0.95
	1.24		(32.49)		(67.42)
	(22.24)		0.62		0.36
	0.18		(31.58)		(8.04)
	(2.03)		0.19		0.93
	1.14		(28.95)		(51.62)
	(12.65)		0.35		0.55
	1.00		(28.39)		(9.77)
	(14.84)		0.18		0.71
	1.41		(22.21)		(12.65)
	(16.65)		0.37		0.94
	1.55		(32.46)		(60.29)
	(19.48)		0.38		0.89
	0.28		(31.01)		(41.87)
	(2.64)				
	1.16				
	(9.79)				

*t-statistics are provided in parenthesis.

Table 2: Maximum Likelihood Estimates of the 3-State Money Market Stress Model for the Crisis Period: August 2007 – June 2009

Factor Equation Parameters		*Factor Loadings*		*Idiosyncratic standard*		*Idiosyncratic AR(1) parameters*	
	0.66		0.57		0.18		0.93
	(17.76)		(4.93)		(10.76)		(24.80)
	-0.15		0.64		0.26		0.94
	(-7.14)		(3.12)		(13.66)		(29.38)
	0.13		1.32		0.78		0.48
	(2.91)		(10.38)		(14.05)		(5.39)
	1.17		0.18		0.21		0.77
	(6.25)		(1.04)		(11.14)		(10.32)
	0.00		0.82		0.42		0.91
	(0.00)		(4.51)		(14.07)		(20.94)
	0.16		0.87		0.73		0.40
	(5.10)		(7.41)		(13.98)		(4.22)
	0.35		1.19		0.22		0.92
	(2.74)		(7.52)		(12.18)		(21.59)
Transition probs.			1.42		0.43		0.58
	0.94		(10.05)		(13.39)		(6.42)
	(30.25)		0.34		0.23		0.72
	0.05		(2.35)		(11.10)		(8.46)
	(1.70)		1.12		0.36		0.93
	0.15		(5.24)		(14.04)		(24.01)
	(2.05)				0.50		0.75
	0.85				(13.55)		(10.55)
	(11.94)						
	0.00						
	(0.01)						
	0.20						
	(1.15)						

*t-statistics are provided in parenthesis.

Table 3: Maximum Likelihood Estimates of the 2-State Money Market Stress Model for the Post Crisis Period: June 2009 – February 2011

Factor Equation Parameters		*Factor Loadings*		*Idiosyncratic standard*		*Idiosyncratic AR(1) parameters*	
	0.92		2.31		0.24		0.94
	(75.66)		(2.60)		(10.76)		(28.78)
	-0.03		1.92		0.07		0.94
	(-2.48)		(2.44)		(13.66)		(25.40)
	0.10		-0.33		0.29		0.86
	(2.56)		(-0.90)		(14.05)		(19.07)
	0.04		2.55		0.84		0.52
	(2.64)		(2.65)		(11.14)		(7.01)
Transition probs.			1.45		0.09		0.92
	0.98		(2.54)		(14.07)		(26.24)
	(78.35)		1.94		0.79		0.01
	0.93		(2.51)		(13.98)		(0.18)
	(19.68)		0.56		0.22		0.86
			(1.03)		(12.18)		(18.10)
			1.94		0.43		0.74
			(2.61)		(13.39)		(12.66)
			-0.54		0.23		0.34
			(-0.87)		(11.10)		(3.95)
			-0.73		0.36		0.87
			(-1.32)		(14.04)		(17.32)
					0.50		0.88
					(13.55)		(21.56)

*t-statistics are provided in parenthesis.

Table 4: Money Market Stress Index and Bank Performance

		I	II	III	IV	V
		Full sample	Pre-crisis	Crisis I	Crisis II	Crisis III
		1/9/2002-2/1/2012	1/9/2002-7/25/2007	8/1/2007-10/15/2008	10/22/2008-6/24/2009	7/1/2009-2/1/2012
1.		1.23**	0.98**	2.09**	1.09**	1.17**
		(15.62)	(3.79)	(6.68)	(2.03)	(10.45)
2.		-0.16**	-0.28	0.10	0.48	0.16
		(-1.95)	(-0.75)	(0.24)	(0.77)	(0.93)
3.		1.12**	0.26	2.60**	2.70	0.45
		(5.30)	(0.51)	(5.80)	(2.78)	(1.58)
4.		-0.17**	0.10	-0.34**	-0.13	0.12
		(-3.17)	(0.12)	(-4.78)	(-0.52)	(0.20)
5.		0.05**	-0.35	-0.10	0.09	0.91
		(0.62)	(-0.29)	(-0.76)	(0.24)	(1.17)
6.		0.35	0.55	0.04	-0.60	-1.10
		(1.41)	(0.35)	(0.22)	(-1.32)	(-1.06)
7.		-0.23**	-0.01	-0.53	-0.37	-0.10
		(-2.21)	(-0.16)	(-1.51)	(-0.47)	(-0.62)
8.	Adjusted	0.66	0.66	0.73	0.76	0.72
9.	No. of obs.	526	290	64	36	136

** indicates significance at the 95% confidence level, *t*-statistics based on HAC errors are provided in parenthesis.