Financial Frictions and Swap Market Risk Premiums

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Introduction

- The global impact of the "subprime" crisis provides a challenging reminder that economic theories often omit important financial frictions that contribute to credit-related distress in financial markets.
- While the importance of macro-financial linkages are evident in the current crisis, surely many of the same economic mechanisms are, in less extreme forms, operative throughout the business cycle.

Our Goal: look back over the pre-crisis period and investigate the contributions of macroeconomic activity and financial market conditions to variation in the *levels* of yields swap markets.

- Most of the variation in interest rates and risk premiums is, no doubt, associated with standard real business-cycle developments or concerns about inflation.
- This is consistent with the degree of success of preference-based, equilibrium models in explaining risk premiums in bond markets.
  - habit formation: Wachter (2006), Ravenna and Seppala (2007), and Le, Singleton, and Dai (2009),
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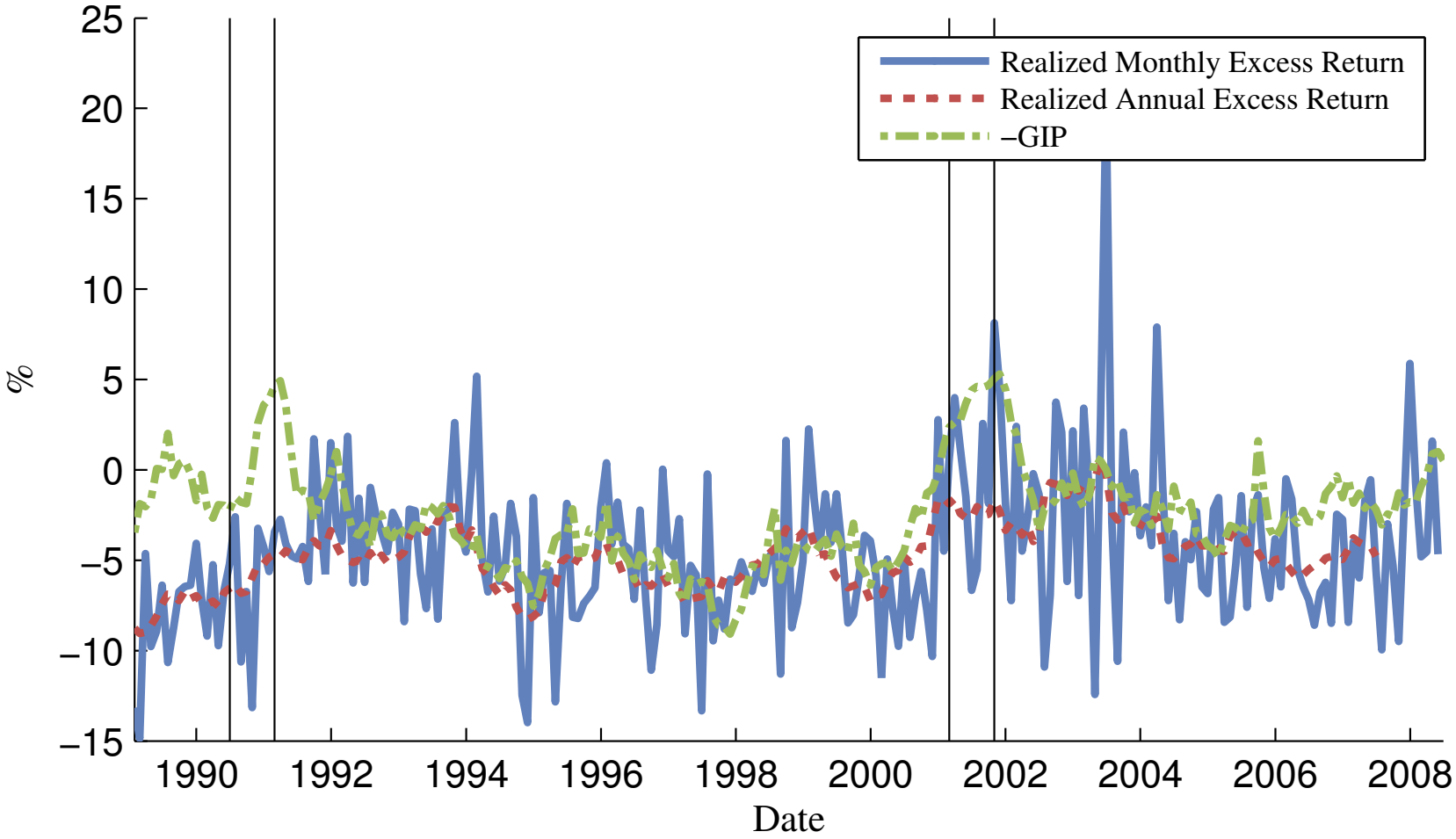
  - habit formation: Wachter (2006), Ravenna and Seppala (2007), and Le, Singleton, and Dai (2009),
  - long-run risks: Bansal and Shaliastovich (2009).
- It is also supported by the substantial contributions of output growth to variation in risk premiums in:
  - U.S. Treasury markets (Cooper and Priestley (2008), Ludvigson and Ng (2009)) and
  - swap markets (Joslin, Priebsch, and Singleton (2009))

Realized Excess Return on a Slope-Tracking Portfolio From Joslin, Priebsch, Singleton (2009)



Why Swap Markets?

- The direct effects of counterparty risks associated with the (roughly) *AA*-rated LIBOR market are likely to be small, owing to marking to market and collateralization.
- However the changing intensities of use of interest rate swaps over the business cycle are likely to induce a strong link between financial frictions, credit availability, and swap rates.
- Moreover, market participants often express concerns about possible deterioration in the credit quality of bond insurers and financial intermediaries through higher risk premiums and rates in swap markets (e.g., McCormick (2008)).

Thus risk premiums in swap market are likely to be informative about the importance of financial market frictions.

Why Not US Treasury Bonds?

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- Equally importantly, U.S. Treasury yields embody a substantial convenience premium (Feldhutter and Lando (2007), Krishnamurthy and Vissing-Jorgensen (2008)).
- These premiums affects swap *spreads* to Treasuries, but as modeled (both theoretically and econometrically), they do not directly affect the *level* of swap rates.

Financial Market Frictions and Excess Returns

- The "financial accelerator" of Bernanke and Gertler (1989): external finance premium that borrowers face given their financial position (net worth, liquid assets, etc.).
- Channels through with monetary policy affects bank lending: the "bank balance-sheet" (Bernanke and Gertler (1999)), "bank-lending" (Bernanke and Blinder (1988)), and the "bank-capital" (den Heuvel (2005)) channels.

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- Links between the soundness of intermediaries' balance sheets and risk premiums in financial markets (Allen and Gale (2005), Vayanos (2004), and He and Krishnamurthy (2008)).
- Deterioration in the capital and collateral positions of financial intermediaries during economic downturns affects their funding (il)liquidity (Brunnermeier and Pedersen (2008)).

Conditions in Bank Lending Markets

- FRB's Senior Loan Officer Survey (*SLOS*): Tighten lending standards for *C&I* loans to large companies (*C&ILT*)?
- Do you perceive an increase in the demand for *C&I* loans (*C&ILD*)? $Corr(C\&ILT, C\&ILD) = -0.77$

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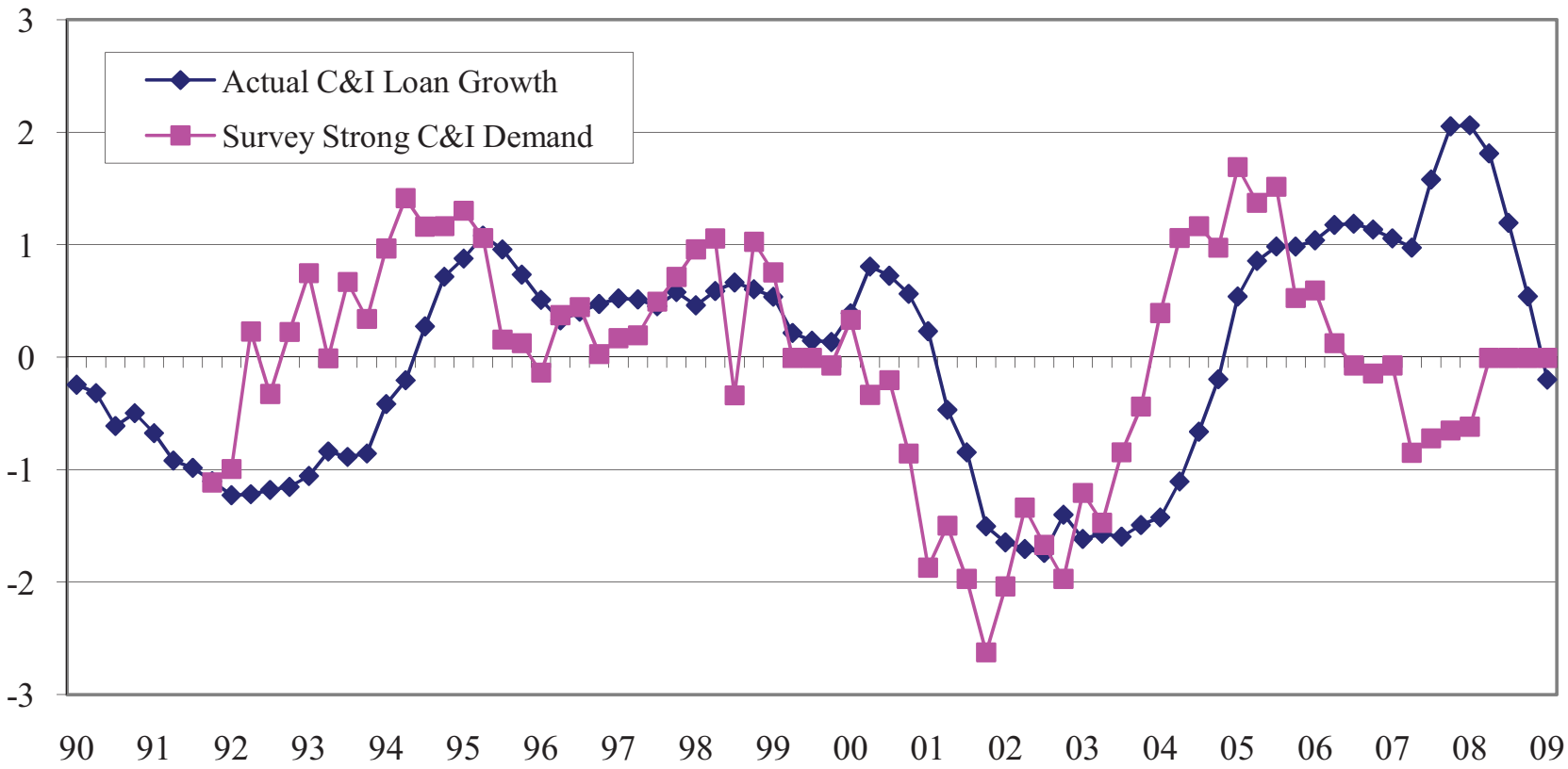
- Ivashina and Scharfstein (2008): weakness in banks' capacity to lend and large firms' access to syndicated loans.
- Jimenez, Ongena, Peydro, and Saurina (2009): falling GDP growth impacts the lending decisions of banks with relatively weak capital and liquidity positions.
- Lown and Morgan (2006) and Bayoumi and Melander (2008) document strong relationships between changes in bank lending conditions and future growth in aggregate real output.

Perceived Market Demand Versus Actual Loan Growth



Corporate Bond Spreads Predict Future Output Growth

- The strong predictive content of credit spreads for future output (Gilchrist, Yankov, and Zakrajsek (2009) and Mueller (2009)) has been attributed to:
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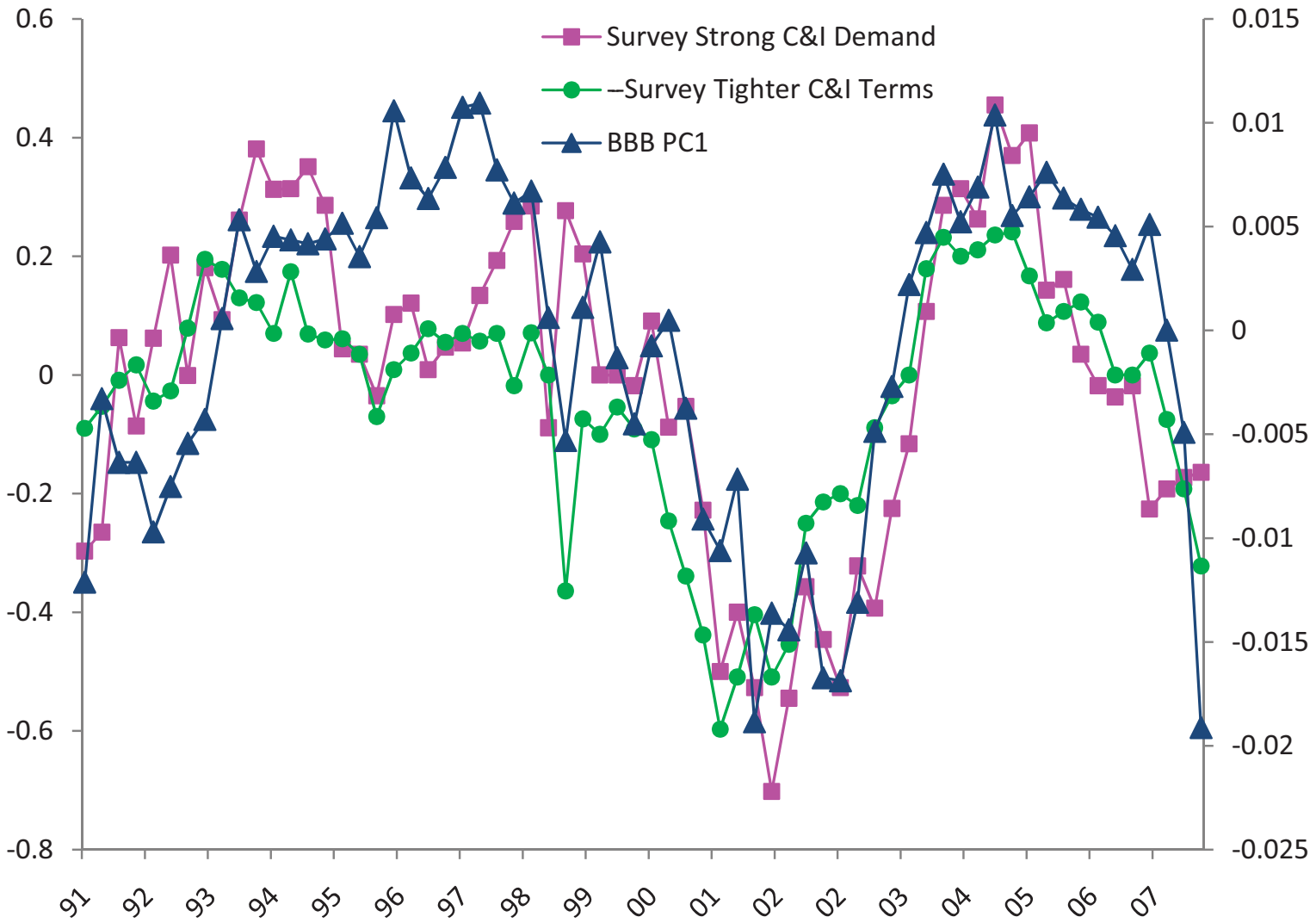
  - cyclical variation in consumers' default risk premiums (Gomes and Schmid (2009));
- But these explanations largely abstract from the financial accelerator (Bernanke, Gertler, and Gilchrist (1999)) or other mechanisms/frictions that disrupt funding in financial markets.

Bank Lending Conditions: Senior Loan Officer Survey

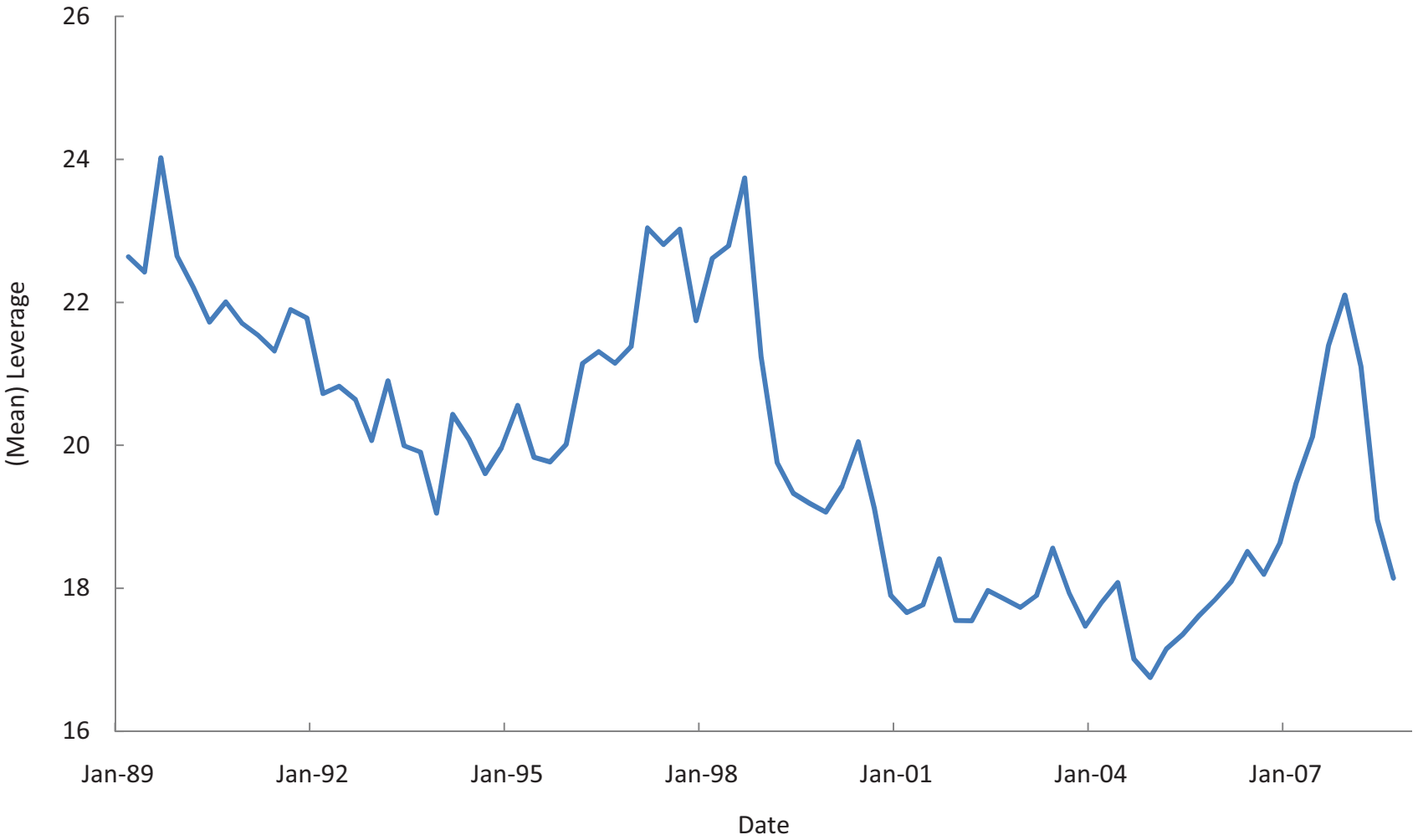


Funding Liquidity: Growth in Net Repo

- A measure of funding liquidity proposed by Adrian and Shin (2009) is the annualized growth rate of the net repo positions of primary dealers in the U.S.
- Repo financing allows dealers to expand their balance sheets.

However we found that *NetRepo* had insignificant effects on risk premiums in swap markets.

Mean Leverage of US Primary Dealers



Funding Costs of GSEs

- We anticipate that the funding costs of GSEs will affect risk premiums in swap markets, because they affect the activities of GSEs in mortgage markets.
- GSE spreads also reflect the relative liquidity of agency debt versus Treasuries.

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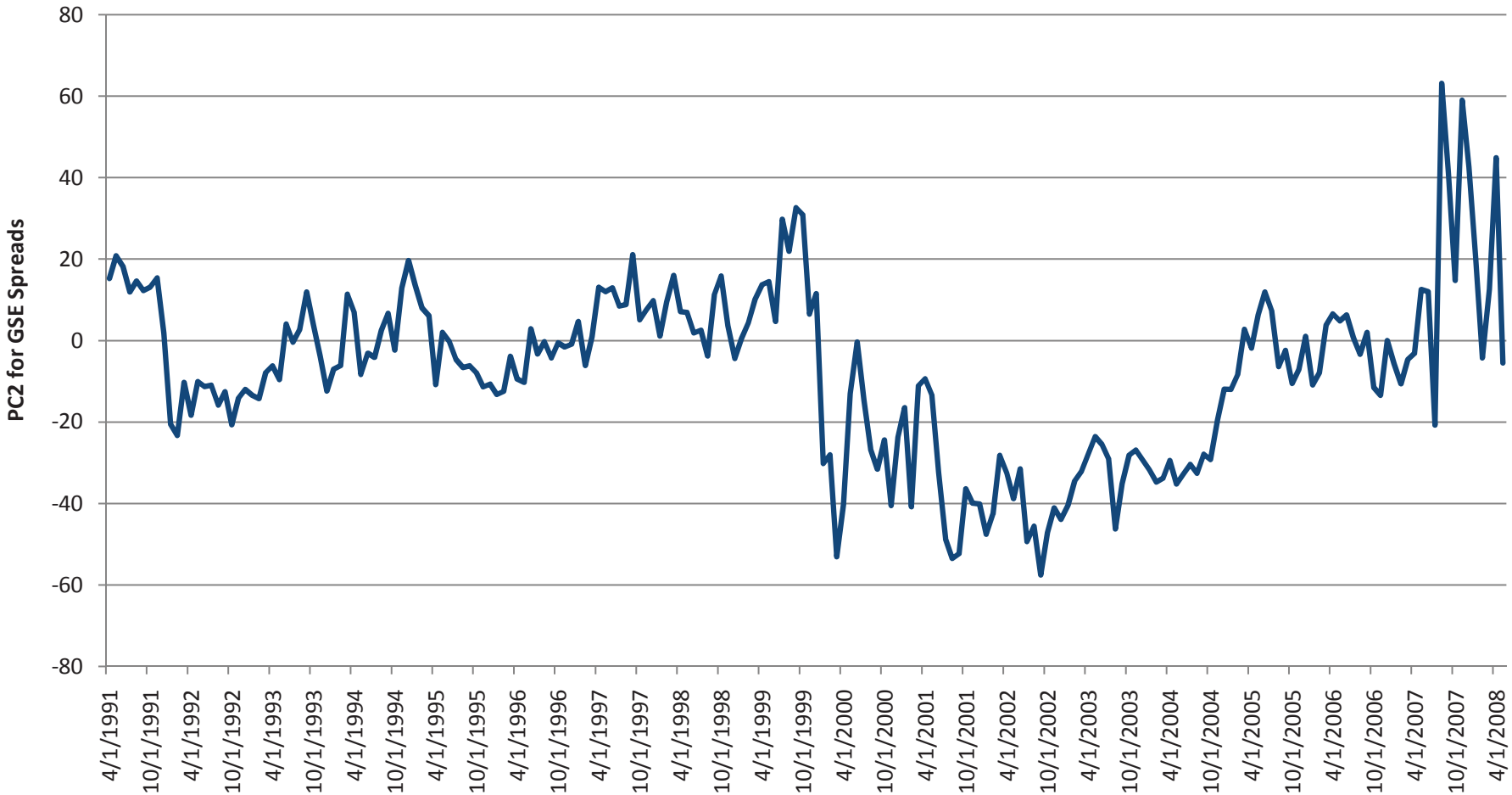
- GSE spreads also reflect the relative liquidity of agency debt versus Treasuries.
- We computed the first two *PC*s of GSE spreads:
  - GSE1: highly correlated with the IMF's Financial Stress Index for the US.
  - GSE2: $\approx$ minus the slope of the GSE spread curve.

GSE1 was generally insignificant as a predictor of risk premiums in swap markets, after conditioning on macroeconomic information.

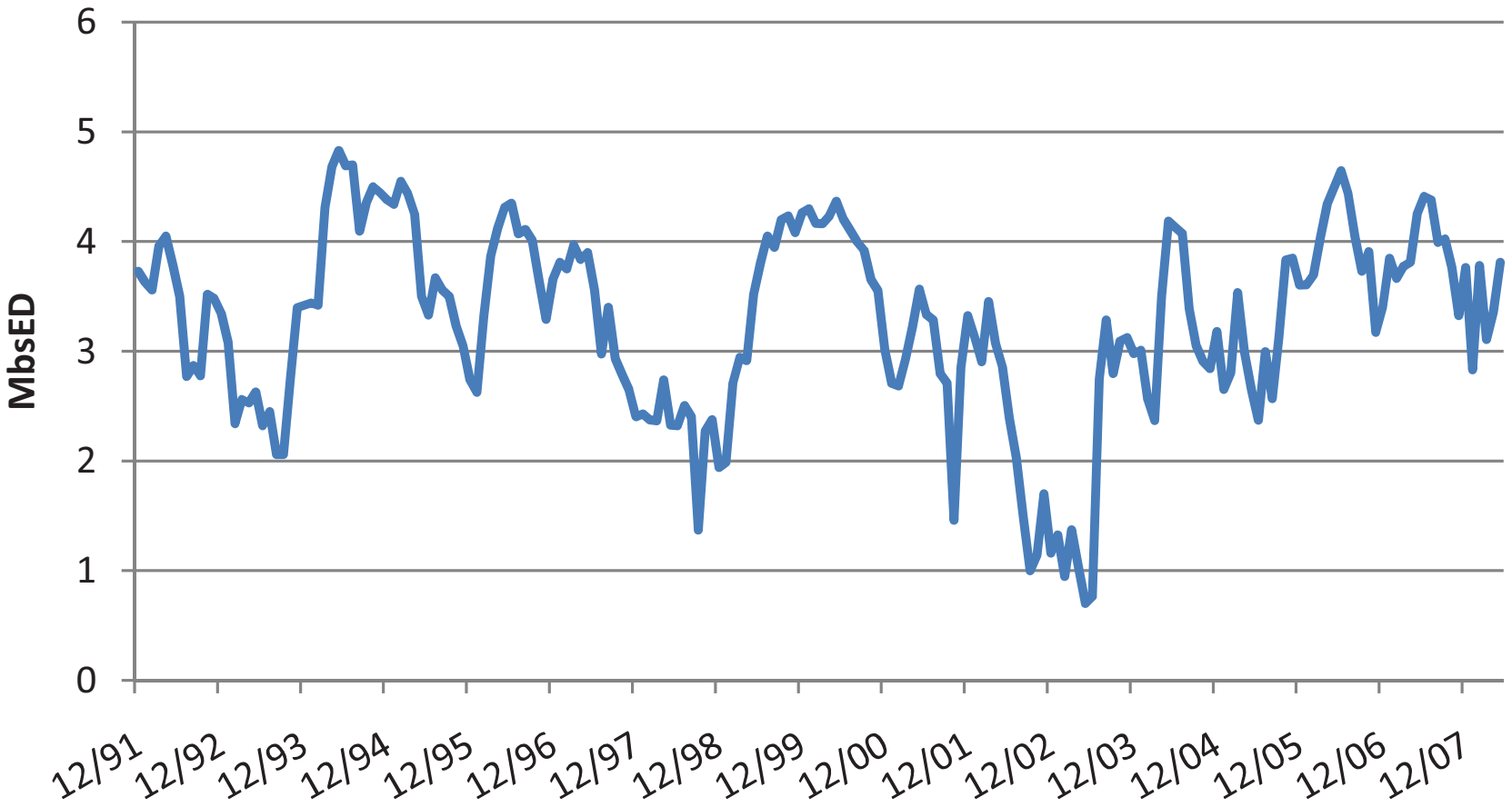
Slope of the GSE Spread Curve



Issuance in the MBS Market

- There was significant growth in issuance of MBS during our sample period.
- One measure of the effects of issuance on the composition of MBS is the effective duration of the Lehman Brothers MBS index, as maintained by Barclays Capital (MbsED)
- Issuance reflects refinancing activities and it affects hedging. For example, the Fannie-Mae 2008 10-Q showed $444B in payer swaps and $409B in receiver swaps.

MBS Effective Duration



Do Indicators of Financial Market Conditions Forecast Excess Returns?

- Regress realized excess returns on macro factors,
  - *GIP*: growth rate of industrial production.
  - *INF*: smoothed CPI inflation rate.
  - *GPay*: growth rate of non-farm payrolls.
- and our indicators of financial market conditions, *MbsED*, *GSE2*, *C&ILT*.
- Sample period: 1992:1 – 2007:4.

Excess Returns on *PC*-Mimicking Portfolios

- Nearly all variation in swap rates can be explained by the level, slope, and curvature of the the swap curve.
- Each individual bond is primarily exposed to level risk.
- We construct portfolios of bonds with *payoffs* that are (locally) perfectly correlated with changes in the level or slope of the swap curve, the primary sources of variation in yields.
  - Cochrane and Piazzesi (2008): only "level" risk is priced;
  - Joslin, Priebsch, and Singleton (2009) find substantial variation in excess returns on exposure to "slope" risk when they condition on macro information.

Projections of $xrPC1_{t+1yr}$ and $xrPC2_{t+1yr}$

LHS / RHS	$xrPC1_{t+1yr}$			$xrPC2_{t+1yr}$		
*PC*1	$-.352^{\dagger}$			$.300^{\diamond}$		
*PC*2	.413			$-.262^{*}$		
*PC*3	$-.953$			$1.17^{\diamond}$		
INF	-2.92	2.22	.579	$1.97^{\diamond}$	-2.13	$-.416$
GIP	1.70^{*}	1.77^{*}	$2.61^{\diamond}$	$-.868^{\diamond}$	-1.06	$-1.59^{\diamond}$
GPay	$-10.5^{\diamond}$	$-9.58^{\diamond}$	$-9.96^{\diamond}$	1.35^{*}	-2.04	.780
MbsED	.006		$.015^{\diamond}$	$-.005^{\diamond}$		$-.012^{\diamond}$
*GSE*2	$-.0004^{\diamond}$		$-.0003^{\diamond}$	$-.0001$		$-.0001^{\diamond}$
C&ILT	$-.002$		$.030^{*}$	$-.010^{*}$		$-.002$
R^2	0.67	0.45	0.65	0.91	0.51	0.85

Significance: $\diamond$ 1%; $*$ 5%; $\dagger$ 10%

Dynamic Term Structure Models

Following Joslin, Priebsch, and Singleton (2009) and Joslin, Singleton, and Zhu (2009), we consider a Gaussian dynamic term structure model (GDTSM) in which

- the risk factors are observable portfolios of yields;
- macro and financial variables have predictive content for excess returns, over and above the information in bond prices;
- the macro and financial variables are not spanned by the information in swap yields.

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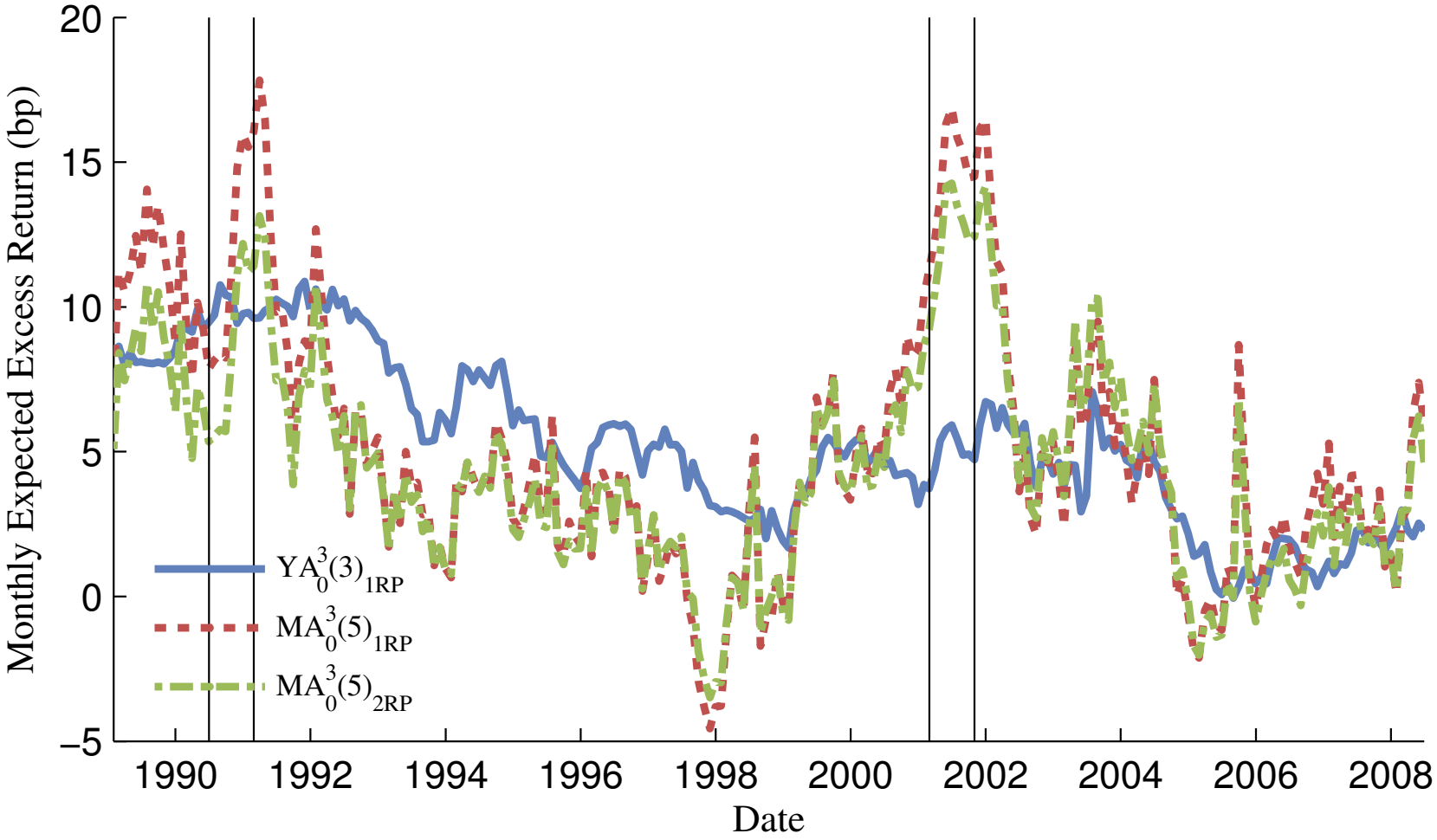
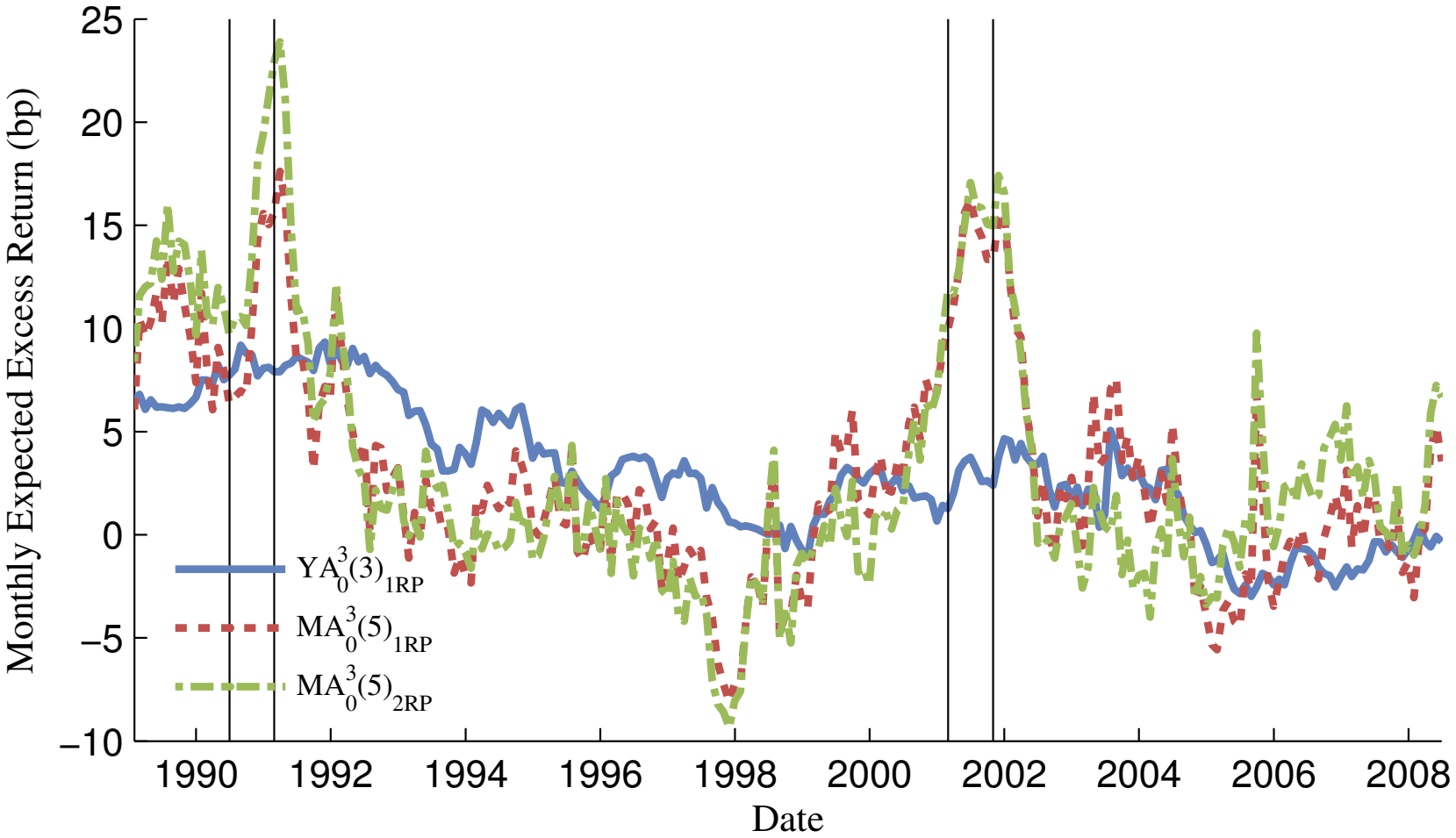
- the macro and financial variables are not spanned by the information in swap yields.
- "Reduced rank risk premia"
  - Example: agents do not demand compensation for bearing curvature risk
  - Example: compensation for level and slope risk move together

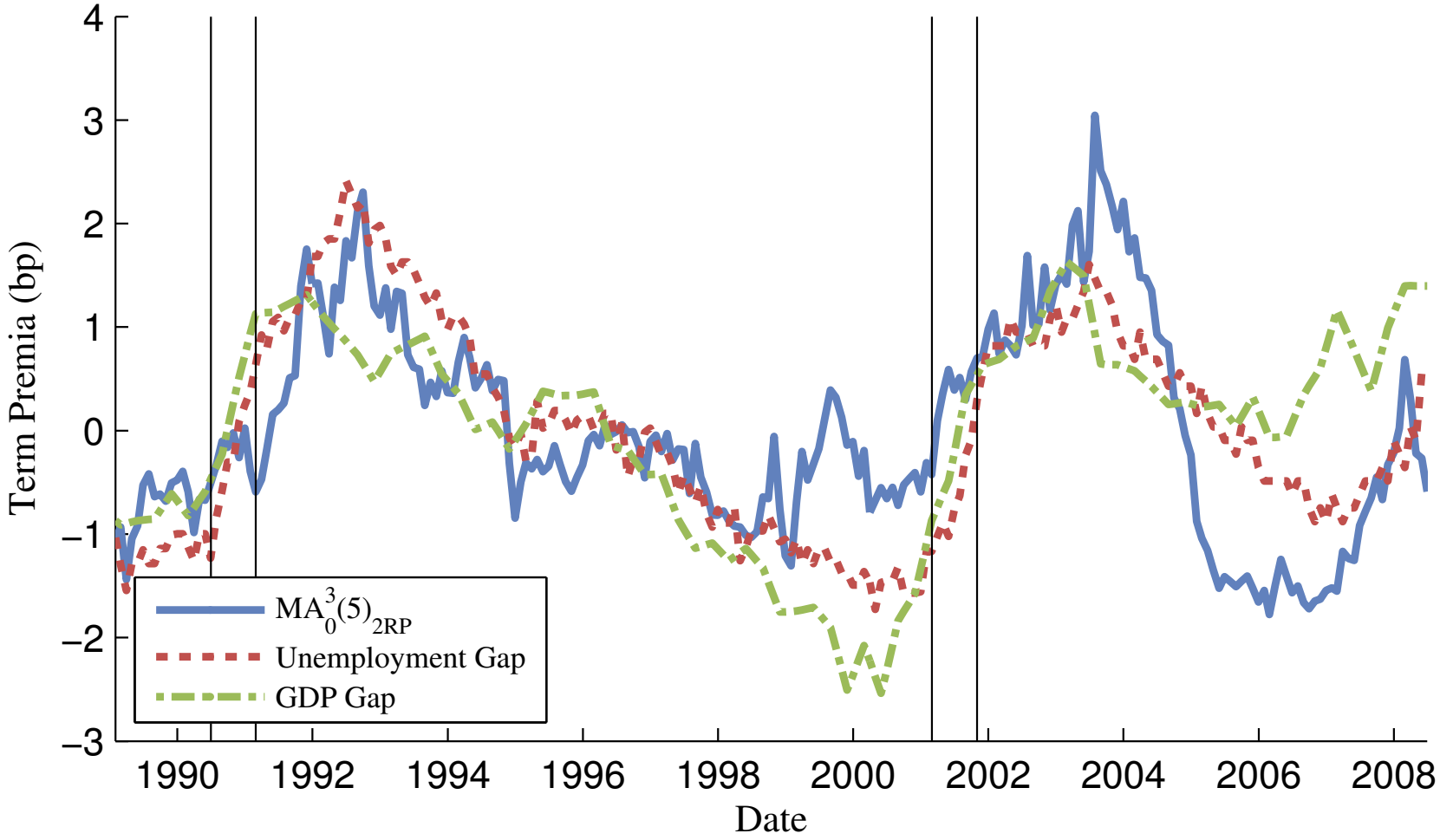
Excess Return on Level-Mimicking Portfolio [JPS(2009)]



Excess Return on Slope-Mimicking Portfolio [JPS(2009)]



Term Premiums and Macro Variables [JPS(2009)]



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