Capital Inflow Shocks and Monetary Policy Autonomy*

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Abstract

We document significant monetary policy autonomy imperfections in small open economies with free capital mobility and floating exchange rates. Using novel daily data on foreign financial institutions' purchases of Israeli central bank securities, we identify exogenous capital inflow shocks driven by covered interest parity arbitrage. These shocks generate persistent disconnect between interbank and market short-term interest rates lasting up to two years, with a one-standard-deviation shock explaining 44.7% of this disconnect's variation. The effects spill over to government and corporate bond markets, as well as the local stock market, as mutual funds rebalance their portfolios. This rebalancing narrows yield spreads in government and corporate bonds by up to 9 and 34 basis points respectively.

JEL classification: E0,F0,F3,G2

Keywords: Monetary Policy Autonomy; Covered Interest Parity Arbitrage; Capital Inflow Shock; Foreign Financial Institutions; Policy Interest Rates; Market Interest Rates; Portfolio Rebalancing; Granular Instrumental Variable; Slow Moving Capital

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1 Introduction

The ability of small open economies (SOEs) to insulate themselves from external financial shocks is a critical challenge in today's globalized world, particularly for those with free capital mobility and floating exchange rate regimes. Traditional international macroeconomic theory suggests that such economies can achieve monetary policy autonomy (Obstfeld and Taylor (2004)), allowing central banks to set local short-term interest rates independently of global financial pressures. However, recent research has questioned this view, proposing a "dilemma" instead of a "trilemma": full monetary policy autonomy is only possible with capital controls, even for economies with floating exchange rates.

This paper contributes to this ongoing debate by examining the disconnect between interbank and market short-term interest rates as a key dimension of monetary policy autonomy imperfection (Lenel et al. (2019) and De Leo et al. (2022)). We focus on Israel, a unique case study and a prototype of an SOE with free capital mobility, which experienced unprecedented levels of Covered Interest Parity (CIP) arbitrage during our sample period that induced a steady and dominant presence of foreign financial institutions (FFIs) as demanders of central bank securities that led them buy in a short period of time an astonishing 50% of the market. This scenario provides an ideal context to explore how external shocks to this presence affect the effectiveness of monetary policy (Rey (2013) and Miranda-Agrippino and Rey (2020)).

To causally identify monetary policy autonomy imperfection, we employ a granular instrumental variable (GIV) estimation approach. This method has been extensively used in recent literature to address endogeneity concerns and identify causal effects in various economic contexts (e.g., Gabaix and Koijen, 2020 and the exhaustive references within; Autor et al., 2022; Ben Zeev, 2023). We apply this approach to a novel dataset comprising daily, granular data on the universe of foreign financial institutions' (FFIs') purchases of Israeli central bank securities (MAKAM) over a period of approximately 6 years. MAKAM, the Israeli equivalent of short-term Treasuries, are the preferred investment vehicle for FFIs conducting CIP arbitrage in the USD/ILS foreign exchange swap market, primarily due to regulatory considerations (as detailed in Section X). This unique dataset allows us to examine the direct impact of exogenous capital inflow shocks on domestic

interest rates and broader financial markets.

Our GIV capital inflow shock is constructed from the universe of 18 FFIs active in the MAKAM market, including global investment banks, asset managers, and hedge funds. We define this shock as the difference between the size-weighted and inverse-variance-weighted averages of individual FFIs' MAKAM purchase shocks. This approach isolates exogenous variations in FFIs' demand for local short-term risk-free bonds, stemming from idiosyncratic demand shocks rather than endogenous macroeconomic forces.

The identified shock induces a rightward shift in FFIs' demand curve for MAKAM securities. The slope of the corresponding supply curve determines the degree of monetary policy autonomy imperfection: a steeper slope indicates greater imperfection, while a perfectly elastic supply curve would imply full monetary policy autonomy.

To ensure our identified shocks are unrelated to common market factors, our GIV estimation procedure incorporates an extensive set of controls. These include shocks to U.S. and local monetary policy rates, global and local equity markets, global wholesale and corporate credit markets, safe asset markets, and local risk factors as measured by the credit default swap (CDS) price of the 5-year dollar-denominated Israeli government bond.

Main Results. Our main findings reveal significant and persistent effects of capital inflow shocks across multiple asset markets. A capital inflow shock that eventually increases FFIs' market share by 10 percentage points leads to a persistent decline in the spread between MAKAM and interbank rates, reaching a trough of 9.1 basis points after 481 trading days. This persistence mirrors the gradual nature of the shock, with FFIs increasing their MAKAM purchases steadily over 364 days to achieve the full 10 percentage point market share increase.

The short rate disconnect spills over to government and corporate bond markets, as well as the equity market. Government bond yield spreads narrow by 5.4 to 9 basis points across 1- to 5-year maturities, with effects persisting up to 476 days. Corporate bond markets experience even larger effects, with yield spreads narrowing by 16.3 to 34.2 basis points across maturities, lasting up to 389 days. Concurrently, the local stock price index shows a significant peak rise of 6% after 389 days.

These widespread effects are driven by an intriguing portfolio rebalancing mechanism. Using supplementary sectoral secondary market data, we uncover that mutual funds act as counterparts to FFIs' MAKAM purchases. These funds then reallocate the proceeds from MAKAM sales to corporate bond and equity investments. This finding provides strong evidence of local portfolio rebalancing from MAKAM to riskier domestic assets, explaining the observed spillover price effects across markets.

Literature Review. Our paper belongs to two strands of literature. The first studies monetary policy autonomy and the associated "trilemma" principle (Shambaugh (2004), Obstfeld et al. (2005), and Klein and Shambaugh (2015)). This literature defines monetary policy autonomy as the coefficient obtained from regressing countries' short-term interest rates on corresponding base rates, with smaller such coefficient values indicating more monetary policy autonomy. The evidence from this literature has supported the traditional "trilemma" view in international macroeconomics that floaters with free capital mobility enjoy full monetary policy autonomy. However, recent work by Rey (2013) and Miranda-Agrippino and Rey (2020) has challenged this view by providing compelling evidence of a 'global financial cycle' that is meaningfully determined by U.S. monetary policy, transmits its effects through international financial markets, and significantly constrains national monetary policies regardless of the exchange rate regime in place.

Recently, Rey (2013) and De Leo et al. (2022) have highlighted in the context of emerging economies that the literature's standard use of short-term money market rates to measure monetary policy rates masks an important dimension of monetary policy autonomy imperfection: a disconnect between these monetary policy rates (or their proxies - interbank rates) and short-term market rates from the government bond market. Hence, our paper contributes to the literature by further stressing this important autonomy imperfection dimension in the context of floater SOEs with open capital markets. Our focus on capital inflow shocks as the impulse driving this imperfection is much in line with the international macroeconomics literature's focus on the capital flows variable, which also plays a central role in transmitting the 'global financial cycle' from the related above-cited works.

The second literature our paper connects to is the extant literature investigating the many

ways in which intermediaries affect financial markets (Greenwood and Vayanos (2010), Ellul et al. (2011), He and Krishnamurthy (2013), He et al. (2017), O' Hara et al. (2018), He and Krishnamurthy (2018), Klingler and Sundaresan (2019), Hendershott et al. (2020), Jiang et al. (2021), Koijen and Yogo (2022), Greenwood et al. (2023), Pinter (2023), and Ben Zeev and Nathan (2024a,b) among others). We add to this literature by showing how short-term risk-free bond demand by FFIs affects monetary policy autonomy as measured by the disconnect between interbank and market rates.

We also contribute to the literature on CIP deviations and their real economic impacts which has grown significantly in recent years. Du, Tepper, and Verdelhan (2018) document persistent CIP violations and discuss their broader economic implications. Ivashina, Scharfstein, and Stein (2015) demonstrate how these deviations affect global banks' lending behavior across currencies. Bahaj and Reis (2020) show the influence of central bank swap lines, which affect CIP deviations, on real economic outcomes. Avdjiev et al. (2019) link CIP deviations to bank leverage and its economic consequences. Bräuning and Ivashina (2020) explore how U.S. monetary policy impacts CIP deviations and emerging market credit cycles. Rime, Schrimpf, and Syrstad (2021) discuss how CIP arbitrage affects real resource allocation in the economy. Collectively, these studies demonstrate that CIP deviations are not merely financial anomalies but have significant implications for real economic outcomes, including bank lending, investment decisions, and international capital flows.

Our paper adds to this literature by showing how CIP arbitrage by FFIs affects monetary policy autonomy in small open economies.

Outline. The remainder of the paper is organized as follows. In the next section the theoretical motivation for this paper is described (to save space, the full depiction of the associated model is deferred to Appendix A of the online appendix to this paper). The subsequent section provides institutional background of FFIs' activity in the MAKAM market. Section 4 provides a description of the data and methodology used in this paper. Section 5 presents the baseline results and briefly discusses additional robustness checks (the results of which are shown in Appendix B of the online appendix to this paper). The final section concludes.

2 Theoretical Motivation

Appendix A of the online appendix to this paper presents a simple structural model that provides a conceptual base and motivation for the empirical analysis of this paper. The model presents a partial equilibrium of a local risk-free bond market that is governed by a risk-averse FFI - subject to demand shocks affecting its preference for local risk-free bond investment - representing the demand side of the market and a local central bank (CB) who is the monopoly issuer of the bonds. The monetary policy autonomy imperfection arising from the model is rooted in the assumption that the CB incurs a cost from large swings in reserves emanating from large bond issuances. This assumption is based on the notion that the CB has a disdain for having to conduct large interbank/open market operations, which in turn may prove too large for the depth of the corresponding markets for these operations, to counter reserve changes arising from issuances in the local risk-free bond market. (Issuance of such bonds mechanically draws down local depository institutions' reserves as the payment to the CB by the FFI for the issuance must be through the drawing down of these reserves.)

Given the latter cost/disdain, the equilibrium bond rate deviates from the CB's targeted monetary policy rate. The CB has an upward-sloping bond supply curve (in the bond price-quantity plane) that intersects the FFI's downward-sloping demand curve and favorable demand shocks to the latter curve result in lower bond rates both in absolute terms as well as relative terms with respect to the monetary policy rate.

3 Institutional Background

This section provides an overview of the MAKAM market in Israel and the role of FFIs in the context of small open economies' monetary policy autonomy. We begin by detailing the structure and purpose of MAKAM, short-term securities issued by the Bank of Israel (BOI) that are central to its liquidity management strategy. Since its inception in 1995, MAKAM has been integral to Israel's monetary policy, providing a liquid, risk-free investment vehicle with consistent monthly issuances, making it a focal point for market participants.

MAKAM: Israel's Short-Term Risk-Free Bond Market. MAKAM are short-term securities issued by the Bank of Israel (BOI), analogous to U.S. Treasury bills. Introduced in 1995 alongside Israel's adoption of inflation targeting, these zero-coupon instruments play a crucial role in BOI's monetary policy implementation and liquidity management. The BOI issues MAKAM to large primary dealers as 3- or 12-month duration bonds, with monthly issuances resulting in 12 series traded concurrently, each with a term up to 1 year.

MAKAM Market Liquidity and Trading The MAKAM market is highly liquid and centrally traded on the TASE. Its liquidity significantly surpasses that of comparable short-term Israeli government bonds. Over our sample period, MAKAM's average daily trading volume was ILS 305.2 million, 3.2 times higher than the ILS 94.6 million for short-term government bonds. Moreover, the MAKAM market has an average bid-ask spread of 0.025%, 40% tighter than that of government bonds, making it a preferred choice for FFIs engaging in USD/ILS CIP arbitrage as we are about to explain.

Definition of FFIs. FFIs are global financial intermediaries, including commercial banks, investment banks, hedge funds, and asset managers, that pool funds from various investors and invest in financial assets. In the MAKAM market, FFIs are major players due to the opportunities for CIP arbitrage. The BOI's daily bond flow data treats FFIs as any foreign institution involved in trading these short-term instruments. FFIs' significant activity in the MAKAM market stems from their ability to circumvent local banking restrictions by accessing a central bank-issued, risk-free asset without needing local branches.

MAKAM Market and CIP Arbitrage. MAKAM plays a crucial role in USD/ILS CIP arbitrage, where FFIs borrow at the risk-free dollar rate and tap into the FX swap market, investing the proceeds in local currency in the MAKAM market. As blablla show, FX swaps are the preferred vehicle to get dollar funding. To illustrate a hypothetical arbitrage opportunity, consider a simplified example: An FFI borrows $1 million for one year at a USD LIBOR rate of 1%. It converts this to ILS at a spot rate of 3.5 ILS/USD and invests the resulting 3.5 million ILS in one-year MAKAM yielding 2%. Simultaneously, it enters a one-year forward contract at 3.55 ILS/USD.

At maturity, the ILS investment grows to 3.57 million ILS, equivalent to $1.0056 million when converted back to USD at the forward rate. After repaying the $1.01 million loan (principal plus interest), the FFI incurs a loss of $4,400, or -0.44%. This negative return represents the cross-currency basis. Despite the apparent loss, FFIs engage in this trade due to balance sheet constraints and regulatory requirements, effectively paying a premium for dollar funding. MAKAM plays a crucial role in USD/ILS CIP arbitrage, where FFIs borrow at the risk-free dollar rate and tap into the FX swap market, investing the proceeds in local currency in the MAKAM market.

Unlike short-term government bonds, which have more volatile yields, MAKAM offers a stable, risk-free return, making it ideal for arbitrage.[1] The market's segmentation allows FFIs to access risk-free BOI assets without needing local subsidiaries, which are typically required for access to central bank deposit facilities (Rime et al. (2022)).

Figure 1 illustrates the 1-month USD/ILS cross-currency basis, representing deviations from CIP. The negative basis, particularly in relation to the MAKAM rate, reflects the profits FFIs achieved through arbitrage, with the MAKAM-based basis averaging -45.2 basis points, less negative than the TELBOR-based basis. This highlights FFIs' preference for the MAKAM market over the local interbank market, driven by the lower perceived risk.

Contrasting MAKAM with other Monetary Policy tools. While investing in a central bank's deposit facility requires the FFI to own a foreign subsidiary with access to this facility, a local central bank securities market such as the MAKAM market circumvents this requirement, thus rendering effectively unlimited access to holding a risk-free central bank asset for all FFIs.

Figure 1 shows the 1-month USD/ILS cross-currency basis (i.e., deviation from CIP) defined in the usual way as the difference between the dollar LIBOR rate and CIP-implied rate. For completeness and comparison purposes, the figure shows the latter for both the 1-month Tel Aviv Inter-Bank Offered Rate (TELBOR), which is based on interest rate quotes by a number of commercial banks in the Israeli inter-bank market (i.e., TELBOR is the local interbank rate) rate as well

[1] As explained in Rime et al. (2022), while short-term government bonds are an alternative such investment vehicle, it is an inferior one relative to central-bank-issued assets because government bond yields are much more volatile, responding much more strongly to demand and supply shocks in their respective markets.

as the 1-month MAKAM rate. The negative MAKAM-based basis for our sample period - which is on average -45.2 basis points - effectively represents the CIP arbitrage profit that was obtained by FFIs. That this basis was clearly less negative than the TELBOR-based basis - which is on average -70.9 basis points - from roughly the summer of 2019 onwards is precisely due to the short rate disconnect between interbank and MAKAM rates and speaks to the segmentation existing between these two markets: FFIs view the latter rates as less risky (they are essentially risk-free) than the local interbank rates and hence tap into the MAKAM market rather than the interbank market when conducting CIP arbitrage, where they are willing to accept a lower MAKAM rate relative to the interbank rate so long that the MAKAM-based basis is still negative. Since short-term interbank rates are a mirror image of the CB's monetary policy rate, one could ask why FFIs do not simply tap into the CB deposit facility when conducting CIP arbitrage. As also discussed below in the 'Regulatory Background' part, this can only be done through a local subsidiary which serves as a local depository institution. However, such associated local branching activity from FFIs' is a rarity in Israel.

MAKAM Yield and MAKAM-TEBLOR Spread. Figure 2 shows the daily evolution of the MAKAM-TELBOR spread. For completeness, we also show the MAKAM and TELBOR rate series. All series are averages over the individual 1-12 monthly duration-specific series. The 1-month TELBOR series effectively represents the *current* monetary policy stance whereas later (2-12) duration-specific TELBOR rates represent the near-term *future* stance of monetary policy. Hence, the MAKAM-TELBOR spread constitutes a sound measure of short rate disconnect and associated monetary policy autonomy imperfection: it precisely captures the inability of the central bank to perfectly align the short-term bond market rate with the corresponding interbank rate.

The close-to-zero TELBOR and MAKAM rates for the majority of the sample (up to April 2022) emphasize the corresponding zero lower bound (ZLB) state characterizing the BOI's policy stance from the beginning of our sample through April 2022 when the BOI began raising their policy rate. For our purposes, it is important to focus on the MAKAM-TELBOR spread's dynamics and in particular its persistent shift into negative territory from the summer of 2019 onwards. While

this spread clearly widens considerably further in tandem with the monetary-policy-induced rise in the MAKAM yield, there is also a meaningful widening that takes place concurrently with the ZLB period. Our econometric analysis, by focusing on exogenous capital inflow shocks and the MAKAM-TELBOR spread as the outcome variable which in turn purges the effects of the current and future stance of monetary policy from the estimation, will be able to cleanly identify the short rate disconnect.

FFIs' MAKAM Trading. Figure 3 shows the evolution of the accumulated daily MAKAM flows of FFIs over our sample period. (positive (negative) such flows represent buying (selling) of bonds.) The figure clearly demonstrates that FFIs were engaged in significant buying activity in the MAKAM market. The cross-currency basis dynamics from Figure 1 explains the main point of attraction for FFIs' meaningful presence as buyers in the MAKAM market and in particular their increased presence from the summer of 2019 onwards. Our identification design is based on capturing shocks to this persistent buying activity.

Sectoral Comparison of MAKAM Holdings as Shares of Outstanding MAKAM. Figure 4 shows the evolution of monthly MAKAM holding shares of total outstanding MAKAM bonds held by various sectors, including FFIs. Note that total outstanding MAKAM level is determined by both the BOI's issuance activity, which it implements once every month, as well as the maturing of bonds. Figure 4 indicates that over the course of our sample period FFIs have replaced local banks as the dominant MAKAM holders, with the former steadily reaching a roughly 50% share of the market from a single digit share and the latter correspondingly dropping from a similar such high share all the way to a single digit share. Local banks mostly substituted MAKAM holding with central bank deposits during our sample, which stresses the important link between the interbank and MAKAM markets. Notably, as discussed in Section 5.5, mutual funds - and not local banks - are FFIs' counterparty in their secondary market MAKAM purchasing activity; local banks play a counteracting role only in the primary market, taking direct purchasing orders from FFIs prior to MAKAM auctions.

4 Methodology

This section elucidates the methodology used in the empirical analysis undertaken in this paper. We first describe the data used in the estimation after which we turn to present the general lines of the estimation.

4.1 Data

Our data is daily and covers the period 1/1/2017-8/31/2022. The specific starting and ending points of this 5.75-year period are dictated by the availability of the Bank of Israel (BOI) proprietary data we have on FFIs' MAKAM flows. We begin our data description by providing details on IIs' data after which we turn to discuss the other variables we utilize in our empirical analysis.

4.1.1 MAKAM-TELBOR Spread and FFIs' MAKAM Flows Data

MAKAM-TELBOR Spread. Our object of interest is the short rate disconnect which we define as the spread between the daily MAKAM and TELBOR yields. Both yields are computed as averages over the 1-12 monthly duration yields. As discussed in the previous section, the MAKAM market operates in a centralized and highly liquid exchange and serves as the preferred investment vehicle for FFIs' CIP arbitrage trading.

FFI-Level Makam Bond Flows. We have proprietary granular, transaction-level daily data for FFIs' bond flows in the MAKAM bond market. We have a total of 18 FFIs, which correspond to the universe of FFIs (i.e., investment banks, investment management firms, commercial banks, hedge funds, and insurance companies) operating in the latter market. We measure all flows in local (ILS) currency. The flows variable measures the daily net transaction flow from FFIs' buying and selling of local bonds. We include bond redemptions as sells in our data to avoid erroneously measure an FFI's desire to merely maintain its holdings level as a demand shock; hence, FFIs' flows can be

viewed as the changes in their bond positions/holdings.[2] We also include non-secondary, primary market MAKAM purchases by FFIs as these capture a presiding share of their demand (this point is further discussed in Section 5.5).[3] There is a positive (negative) value for this variable for a given observation when an FFI was a net buyer (seller) of local bonds on the corresponding day. The aggregate FFIs' daily bond flows variable is simply the sum of the individual 18 FFIs' daily bond flows.

Our GIV-based identification comes from our ability to observe transaction-level bond flows for individual FFIs and its merit is rooted in the very highly concentrated structure of FFIs' activity in the MAKAM market, as reflected by an average Herfindahl-Hirschman Index of 0.47 for FFIs' flow volumes. All 18 FFIs are consistently net buyers of MAKAM bonds, an important fact given that our GIV-based identification approach's validity relies on the FFIs being demanders (net buyers) of MAKAM bonds - see Section 4.3 for a formal depiction of this reliance.

It reasonable to expect only modest correlation among our 18 FFIs' bond flows given the high-frequency (daily) nature of our data. This expectation is borne out by the data with an average absolute pairwise correlation among the 18 FFIs of 10.9% and a corresponding standard deviation of 12.2%. Importantly, by removing the effects on these flows of various common drivers, our estimation procedure is capable of meaningfully reducing these numbers to 6.3% and 6.9%, respectively. I.e., the high-frequency nature of our data along with the suitability of our estimation procedure facilitate the extraction of daily idiosyncratic II-level FX swap demand shocks where the difference between the size-weighted- and inverse-variance-weighted-average of these shocks (i.e., GIV shock) in turn provides a valid aggregate demand shock for the testing and quantification of the short rate disconnect.

[2]While FFIs' rolling over of bond positions/holdings prevents bond prices (rates) from falling (rising), they do not generate demand-induced-price-pressure and thus do not represent demand increases. However, when they buy more than the amount being redeemed, i.e., when they increase their bond positions/holdings, they produce demand increases that in turn induce pressure for price (rate) increases (declines).

[3]FFIs' tend to generate the bulk of their demand through the placement of direct purchase orders with local banks prior to MAKAM auctions. Our flow data captures these important demand flows.

4.2 Additional Local Interest Rates

Local Government Bond Yields and Swaps Rates. To show our short rate disconnect mechanism also spills over to the local government bond market, we examine the responses of spreads of yields in this market for the 1- through 5-year maturities, which are available from the BOI, with respect to corresponding current and future monetary policy stance measures from the interbank market. Since TELBOR rates are not available for maturities longer than one year, while being very illiquid for the one-year maturity, we use interest rate swap (IRS) rates for the 1- through 5-year maturities as such measures, subtracting them from the corresponding government bond yields to control for maturity-comparable money market rates and their associated local and future monetary policy stance effects.[4] IRS rates, which are taken from Reuters, are the fixed interest rates from IRS contracts - i.e., agreements exchanging fixed-rate interest payments with floating-rate ones - traded between local commercial banks who in turn serve as market makers in the local IRS market. IRS rates are effectively the weighted averages of current and future (expected) TEBLOR rates, where zero-coupon present values of the interest payments are used to determine the weights; as such, IRS rates provide a good measure of longer-term interbank market rates and their associated current and future monetary policy stance effects when longer maturities - for which TELBOR rates are unavailable - are considered.

Local Corporate Bond Yields. To asses whether our short rate disconnect mechanism also carries over to the corporate bond market, we examine the responses of spreads of nominal investment-grade corporate bond yields for the 1- through 5-year maturities with respect to corresponding IRS rates. As in the government bond yield case, the subtraction of IRS rates from the corporate bond yields serves to purge these variables of movements induced by current and future monetary policy stance effects. The aggregate bond yields we use taken from the BOI and calculated as the

[4]The segmentation between the IRS and government bond market, as measured by the spread between IRS rates and comparable government bond yields ('swap spread'), has long been recognized and studied by the literature (see, e.g., Duffie and Singleton (1997) and Klingler and Sundaresan (2019)). Klingler and Sundaresan (2019)) focus on the 30-year swap spread and argue it became negative since September 2008 because of increased demand for duration from underfunded pension funds. This long-duration, pension-fund-based mechanism is not a concern for our setting because we consider much shorter-term maturities (1- through 5-year). The considered swap spreads in our data have generally been positive or very mildly negative, with the average 1- through 5-year spreads standing at 8.5, 6.2, 2.9, -0.2, and -2.7 basis points.

market-value-weighted of investment-grade bond yields.

4.2.1 Additional Macro-Financial Data

We use several aggregate daily frequency macro-financial variables in our analysis, all of which cover the FFIs' bond flows' sample (1/1/2017-8/31/2022). All of these variables, except for those underlying the global financial shocks segment of the data, are taken from Reuters and their values are end-of-day quotes.

Global Financial Shocks. To control for shocks to global equity, corporate credit, wholesale funding, and safe asset markets, we include in our FFI-level regressions the first-differences of the corresponding 4 financial stress indices developed by the Office of Financial Research (OFR) (Monin (2019)). These indices are sub-indices of OFR's broader financial stress index and are computed as weighted averages of various regional (U.S., Europe, Japan, and emerging markets) indicators of equity market performance, corporate credit spreads, wholesale funding spreads (spreads between interbank rates and risk-free rates as well as 2-year USD/EUR and USD/JPY cross currency bases), and safe asset market performance (10-year U.S. and German government bond yields, U.S. dollar broad exchange rate as well as its exchange rate with respect to the Swiss franc and Japanese yen, and the gold spot dollar price). The weights are estimated with a dynamic factor model in the spirit of Bai and Ng (2008) and Stock and Watson (2011).[5]

Local Financial Shocks. To control for local equity and risk shocks in our FFI-level regressions, we use current and lagged values of the log-first-difference of the TA-35 index - which lists the largest 35 companies in the TASE - as well as the current and lagged values of the first-difference of the CDS price of 5-year Israeli government dollar bonds.

Note that we also use the TA-35 index as an outcome variable in our analysis, focusing on its dynamic and delayed response to our GIV demand shock, in order to demonstrate a spillover into local equity markets. This dimension of our analysis does not negate the inclusion of this variable

[5]For the OFR data and more details regarding it, the reader is referred to https://www.financialresearch.gov/financial-stress-index/https://www.financialresearch.gov/financial-stress-index/.

as a control in our FFI-level regressions; the TA-35 index clearly contains both a shock element to it as well as an endogenous, rebalancing-induced element. The latter element is what we aim to capture by looking at the dynamic response of this variable. In any case, controlling for just the lagged values of the TA-35 variable has no noticeable bearing on the dynamic response of this variable to our GIV demand shock and its impact response is insignificant also for this case.

Interest Rates. To control for foreign risk-free interest rates in our FFI-level regressions, we use the current and lagged values of changes in the U.S. 3-month treasury t-bill rate. Correspondingly, we use the current and lagged value of changes in the BOI's declared monetary policy interest rate to control for local risk-free rates. The latter rate is effectively the interest rate earned by local banks on short-term deposits they hold with the BOI.

USD/ILS Cross-Currency Basis. We construct the 1-month USD/ILS cross-currency basis in the standard way, i.e., as the difference between the cash market risk-free dollar interest rate at the 1-month maturity and the CIP-implied dollar interest rate (i.e., forward premium multiplied by gross local risk-free rate). The dollar risk-free interest rate is measured by LIBOR. To construct the CIP-implied dollar rate, we use the 1-month MAKAM rate as our measure of the Israeli cash market risk-free interest rate as the MAKAM market serves as the investment vehicle for FFIs' USD/ILS CIP arbitrage. FFIs tend to use short-term FX swaps in their CIP arbitrage activity and roll over these swap positions. Hence, the 1-month basis can be viewed as the arbitrage profit from their various transactions in the MAKAM market regardless of the specific bond duration they opt to hold.[6]

4.2.2 Sectoral Rebalancing Flows

To investigate whether a meaningful portfolio-rebalancing-induced mechanism is driving our results, we use the Smart Money database from the TASE which includes daily and historical (from

[6]FFIs do roughly half of their MAKAM transactions at the 3- and 12-month maturities, which are also the maturities issued by the BOI (19.8% and 29.7% of total transactions volume, respectively). The 4- to 11-month maturities are traded by FFIs roughly uniformly with a range of 3%-5% volume shares. The 1-, 2-, and 11-month maturities are traded at intermediate shares of 11%, 9%, and 6.7% volume shares, respectively.

2018) aggregate buying and selling flows of institutional investors (pension/insurance/provident funds), mutual funds (excluding exchange traded funds (ETFs)), ETFs, portfolio managers, local banks, TASE members, and foreign residents in all traded securities. Note that this database only pertains to secondary market flows and hence covers only a limited portion of FFIs' MAKAM trading. (This issue is discussed further in Section 5.5.)

4.3 Estimation

We estimate a daily frequency econometric model that consists of two estimation steps. The first estimates FFI-level regressions for our 18 FFIs. The second step constructs a GIV demand shock from the latter regressions' residuals and estimates this demand shock's dynamic effects on FFIs' aggregate accumulated bond flows and the MAKAM-TELBOR spread. Our granular econometric approach to studying monetary policy autonomy is premised on the notion that the associated granular constituent-level residuals and resultant GIV construction would generate FFIs' bond demand flow variation that is not coming from macro forces but rather from idiosyncratic large FFIs' demand shocks.

4.3.1 Econometric Model

FFI-Level Specification. We estimate (via OLS) 18 FFI-level regressions given by

$$bf_{i,t} = \mathbb{C}_t'\gamma_i + v_{i,t}, \tag{1}$$

where $bf_{i,t}$ is the bond flow of FFI i; $\mathbb{C}_t$ is a vector of observable controls that includes the fixed effect, day-dummies for Monday through Thursday, lagged values of $bf_{i,t}$, lagged values of the 1-month USD/ILS cross-currency basis which represents their effective net profit from their MAKAM investments (i.e., this basis can be thought of as the effective price of these investments), and current and lagged values of the following exogenous controls:[7] first-differences of 3-month U.S. t-bill rate and BOI monetary policy rate to control for shocks to U.S. and local monetary policy

[7] The number of lags for FFI-level flows, 1-month USD/ILS cross-currency basis, and exogenous controls in $\mathbb{C}$ is common and determined as the average of the chosen lag specifications from the AIC, corrected AIC, BIC, and HQIC lag length criteria tests for each constituent-level regression. The mean and standard deviation of lags across the 18 regressions are 16.1 and 2.7, respectively.

stances; first-differences of OFR's global equity, corporate credit, wholesale funding, and safe asset markets to control for global financial shocks; log-first-difference of the TA-35 index to control for local equity market shocks; and first-difference of the 5-year CDS price of Israeli government dollar bonds to control for local risk shock. $v_{i,t}$ is the regression's residual where $v_{i,t} = \eta_t + \epsilon_{i,t}$ with η_t and $\epsilon_{i,t}$ representing an unobserved common shock and the FFI i's idiosyncratic demand shock, respectively. Regression (1) does a fairly good job of explaining the variation in FFI-level bond flows, with mean and standard deviation of R^2s across the 18 FFI-level regressions of 36.5% and 22.7%, respectively.

Our sought-after shocks are the $\epsilon_{i,t}$s as we wish to use these exogenous, idiosyncratic shocks to construct our GIV. The GIV construction is our preferred way of constructing an IV from the estimated $\hat{v}_{i,t}$ as such construction is able to remove the variation coming from the unobserved common component η_t. Nevertheless, in Appendix B of the online appendix to this paper, for completeness, we also consider the complementary Bartik instrument (also known as shift-share estimators) which has been popularized by Blanchard and Katz (1992) and extensively used in many fields in economics (Goldsmith-Pinkham et al. (2020)). The GIV value shock is superior to the Bartik one due the former's inherent advantage over the latter in being able to remove potential estimation bias from unobserved common shocks. We now turn to a description of our second estimation step which deals with the construction of the GIV and Bartik shocks and estimation of their effects.

Estimation of GIV Shock's Effects. Following Gabaix and Koijen (2024), we define the GIV shock (denoted by $\varrho_{GIV,t}$) as the difference between the size-weighted- and inverse-variance-weighted-average of the estimated idiosyncratic shocks, i.e., $\varrho_{GIV,t} = \sum_{i=1}^{18} \hat{v}_{i,t} w_i - \sum_{i=1}^{18} \hat{v}_{i,t} u_i$ (normalized to have unit standard deviation), where the weights w_i are calculated from the share of bond flows average volume of each FFI in total FFIs' average volume and u_i is the share of $\hat{v}_{i,t}$'s inverse variance in the sum of estimated residuals' inverse variances. As shown in Gabaix and Koijen (2024), this inverse-variance-weights-based GIV construction is optimal in the sense that the resulting estimation possesses the highest precision.

So long that $\hat{v}_{i,t}$ captures well $\epsilon_{i,t}$ for all is, i.e., that the common shock η_t is not meaningful rel-

ative to the $\epsilon_{i,t}$'s, taking the equally-weighted average of the individual shocks (which is precisely the way the Bartik shock is defined in this setting) would represent exogenous idiosyncratic variation from the $\hat{v}_{i,t}$s that can be utilized to properly estimate the short rate disconnect. As opposed to the Bartik shock, even if there still remains an unobserved common component in the $\hat{v}_{i,t}$s, the GIV shock construction removes this common component and ensures that the GIV shock is still valid in that it represents exogenous idiosyncratic variation coming from the $\epsilon_{i,t}$s since the common shock gets cancelled out in the subtraction of the inverse-variance-weighted-average from size-weighted-average. This emphasizes an important advantage possessed by the GIV shock approach relative to the Bartik one in our setting.

Since the MAKAM bond market is rather concentrated, bearing an average Herfindahl-Hirschman Index of 0.47 for FFIs' bond flow volumes, it can deliver sufficient exogenous variation from large FFIs' idiosyncratic demand shocks to properly identify monetary policy autonomy with this variation not being susceptible to a bias from any remaining unobserved common shocks. Our $\hat{v}_{i,t}$s do not appear to contain a material such unobserved common component, possessing an average absolute pairwise correlation of 6.3% and a corresponding standard deviation of 6.9%, thus indicating that the Bartik shock approach is likely to suffer from only a moderate bias. Nevertheless, the concentrated structure of the bond market under study and the GIV shock approach's ability to remove even moderate biasing variation coming from unobserved common shocks both lead us to favor the GIV shock approach over the Bartik one as this paper's preferred method for the estimation of the short rate disconnect.

Specifically, our second estimation step deals with estimating the local projection regressions given by

$$(abf_{t+h} - abf_{t-1})/inv_{t-1} = \alpha_h + \Omega_h \varrho_{GIV,t} + u_t, \tag{2}$$

$$srd_{t+h} - srd_{t-1} = \beta_h + \Xi_h \varrho_{GIV,t} + z_t, \tag{3}$$

where $h = 0, 1, ..., 500$ is the local projection horizon; $abf_t = \sum_{i=0}^{t} bf_i$ is FFIs' aggregate accumulated bond flows ($i = 0$ represents the beginning of our sample), where for economic scaling we normalize the cumulative difference in abf_t by the previous day's value of total outstanding bonds (inv_{t-1}); and srd_t is the short rate disconnect which is defined as the MAKAM-TELBOR spread.

(In our analysis's extensions we also consider as outcome variables the spreads between government bond yields and duration-comparable IRS rates as well as spreads between the corporate bond yields and duration-comparable IRS rates.) Ω_h and Ξ_h represent the impulse responses of the FFIs' accumulated bond flows (as share of total outstanding bond level) and short rate disconnect variable, respectively. We now turn to the estimation of the contributions of the GIV demand shocks to the forecast error variance (FEV) of our considered outcome variables.

FEV Estimation Method. For the forecast error variance (FEV) decomposition estimation, we utilize the estimated impulse responses to compute the FEV contributions of our swap demand shock as follows (without loss of generality, we take those for the short rate disconnect):

$$\mathbb{C}_h = \frac{\hat{\Xi}_0^2 + ... + \hat{\Xi}_h^2}{\mathbb{V}(srd_{t+h} - srd_{t-1})}, \tag{4}$$

where $\hat{\Xi}_h$ is the estimated impulse response coefficient from Equation (3); and $\mathbb{V}(srd_{t+h} - srd_{t-1})$ represents the variance of accumulated differences of the short rate disconnect variable.[8] Recall that the unconditional variance of the GIV demand shock is unit and hence does not appear in Equation (4). In other words, $\mathbb{C}_h$ represents the estimated contribution of a one-standard-deviation GIV demand shock to the dynamic variation in the short rate disconnect variable.

4.4 Estimation of Bond Supply Elasticity

A special case of interest for Equations (2) and (3) lies in the impact ($h = 0$) case where the short rate disconnect variable is replaced by the MAKAM rate. This case, which allows us to estimate the elasticity of supply in the MAKAM market,[9] is of interest for us for two motivational reasons.

[8] In the spirit of Gorodnichenko and Lee (2020)'s FEV method for local projections (termed LP-B in their paper) which ensures that the computed FEV share does not exceed one, we compute the denominator in Equation (4) as the sum of the corresponding numerator and the variance of the residual from Equation (3)'s implied moving average decomposition. (As in the empirical results whose presentation follows next, this moving average decomposition is based on estimated impulse responses up to the 500th horizon, which covers roughly 2 years of calendar years after accounting for non-trading days on the TASE.) While asymptotically this alternative way of computing the variance in the denominator is equivalent to computing it from the actual data, the latter computation in finite samples can lead to estimated FEV shares that exceed one.

[9] Note that this slope can only be reliably estimated for the impact case as the demand shock is likely to induce changes to the supply curve as time advances after the shock where various market participants may opt to shift their supply of bonds in response to the observed price behavior following the shock.

The first is related to the economic motivation dimension of this case while the second is related to fact that this case naturally begs the question of whether our identification design choice of looking at the MAKAM-TELBOR spread as the outcome variable - rather than its two components as separate outcome variables - is warranted.

Economic Motivation Dimension. Considering that Equations (2) and (3) for $h = 0$ can be viewed as the first stage regression and reduced form regression, respectively, corresponding to the structural supply curve equation of the MAKAM market given by (mr_t is the MAKAM rate)

$$mr_t - mr_{t-1} = \delta + \theta(abf_{t+h} - abf_{t-1})/inv_{t-1} + e_t, \tag{5}$$

the special case considered in this section allows us to estimate the slope of the supply curve in the MAKAM market (given by θ which can be estimated via 2SLS). A significant negative estimate of θ is necessary for establishing an upward-sloping bond supply curve (in the bond price-quantity plane). Such result serves as motivation for this paper's dynamic analysis of the short rate disconnect because a natural starting point for such analysis is to confirm that the bond supply curve is not perfectly elastic in which case there would be no economic underpinning for expecting a meaningful short rate disconnect of any nature (both static and dynamic).

Identification Motivation Dimension. This paper's objective is to estimate the dynamic meaningfulness of the short rate disconnect. Toward this end, we use an identification design choice that considers as its central outcome variable the MAKAM-TELBOR spread variable rather than separately considering this spread's two components as outcome variables (and then looking at the difference of the corresponding responses). However, the above-discussed estimation of the supply curve slope with the MAKAM rate used as the outcome variable begs the following question: why not estimate the short rate disconnect by separately estimating the dynamic effects on the MAKAM and TELBOR rates and then simply look at the difference between the two?

To establish the crucialness of our baseline choice for the validity of our identification design and the ruling out of the alternative (severation-based) one, we present in Figure 5 the h-step-ahead correlation between the cumulative differences in the MAKAM and TELBOR rates. In par-

ticular, denoting the MAKAM and TELBOR rate variables by mr_t and tr_t, the figure shows the correlation between $mr_{t+h} - mr_{t-1}$ and $tr_{t+h} - mr_{t-1}$ for $h = 0, 1, ..., 500$.

Figure 5 presents correlations that are not only very significant from the impact horizon onwards (standing at 29.6% on impact) but, crucially, are increasing with h very rapidly, reaching 72.7% already after 10 horizons and 97.1% after 100 horizons (it peaks at 97.4% after 147 horizons and stands at 96.5% after 500 horizons). These remarkable correlations stress that, in order to identify the dynamic importance of the short rate disconnect, one must use the spread variable itself as the outcome variable as this removes all of the effects - which are in turn clearly dominant - of unobserved shocks to the current and future stance (up to horizon h) of local monetary policy on the MAKAM rate. The separation-based alternative to our identification design choice is thus unreliable in a finite sample as it would attempt to estimate an effect - be it on the MAKAM rate or the TELBOR rate - which is dwarfed by the effects of the unobserved shocks to current and future local monetary policy stance.[10]

5 Empirical Evidence

This section presents the main results of the paper. We start with the motivational results from the estimation of the bond supply curve in the MAKAM market, as described in Section 4.4. We then show the results for the MAKAM-TELBOR spread and FFIs' aggregate accumulated bond flows after which we focus on the short rate disconnect's spillover into the government and corporate bond markets as well as the equity market. We also briefly discuss an array of robustness checks at the end of the section, fully showing them in Appendix B of the online appendix to this paper. We end the section with a sectoral flow analysis using supplementary data from the TASE that highlights an intriguing local portfolio rebalancing mechanism. (Note that our considered 501 horizons reflect roughly two calendar years given that there are about 250 MAKAM trading days

[10] In accordance with the message from Figure 5 about the unreliability of the separation-based identification design alternative, our estimation of Equation (3) while replacing the MAKAM-TELBOR spread with the MAKAM rate in the LHS of the equation yielded a significantly negative effect for the first 7 horizons, losing significance at the 8th horizon after which the effect is significant through the 11th horizon, ultimately losing its significance entirely from that point onwards. The corresponding estimated effects from TELBOR-rate-based local projections are significant (with a positive point estimate) at only the 14th horizon through the first 391 horizons, and then again at the 392nd horizon and for the 411th-439th horizons.

during a calendar year.)

5.1 Estimation Results for Bond Supply Elasticity

Table 12 shows the results from the estimation described in Section 4.4: 2SLS-estimated first stage effect of the GIV demand shock on FFIs' aggregate MAKAM flows as a share of total outstanding bonds (second column); the reduced form effect on the MAKAM rate (fourth column); and the 2SLS-estimated second stage estimate of the bond supply elasticity (third column) conditional on the GIV demand shock. For completeness, we also report in the first column the OLS-estimated effect from structural Equation (5). The MAKAM flows variable is multiplied by 100 prior to entering the regressions for comparability purposes and hence its response is in terms of one-percentage-point market share changes; the resultant estimated supply slope is in terms of a 1-percentage-point market share increase in FFIs' MAKAM flows. The reduced form and 2SLS first stage estimates are with respect to a GIV demand shock that generates a peak 10-percentage-point market share increase. This normalization - whose reasoning is elaborated on below - is also done in the subsequent dynamic analysis and implies a 3.7-standard-deviation GIV demand shock.

The results from Table 12, which provide valuable motivation for the subsequent dynamic analysis of the short rate disconnect, establish an upward-sloping bond supply curve in the bond price-quantity plane: a GIV-demand-shock-induced 1-percentage-point market share increase in FFIs' MAKAM flows generates a 0.68 basis point decline in the MAKAM rate. While this constitutes a somewhat modest supply elasticity, what matters to us is the highly significant nature of this estimated slope which clearly rejects the hypothesis of a perfectly elastic supply curve.[11] In what follows next, we turn to a dynamic analysis of the short rate disconnect which we demonstrate to be very rich in the sense of providing persistent and gradually-increasing effects of the demand shock on the MAKAM-TELBOR spread and FFIs' aggregate flows variables.

[11] While not shown here, we have confirmed that the demand shock has an insignificant effect on the TELBOR rate (with a positive point estimate) as expected given that this variable reflects the current and future local monetary policy stance which in turn should not be related to our identified high-frequency GIV demand shock.

5.2 MAKAM-TELBOR Spread and FFIs' Accumulated Bond Flows

Impulse Responses. Figure 6 shows impulse responses to the GIV demand shock of the MAKAM-TELBOR spread and FFIs' accumulated bond flows (as share of total outstanding bonds). We normalize the two variables responses such that the response of the accumulated bond flow variable reaches a peak of 10 percentage points, i.e., FFIs' accumulate a 10-percentage-point market share increase. This peak response takes place after 364 days, which demonstrates the very persistent nature of FFIs' bond purchasing following the demand shock. Note that this normalization implies that the responses from Figure 6 are with respect to a 3.7-standard-deviation GIV demand shock. While this is a large shock, we view our normalization as reasonable given the high-frequency (daily) nature of our shock series and that over our sample FFIs' MAKAM holding share has unconditionally surpassed the 50% mark. Importantly, when we move to examine the importance of our demand shock in driving the variation in the short rate disconnect variable in the FEV estimation, we consider a one-standard-deviation demand shock.

The MAKAM-TELBOR spread declines significantly for the bulk of the considered horizons, doing so in a persistent and gradual manner. The response on impact is -1.4 basis points (with a t-stat of -3.8), while the trough response - which takes place 481 days - is -9.1 basis points (with a t-stat of -2.2). The response is significant at the 95% and 90% levels for a total of 430 and 497 days, respectively.

What can explain the persistent short rate disconnect response just discussed? The right panel of Figure 6 shows that FFIs buy bonds following the demand shock in a very persistent and gradual manner as well, increasing their market share by 1.5 percentage points on impact while gradually building up this increased market share to a peak of 10-percentage-point share increase after 364 days. The response is significant at the 95% and 90% levels for a total of 418 and 501 (i.e., for all considered horizons) days, respectively.

FEVs. Figure 7 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in the short rate disconnect variable (MAKAM-TELBOR spread) and FFIs' accumulated flows (as market share). For the former variable, the peak FEV share is attained after 500 horizons with an estimated 44.7% share. That our demand shock ex-

plains such a meaningful share after two calendar years is a testament to the added value of the *dynamic* dimension of our econometric analysis and the associated gradual and persistent nature of our shock.

The above-mentioned 44.7% peak FEV share for the MAKAM-TELBOR spread is consistent with the very high FEV share of the variation in FFIs' accumulated flows variable accounted for by our shock. Already on impact, our shock explains an important 31.5% share of the variation in FFIs accumulated flows variable. And after 202 trading days this share reaches its peak of 70.5%, remaining very high persistently throughout the remaining horizons with an estimated share of 62.8% at the last (500th) horizon.

5.3 Additional Analysis: Government Bond, Corporate Bond, and Equity Markets

Government Bond Spreads: Impulse Responses. Figure 8 shows the responses of the spreads between the 1-, 2-, 3-, 4-, and 5-year government bond yield and the corresponding IRS rates. Clearly, the short rate disconnect from Figure 6 meaningfully spills over to the government bond market, with the five government bond spreads significantly falling at the 95% confidence level for 400, 439, 389, 304, and 255 trading days (by increasing order of bond duration) with corresponding trough responses of -9 basis points (475th horizon), -7.4 basis points (365th horizon), -7.2 basis points (386th horizon), -5.9 basis points (339th horizon), and -5.4 basis points (at the 339th horizon).

As the bond duration increases, particularly at the 4- and 5-year durations, responses weaken somewhat and largely in accordance with the expectations hypothesis. Nevertheless, it is clear that there is in effect a short rate disconnect also in the government bond market with respect to interbank rates as results for the 1-year government bond yield spread are similar to the baseline MAKAM-TELBOR spread results.

Government Bond Spreads: FEVs. Figure 9 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in the five government bond yield spread variables. Our demand shock accounts for peak FEV shares of the variation in

these variables of 48.7% (499th horizon), 48.7% (415th horizon), 49% (426th horizon), 36.4% (432nd horizon), and 29.7% (421st horizon). Similar to the baseline short rate disconnect variable, our demand shock accounts for a meaningful share of the variation in the government bond yield spread variables.

Corporate Bond Spreads: Impulse Responses. Figure 10 shows the responses of the spreads between the 1-, 2-, 3-, 4-, and 5-year investment-grade corporate bond yield and the corresponding IRS rates. these spreads posses significant responses at the 95% confidence level for 335, 137, 288, 172, and 221 trading days (in increasing duration order) with corresponding trough responses of -34.2 basis points (365th horizon), -19.5 basis points (365th horizon), -23.4 basis points (366th horizon), -16.3 basis points (366th horizon), and -17.6 basis points (388th horizon). Overall, we observe a significant spillover effect of the short rate disconnect mechanism into the corporate bond market.

Corporate Bond Spreads: FEVs. Figure 11 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in the five corporate bond yield spread variables. Our demand shock accounts for peak FEV shares of the variation in these variables of 56% (350th horizon), 14.9% (256th horizon), 24.7% (269th horizon), 17.8% (342nd horizon), and 19.9% (98th horizon). These estimated FEV shares indicate that our demand shock accounts for a meaningful share of the variation in the corporate bond yield spread variables.

Equity Market: Impulse Responses. Figure 12 shows the response of the TA-35 stock price index. The response is significant at the 95% (90%) confidence level for 281 (338) horizons and peaks at 6% after 389 horizons. Overall, we observe a significant spillover effect of the short rate disconnect mechanism into the equity market.

Equity Market: FEVs. Figure 13 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in the TA-35 stock price index. Our demand shock accounts for a peak FEV share of the variation in this variable of 46.5% at the 412th

horizon. This estimated FEV share indicates that our demand shock accounts for a meaningful share of the variation in the equity index variable.

5.4 Robustness Checks

Appendix B of the online appendix to this paper examines and confirms the robustness of the baseline results from Figures 6-11 along three dimensions. The first considers alternative lag specifications for the FFI-level regressions. The second truncates the baseline sample at 4/11/2022 so as to confirm that the baseline results are robust to omission of the monetary tightening period part of our sample. And the third replaces the inverse-variance-weighted-average shock component in the GIV construction with the equally-weighted-average one.

5.5 Local Portfolio Rebalancing Effects

The results shown above for corporate bonds and equities demonstrate a relatively high corporate bond spread and equity price response magnitude relative to the MAKAM-TELBOR spread. This section aims to explore if this is driven by a local portfolio rebalancing mechanism, where a particular sector which sells MAKAM bonds to FFIs uses the proceeds to purchase corporate bonds and equities thus generating a rebalancing-induced rise in their prices. Toward this end, this section makes use of supplementary TASE-owned (also known as the 'Smart Money' database - see Section 4.2.2 for more details) data on secondary market activity by sector in the MAKAM and corporate bond and equity markets. (In accordance with the corporate bond spread analysis, we restrict attention to nominal investment-grade corporate bonds of durations of up to 5 years.)

The secondary MAKAM flow data has two shortcomings. First, it starts only in January 2018, thus losing one year of observations relative to our baseline data. Second, it does not include either bond redemption flows or primary-market-related purchases, with the latter being very dominant in FFIs' MAKAM flow activity due to the placement of direct orders by FFIs with local banks prior to MAKAM auctions. Specifically, FFIs' accumulated flows' value from the secondary market is half of the corresponding value from our baseline data - which in turn includes both redemptions and primary-market-related purchases. (And the two flow series have a modest correlation of 44.6%, additionally pointing to the importance of redemptions and primary-market-

related purchases.) Nevertheless, the added value from this data outweighes these shortcomings as it allows us to shed light on important local rebalancing effects from MAKAM to corporate bond markets.

In what follows, for ease of exposition, we focus our analysis solely on the local mutual fund (MF) sector. The reason for this expositional choice is that our experimentations with all of the sectors available in the supplementary secondary market data reveled that MFs are effectively the sole counterparty against which FFIs conduct their demand-driven secondary market MAKAM purchases. This indicates that, while local banks serve as the sole counterparties against FFIs' primary-market-related demand, they play no such counterparty role in the secondary market.

MFs' and FFIs' Secondary Market MAKAM Flows: Impulse Responses. Figure 14 shows impulse responses to the GIV demand shock of MFs' and FFIs' accumulated MAKAM flows (as share of total outstanding MAKAM bonds) from the secondary MAKAM market. Echoing the previous discussion about presiding role of primary-market-related purchases by FFIs in driving their demand, we can see that the peak response of the secondary market accumulated flow variable of FFIs is 2.9 percentage points after 476 horizons (with a t-stat of 1.9), or a mere 29% of the 10-percentage-point peak baseline response from the baseline data. (The response is significant at the 95% (90%) confidence level for 156 (362) horizons.) This tells us that accounting for primary-market-related demand flows is crucial for identification. But, as noted above, the added value from using the supplementary TASE-owned secondary market data still outweighes the lacking of the primary-market-related demand component.

The answer to who serves as the counterparty to FFIs secondary market demand is borne out by MFs' accumulated flows response, which is the effectively the mirror image of that of FFIs. (The response is significant at the 95% confidence level for all (501) considered horizons.) The correlation between the two impulse response functions is a remarkable -91.5%, in accordance with the clear quantitative and qualitative similarity between the these functions. This important result begs the following intriguing question: do MFs allocate a meaningful share of the proceeds from their secondary market MAKAM trading with FFIs to corporate bond and equity investment? After briefly discussing the FEV results for the MAKAM flows, we shall answer this question in the

affirmative by looking at the corresponding corporate bond and equity flows.

MFs' and FFIs' Secondary Market MAKAM Flows: FEVs. Figure 15 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in MFs' and FFIs' accumulated MAKAM flows (as share of total outstanding MAKAM bonds) from the secondary MAKAM market. It is apparent that our shock is an important driver of the variation in these two variables, reaching peak FEV shares of 49.2% (500th horizon) and 48.9% (500th horizon), respectively.

MFs' Rebalancing Flows: Impulse Responses. Figure 16 shows impulse responses to the GIV demand shock of MFs' accumulated government bond, corporate bond, and equity flows from their corresponding secondary markets (all flows are normalized as shares of total outstanding MAKAM bonds - for comparability purposes with respect to Figure 14).

MFs' accumulated government bond, corporate bond, and equity flows responses peak at 0.71, 0.61, and 0.96 percentage points after 379, 329, and 364 horizons (with t-stats of 2.6, 2.8, and 2.5), respectively, which indicates a meaningful portfolio rebalancing by MFs from MAKAM to government and corporate bond investment as well as equity investment. (The responses are significant at the 95% (90%) confidence level for 151 (200), 138 (196), and 123 (230) horizons, respectively.) Specifically, considering that MFs' accumulated MAKAM flows response is -2, -2.1, and -2.4 percentage points after 329, 379, and 364 horizons, respectively, the just-mentioned peak responses of 0.71, 0.61, and 0.96 percentage points imply that MFs allocate at these peak-implied horizons 35.5%, 29%, and 40% of their proceeds from MAKAM trading with FFIs to investment in government bond, corporate bond, and equity markets.

The meaningful rebalancing from mutual funds evident from Figure 16 is valuable in explaining the relatively large magnitude of corporate bond spread and equity price responses from Figures 10 and 12, respectively, as it highlights an important local portfolio rebalancing from MAKAM bonds to corporate bonds and equities. Given that these markets trade significantly riskier assets than both the MAKAM and government bond markets, it is sensible to expect significant rebalancing flows into these markets to induce meaningful prices changes in them.

MFs' Rebalancing Flows: FEVs. Figure 17 shows the contributions of a one-standard-deviation GIV demand shock to the variation over our considered horizons in MFs' accumulated government bond, corporate bond, and equity flows (as shares of total outstanding MAKAM bonds) from their corresponding secondary markets. Our shock accounts for peak FEV shares of 81.6% (497th horizon), 88.4% (490th horizon), and 81.8% (500th horizon) for these three variables, respectively. These remarkable shares indicates that our shock is the presiding driver of the variation in MFs' accumulated rebalancing flows across all three considered markets, i.e., the rebalancing mechanism we uncover is responsible for the bulk of the variation in MFs' government bond, corporate bond and equity investment activity. Given that MFs are the largest position holder in the corporate bond market, holding an average market share of 32.8% over our sample period, our FEV result implies that our shock is likely to generate a considerable rebalancing-induced price effect in the corporate bond market. Although the corresponding average market share for stocks is much more modest at 6.6%, taken together with the remarkable FEV share of MFs' equity investment accounted for by our shock this 6.6% share is still meaningful enough to imply a significant rebalancing-induced equity price increase.

6 Conclusion

This paper documents a significant and persistent negative response of the spread between Israeli short-term market rates and interbank rates following a shock to FFIs' demand for local risk-free short-term bonds. The latter capital inflow shock also leads to significant and persistent narrowing of the spreads between both government and corporate bond yields with respect to duration-comparable interbank rates as well as a corresponding increase in equity prices. We uncover an intriguing local-portfolio-rebalancing-induced rise in corporate bond and equity prices as our demand shock leads to MFs (FFIs' counterparty in the MAKAM market) allocating their MAKAM proceeds to corporate bond and equity investments. Our set of findings, obtained from a granular econometric approach, can be viewed as representing evidence in favor of a meaningful short rate disconnect channel distinct that points to a meaningful monetary policy autonomy imperfection in a prototype floater SOE with free capital mobility.

This paper's results shed light on the difficulty facing central banks of floater SOEs with free capital mobility of enforcing their target rate in the short-term risk free bond market when hit by large capital inflow shocks. This difficulty speaks to the hard task of maintaining the level of reserves consistent with the targeted rate in the interbank market when large such shocks force the central bank to generate large swings in reserves to keep the market rate from steering away from the latter target/interbank rate.

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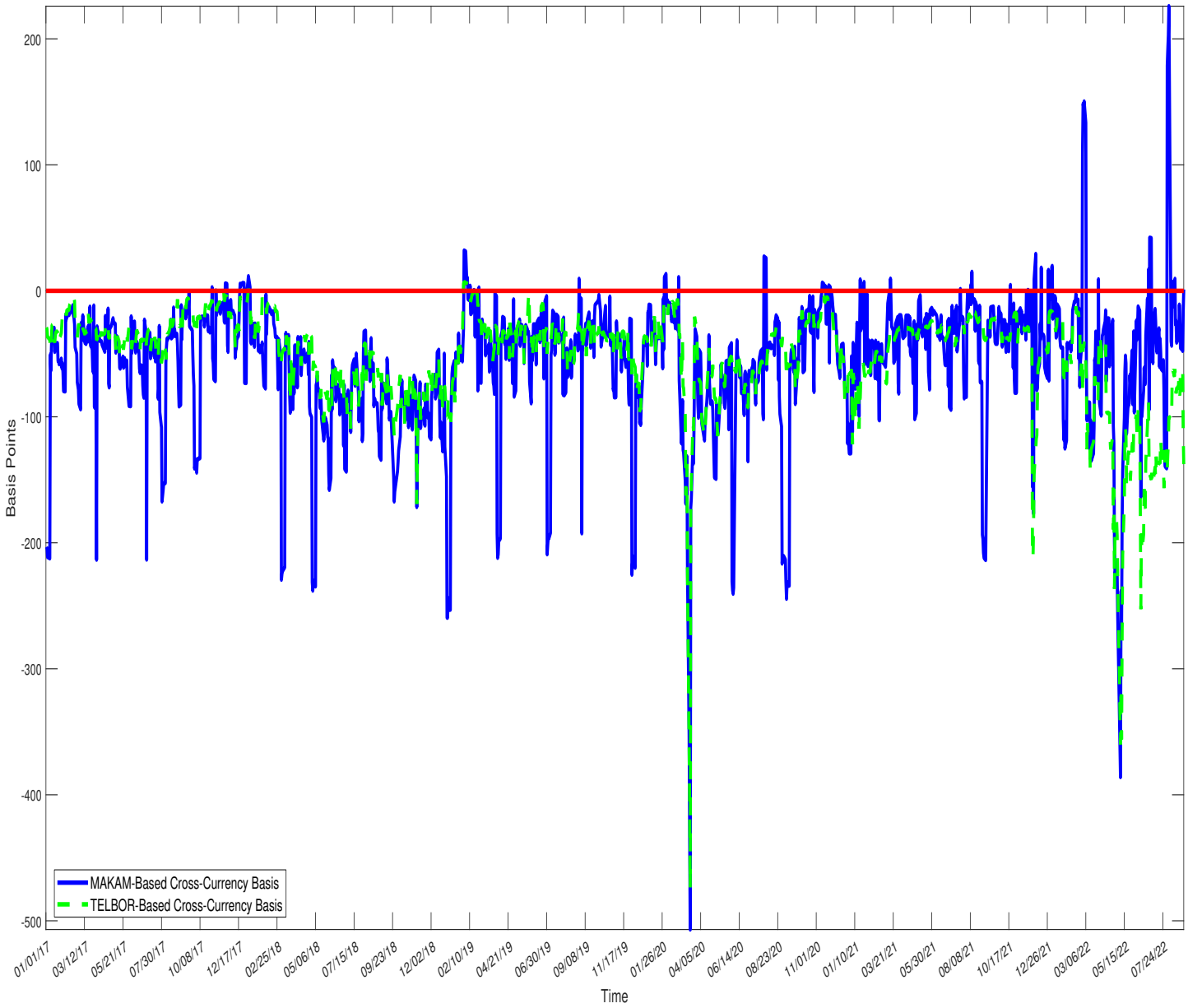
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Table 1: **Estimation of Bond Supply Curve Elasticity.**

Response	OLS	2SLS 1^{st} Stage	2SLS 2^{nd} Stage	Reduced Form
MAKAM Rate	-0.55***		-0.68***	-1.03***
	(0.07)		(0.07)	(0.35)
FFIs' MAKAM Flows		1.51***		
		(0.07)		
F-Stat		498.62		
R^2	1.15%	75.79%	1.28%	1.28%
Obs	1,366	1,366	1,366	1,366

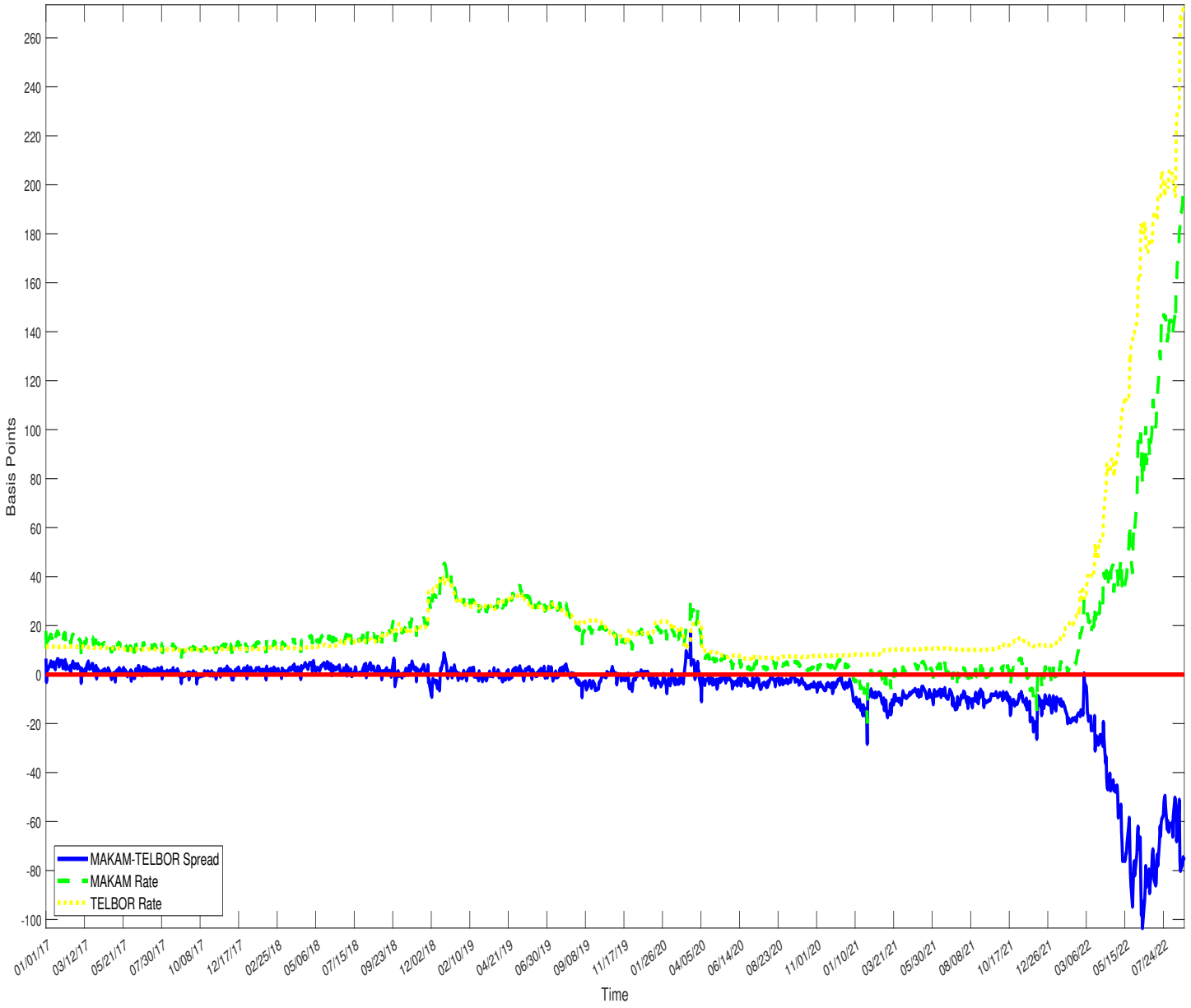
Notes: This table shows the results from the estimation described in Section 4.4: 2SLS-estimated first stage effect of the GIV demand shock on FFIs' aggregate MAKAM flows as share of total outstanding bonds (second column; in percentage point terms); the reduced form effect on the MAKAM rate (fourth column; in basis point terms); and the 2SLS-estimated second stage estimate of the bond supply curve elasticity (third column; in basis point terms) conditional on the GIV demand shock. For completeness, we also report in the first column the OLS-estimated effect from structural Equation (5). The MAKAM flows variable is multiplied by 100 prior to entering the regressions for comparability purposes and hence its response is in terms of one-percentage-point market share changes; the resultant estimated supply slope is in terms of a 1-percentage-point market share increase in FFIs' MAKAM flows. MAKAM rate response and associated Numbers in parentheses represent standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to one. *, **, and *** represent significance levels at the 10%, 5%, and 1% levels.

Figure 1: **Time Series of 1-Month USD/ILS Cross-Currency Basis.**



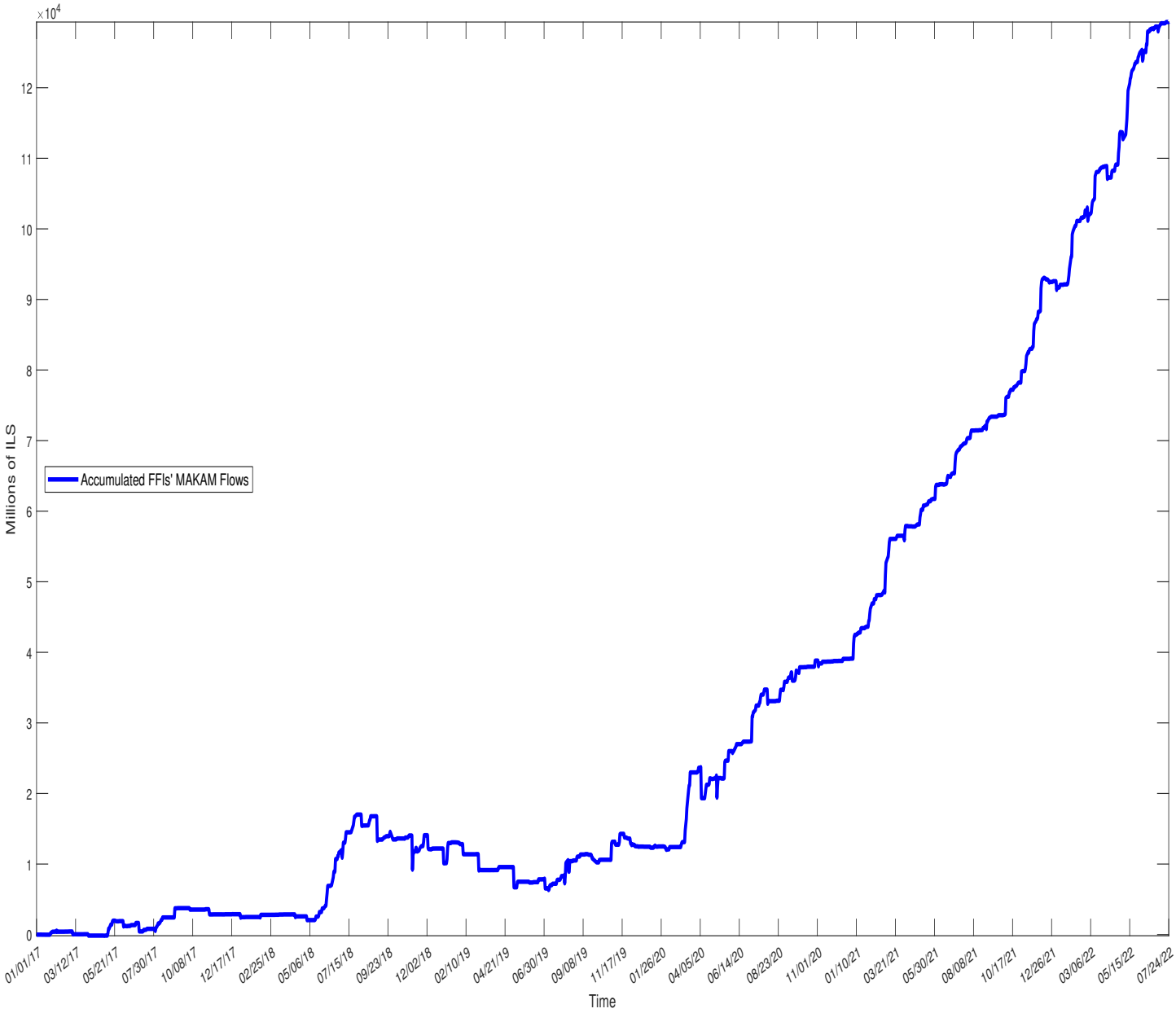
Notes: This figure presents the time series of the daily 1-month USD/ILS cross-currency basis calculated as the difference between 1-month LIBOR and CIP-implied dollar rate, where the local risk-free rate is either the 1-month MAKAM rate (solid line case) or 1-month TELBOR rate (dashed line case). Data are from Reuters and cover 1/1/201-8/31/2022. Time (daily dates) is on the x-axis. The bases (in basis points) are on the left y-axis.

Figure 2: **Time Series of MAKAM-TELBOR Spread.**



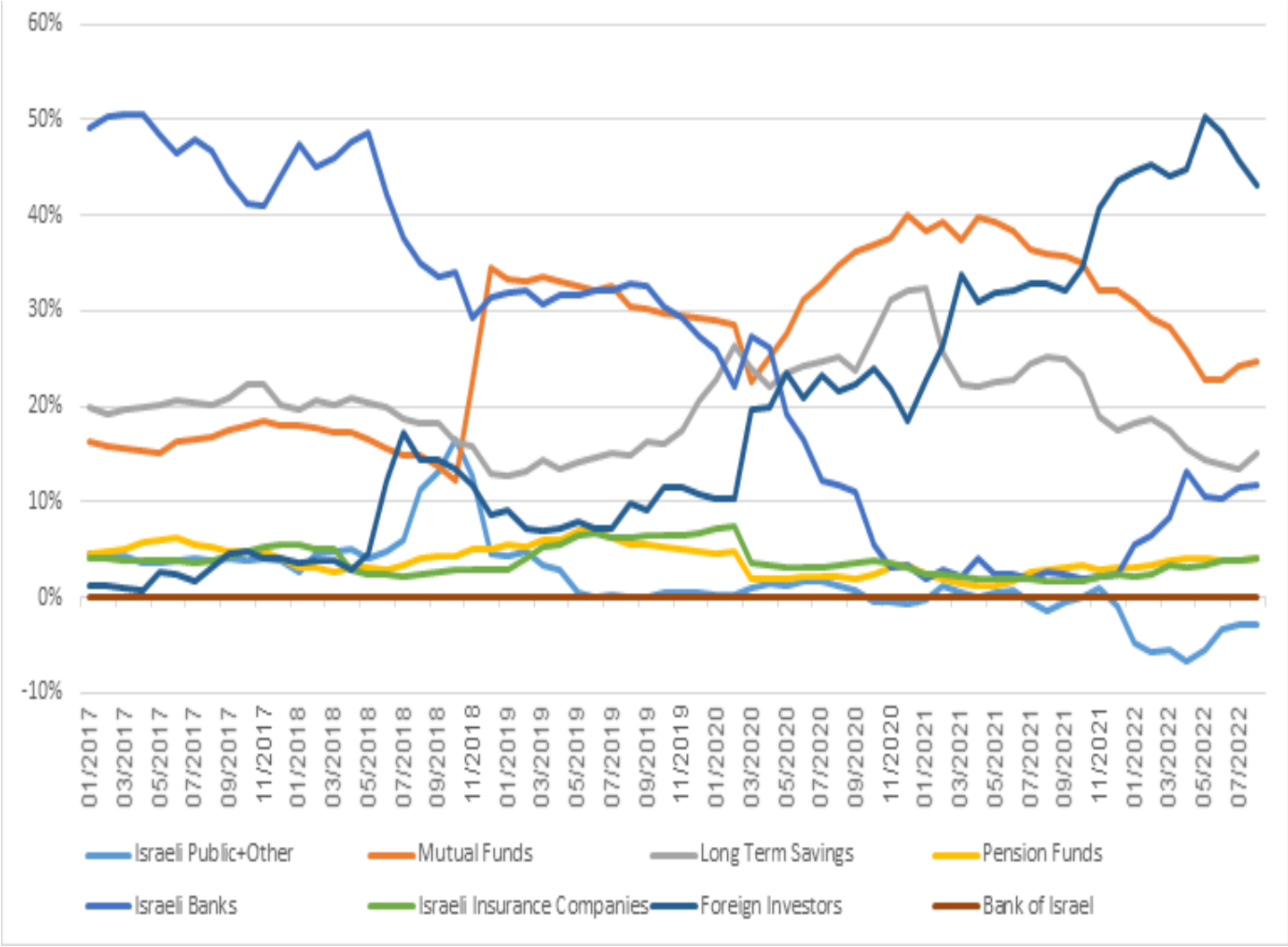
Notes: This figure presents the time series of the MAKAM-TELBOR spread (solid line) as well as its underlying MAKAM yield (dashed line) and TELBOR yield (dotted line). MAKAM yield data are from the TASE and TELBOR data are from the BOI. The data cover 1/1/2017-8/31/2022. Time (daily dates) is on the x-axis. Values on the y-axis are in basis point units.

Figure 3: **Time Series of FFIs' Accumulated MAKAM Bond Flows.**



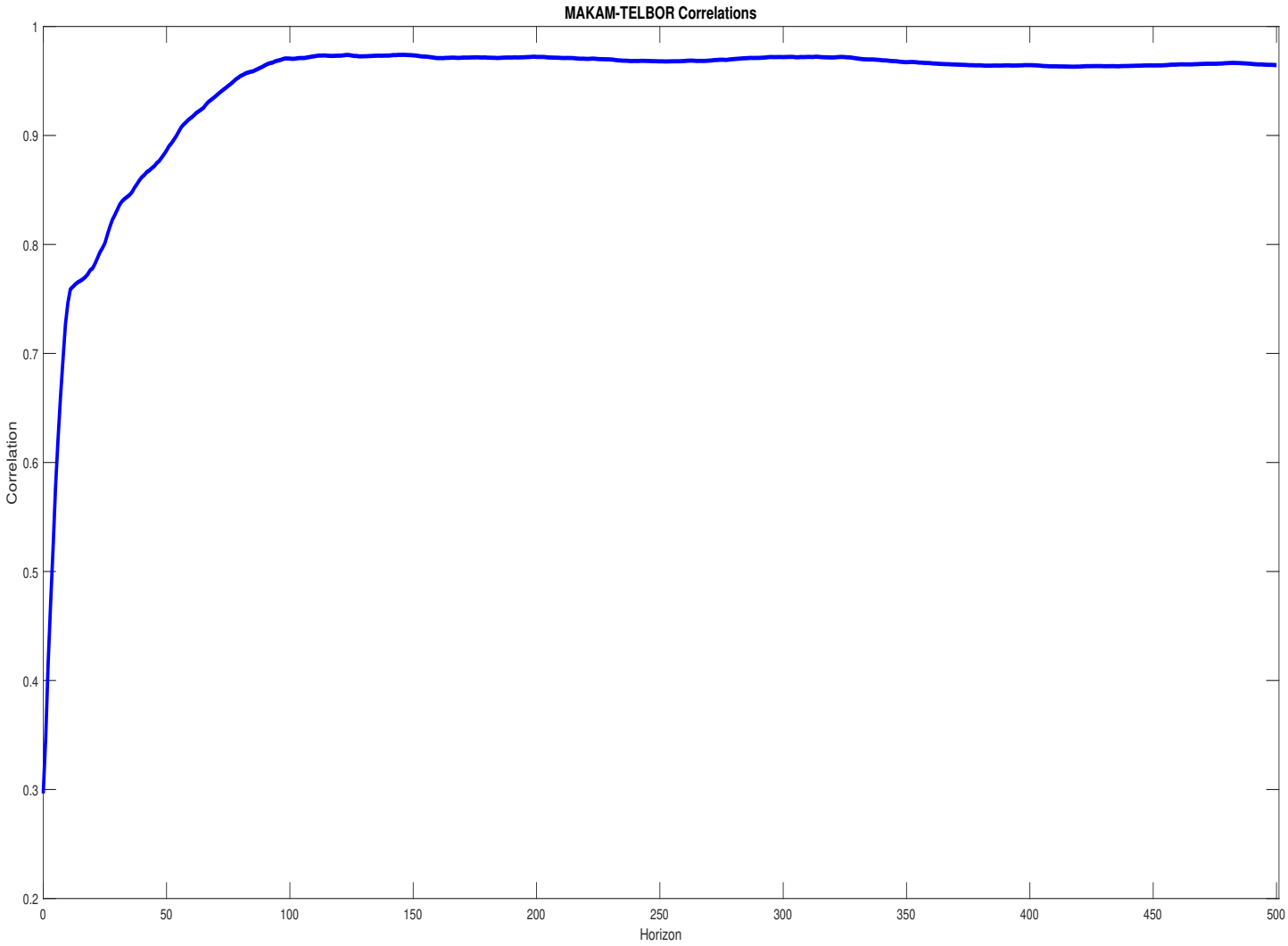
Notes: This figure presents the time series of FFIs' accumulated MAKAM bond flows. Positive (negative) accumulated flows' values represent the accumulated buying (selling) of bonds. The data are from the BOI and cover 1/1/2017-8/31/2022. Time (daily dates) is on the x-axis. Values on the y-axis are in ILS million.

Figure 4: **Time Series of MAKAM Holding Shares' Distribution by Sector.**



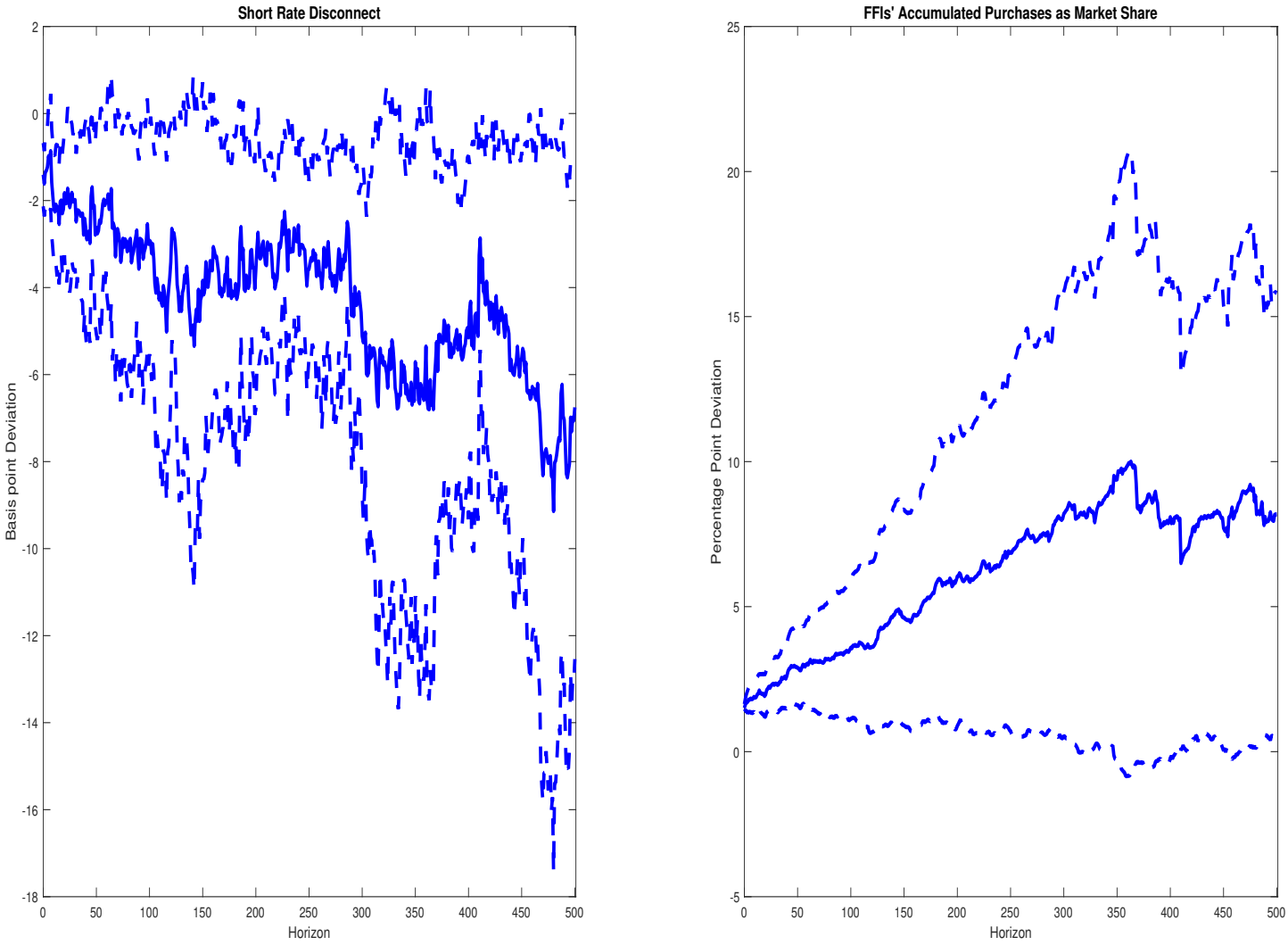
Notes: This figure presents the time series of MAKAM market holding shares by sector. On top of the FFI sector (which, for completeness, is also included in the figure and is represented by dark blue line), this figure includes seven additional sectors: Israeli public and other sector (light blue line), which represents the market share of households and firms (including Israeli hedge funds and proprietary trading firms); Israeli mutual fund sector (light orange line); long term savings sector (grey), which includes Israeli provident and advanced training funds; Israeli pension funds sector (yellow line); Israeli commercial banks sector (blue line); Israeli insurance companies sector (green line); and the BOI. Data are from the BOI and cover 4/26/2011-8/18/2021. Time (in monthly dates) is on the x-axis. Values are in percentage terms.

Figure 5: **Dynamic Correlations Between MAKAM and TELBOR Rates.**



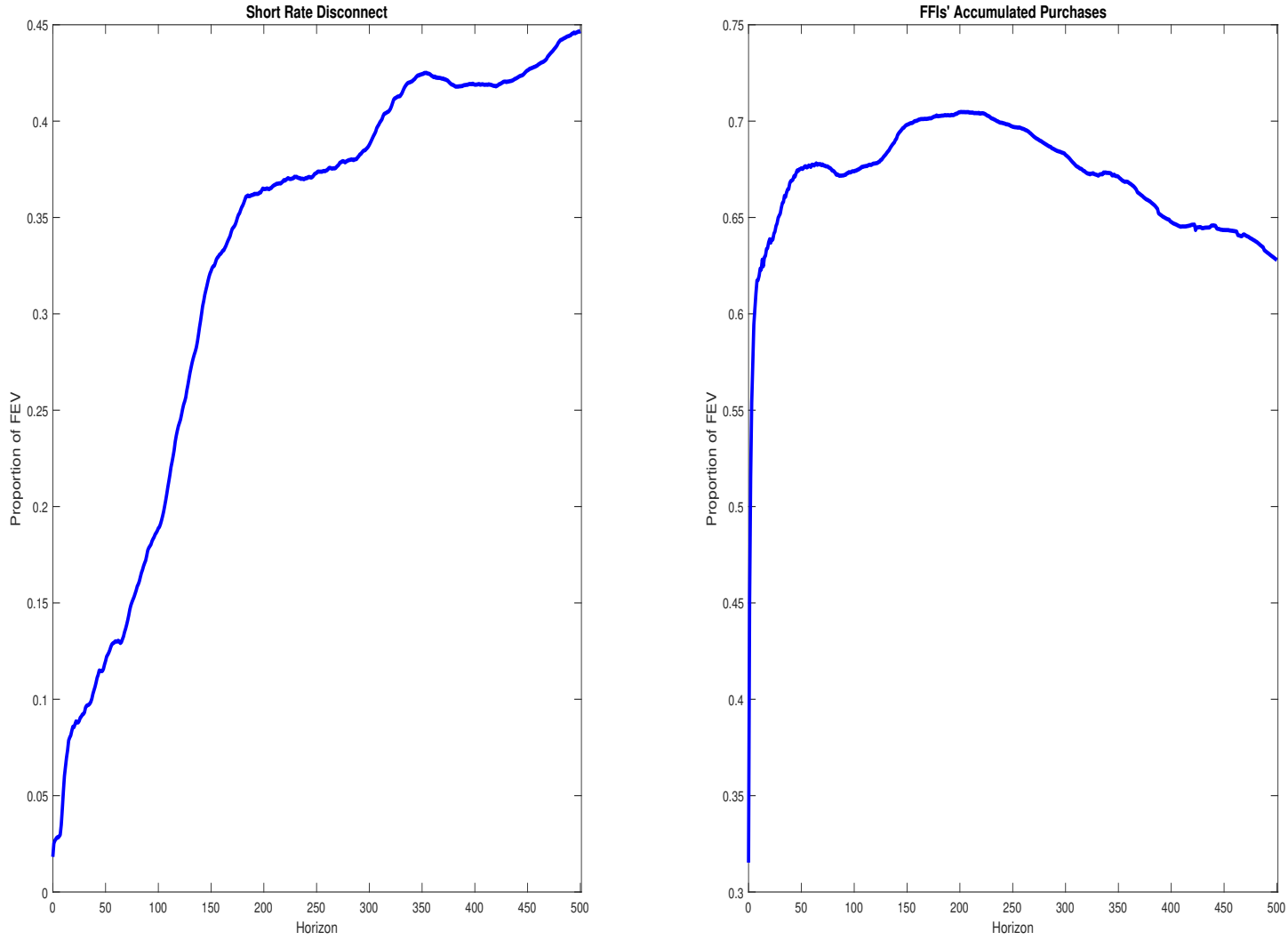
Notes: This figure presents the h-step-ahead correlation between the cumulative differences in the MAKAM and TELBOR rates. In particular, denoting the MAKAM and TELBOR rate variables by mr_t and tr_t, the figure shows the correlation between $mr_{t+h} - mr_{t-1}$ and $tr_{t+h} - mr_{t-1}$ for $h = 0, 1, ..., 500$. Horizon ($h = 0, 1, ..., 500$) is on the x-axis. Values are in fractional terms.

Figure 6: **Impulse Responses to GIV Demand Shock: MAKAM-TELBOR Spread and FFIs' Accumulated MAKAM Flows.**



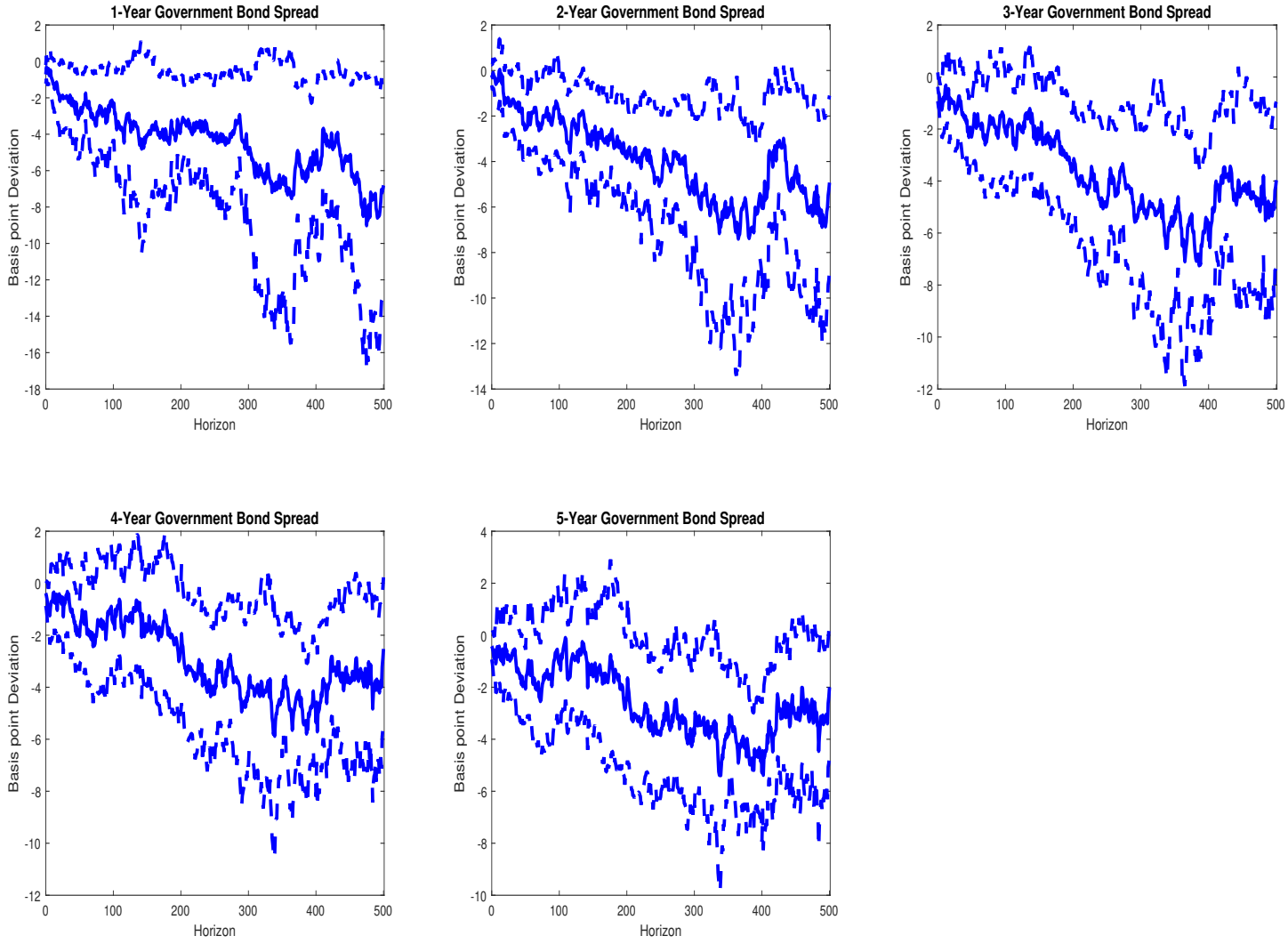
Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of the short rate disconnect variable (MAKAM-TELBOR spread) and FFIs' accumulated MAKAM flows as share of outstanding MAKAM. Responses are normalized such that the peak response of the latter variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values for MAKAM-TELBOR spread variable are in basis point change units relative to the pre-shock value of the spread; those for the FFIs' accumulated MAKAM flows variable are in percentage-point change units relative to the pre-shock value of FFIs' market share.

Figure 7: **FEVs Attributable to GIV Demand Shock: MAKAM-TELBOR Spread and FFIs' Accumulated MAKAM Flows.**



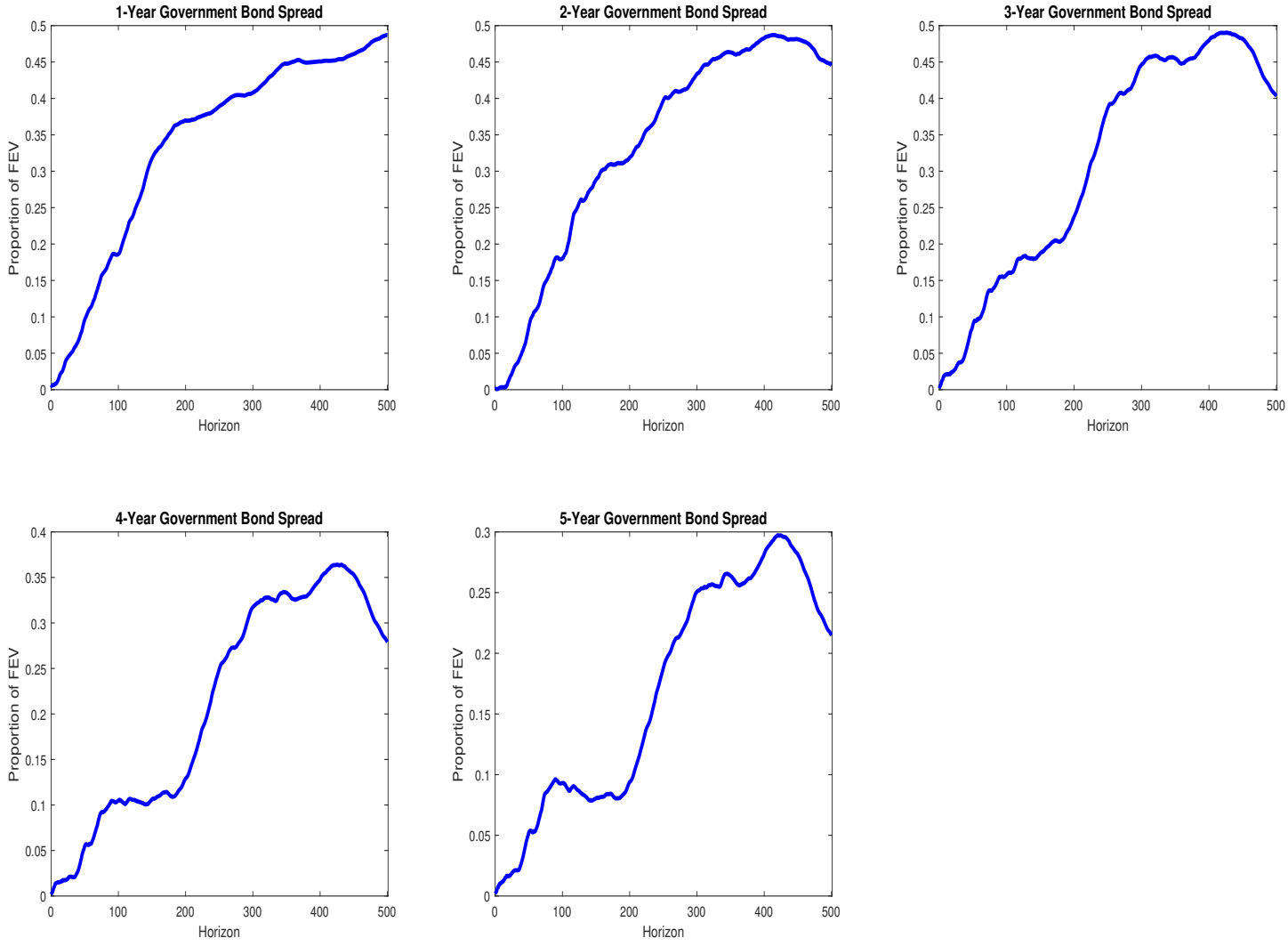
Notes: This figure presents the FEV shares of the variation in the MAKAM-TELBOR spread and FFIs' accumulated MAKAM flow (as share of outstanding MAKAM) variables attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).

Figure 8: **Impulse Responses to GIV Demand Shock: Government Bond Yield Spreads.**



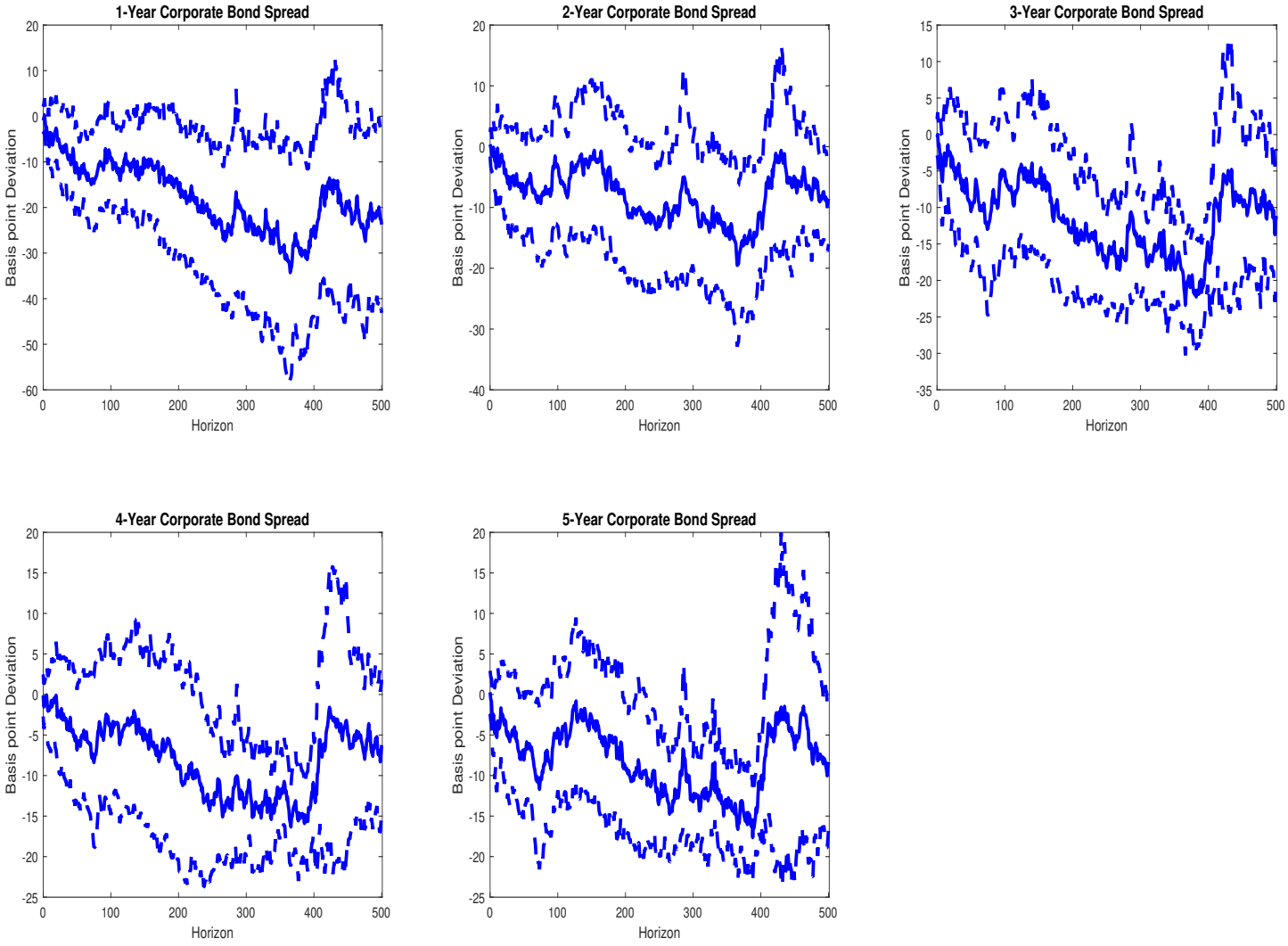
Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of the 1- through 5-year government bond yield spreads (with respect to duration-comparable IRS rates). Responses are normalized such that the peak response of FFIs' accumulated flows variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values are in basis point change units relative to the pre-shock value of the spread variable.

Figure 9: **FEVs Attributable to GIV Demand Shock: Government Bond Yield Spreads.**



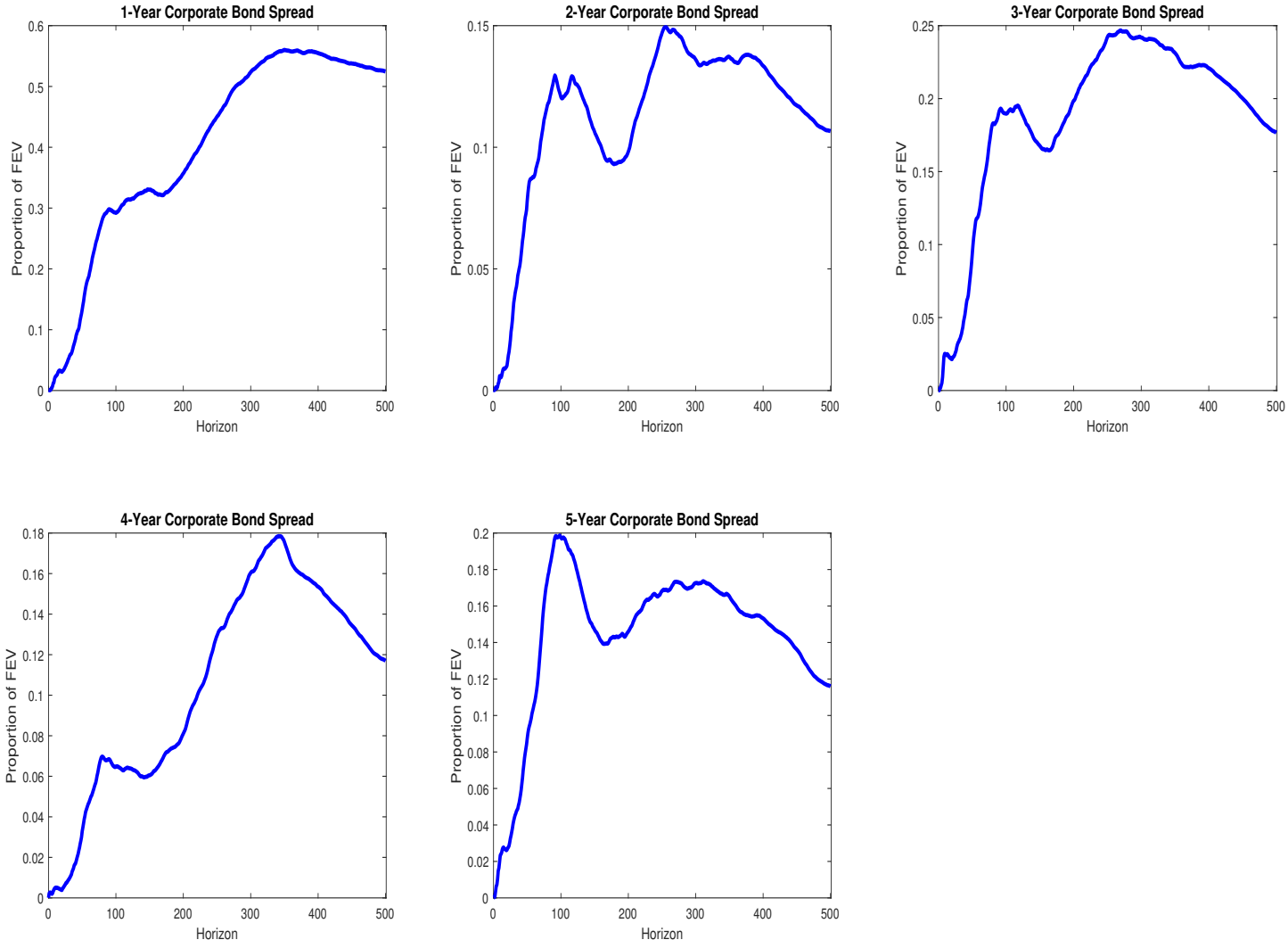
Notes: This figure presents the FEV shares of the variation in the government bond spread variables attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).

Figure 10: **Impulse Responses to GIV Demand Shock: Corporate Bond Yield Spreads.**



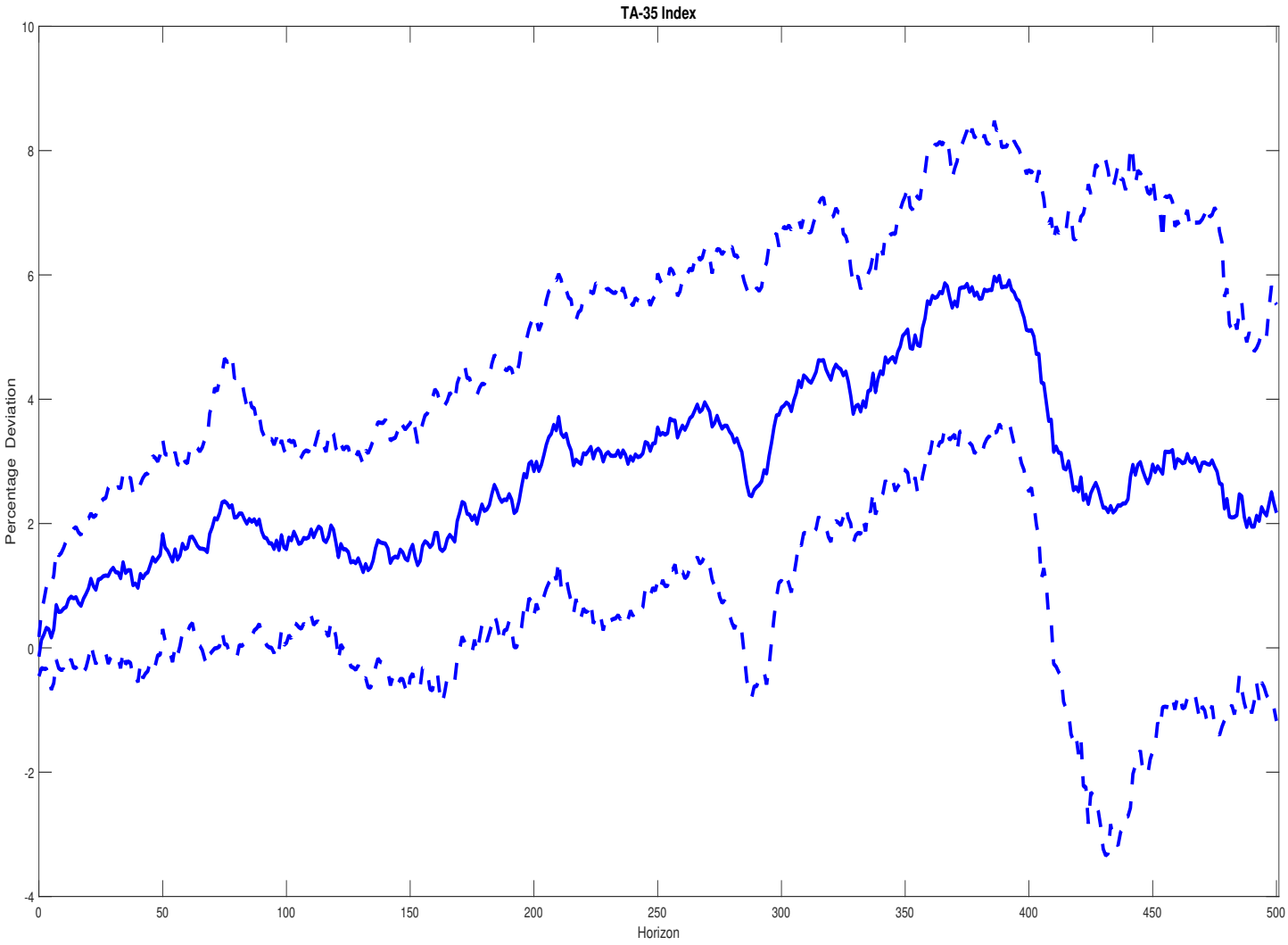
Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of the 1- through 5-year investment-grade corporate bond yield spreads (with respect to duration-comparable IRS rates). Responses are normalized such that the peak response of FFIs' accumulated flows variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values are in basis point change units relative to the pre-shock value of the spread variable.

Figure 11: **FEVs Attributable to GIV Demand Shock: Corporate Bond Yield Spreads.**



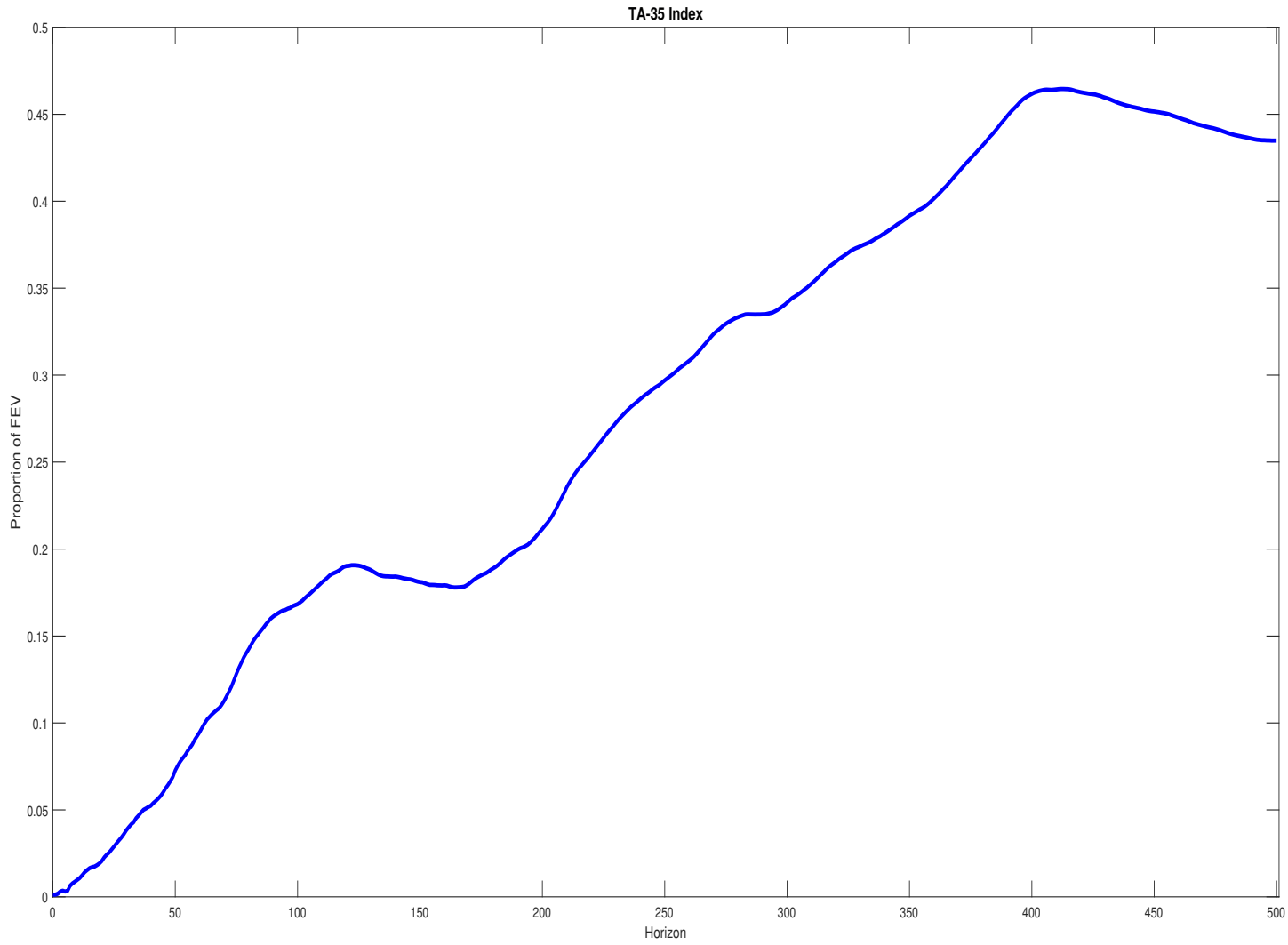
Notes: This figure presents the FEV shares of the variation in the corporate bond spread variables attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).

Figure 12: **Impulse Responses to GIV Demand Shock: TA-35 Index.**



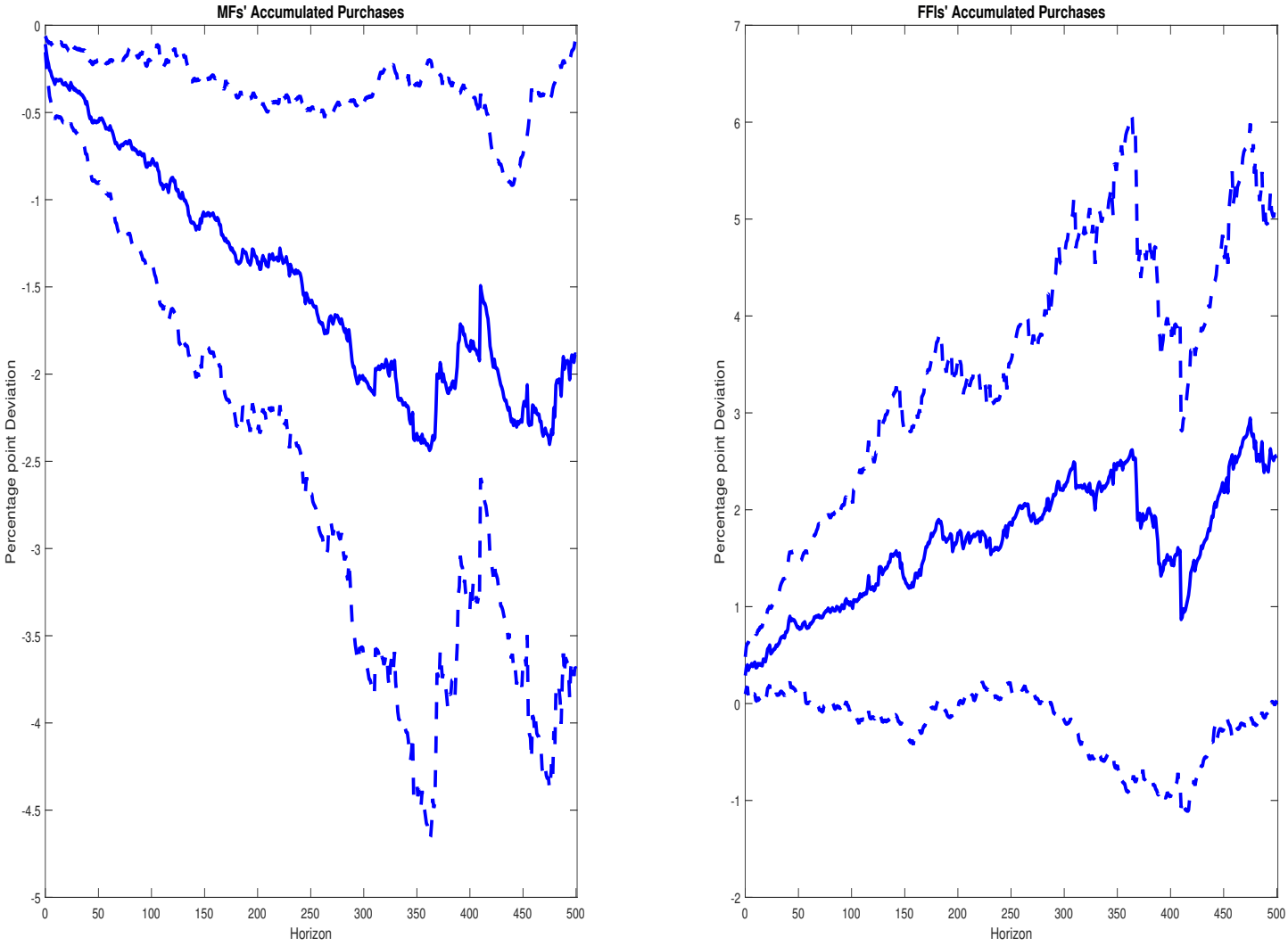
Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of the TA-35 stock price index. Responses are normalized such that the peak response of FFIs' accumulated flows variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values are in percentage point change units relative to the pre-shock value of the stock price index variable.

Figure 13: **FEVs Attributable to GIV Demand Shock: TA-35 Index.**



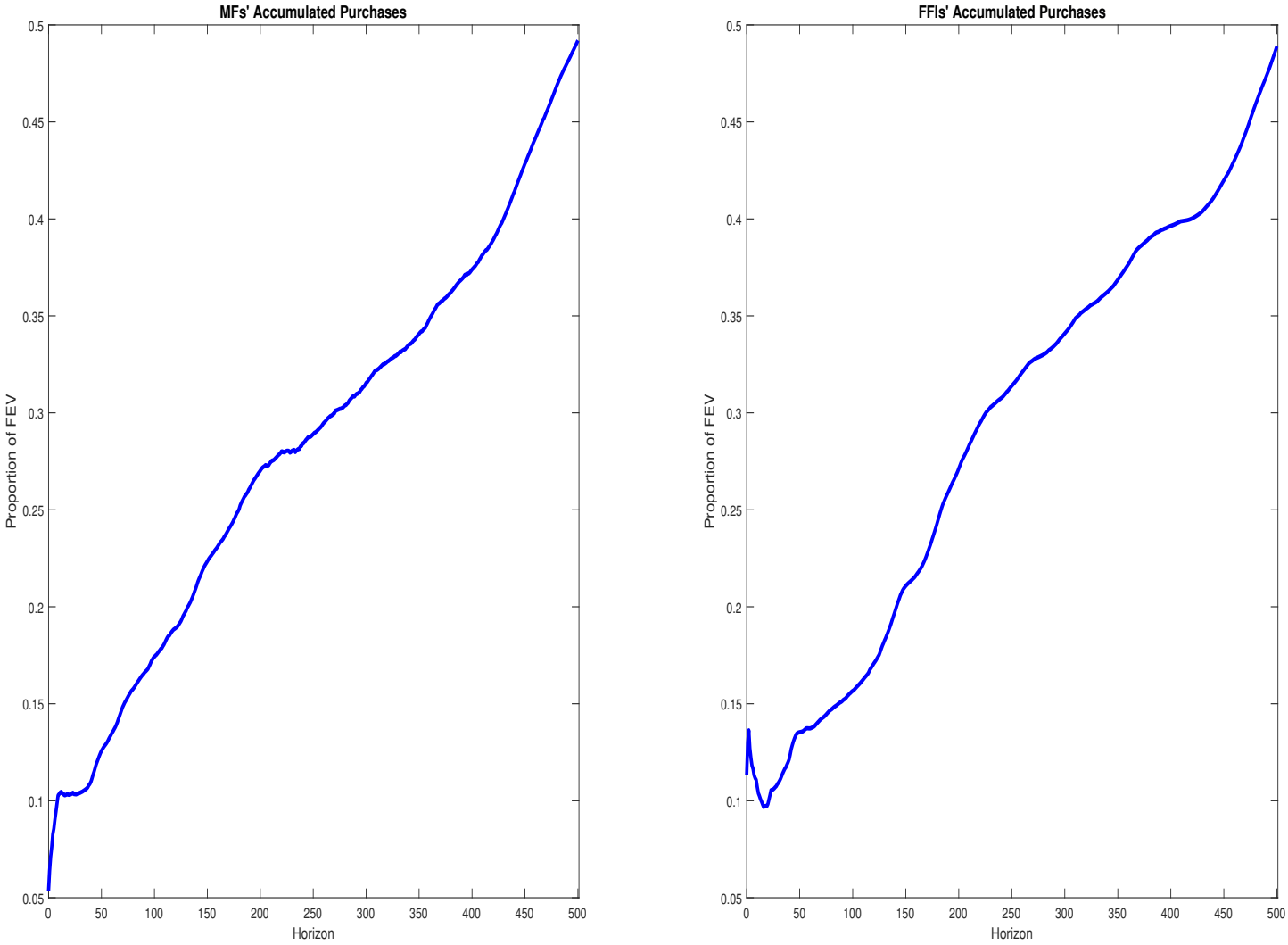
Notes: This figure presents the FEV shares of the variation in the TA-35 stock price index variable attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).

Figure 14: **Impulse Responses to GIV Demand Shock: MFs' and FFIs' Accumulated Secondary Market MAKAM Flows.**



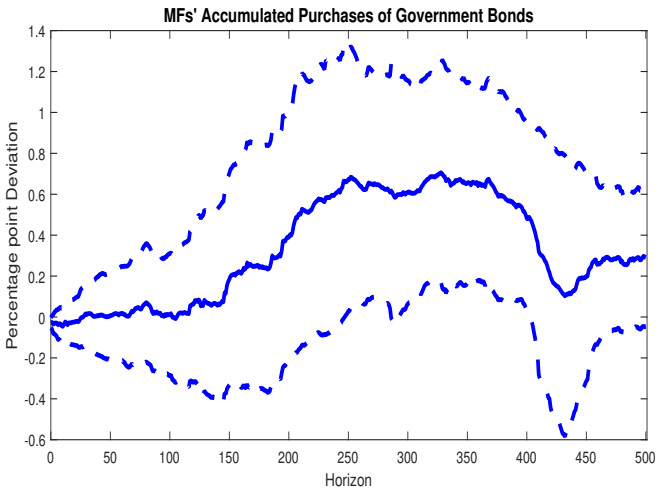
Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of HFs' and FFIs' accumulated secondary market MAKAM flows as share of outstanding MAKAM. Responses are normalized such that the peak response of the baseline FFIs' accumulated flows variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values for the two sectors' accumulated flows variables are in percentage-point change units relative to the pre-shock value of the corresponding sector's market share.

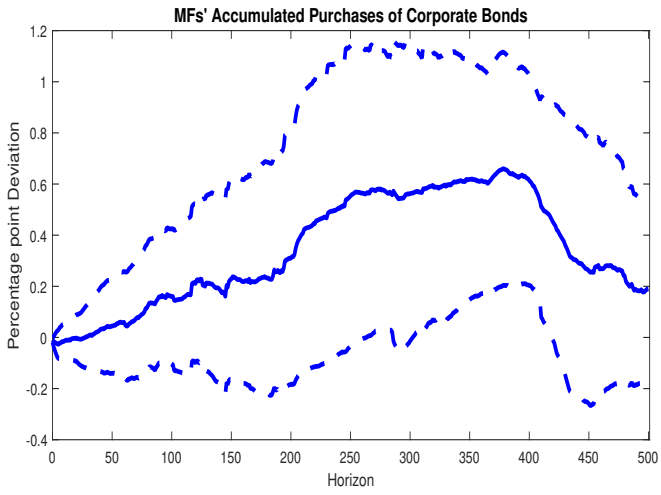
Figure 15: **FEVs Attributable to GIV Demand Shock: MFs' and FFIs' Accumulated Secondary Market MAKAM Flows.**

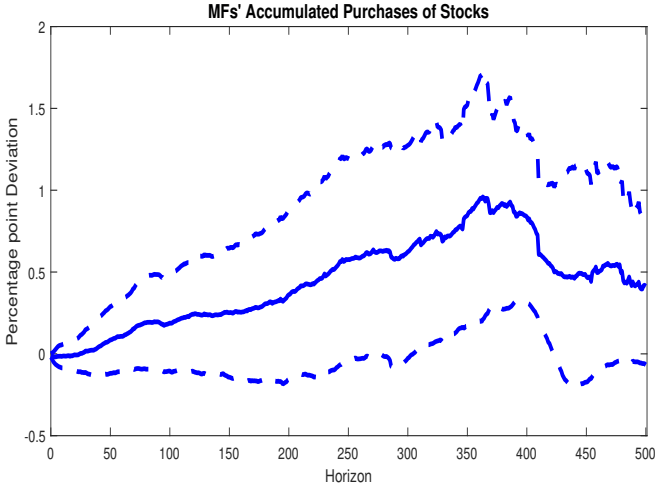


Notes: This figure presents the FEV shares of the variation in HFs' and FFIs' accumulated secondary market MAKAM flows as share of outstanding MAKAM attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).

Figure 16: **Impulse Responses to GIV Demand Shock: MFs' Accumulated Secondary Market Rebalancing Flows.**

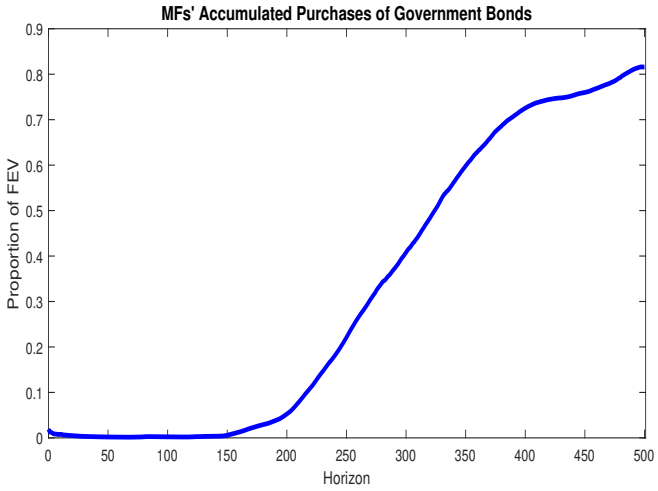


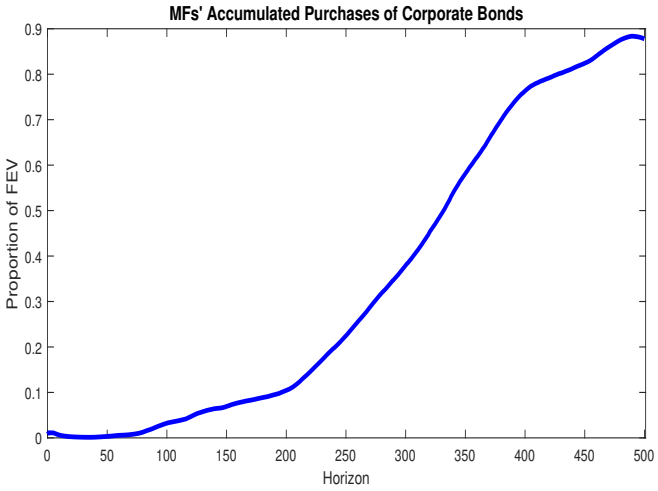


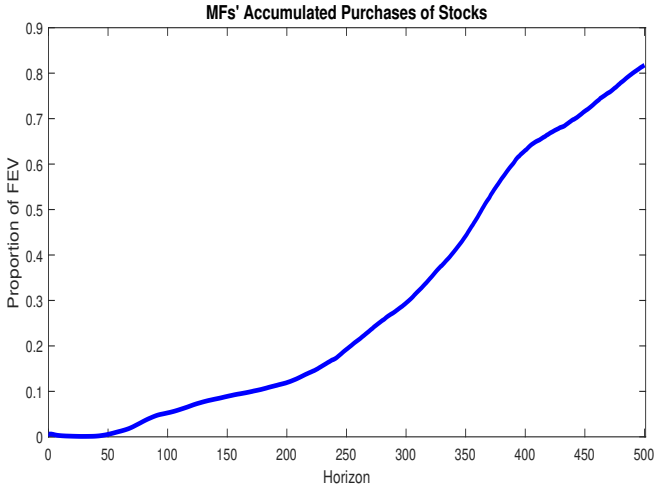


Notes: This figure presents the impulse responses (solid lines) to a GIV demand shock of MFs' accumulated secondary market government bond, corporate bond, and equity flows as shares of outstanding MAKAM. Responses are normalized such that the peak response of the baseline FFIs' accumulated flows variable is 10 (i.e., 10-percentage-point market share increase), implying a 3.7-standard-deviation GIV demand shock size. 95% confidence bands (dashed lines) are based on standard errors computed from the heteroskedasticity- and autocorrelation-consistent procedure of Newey and West (1987) with the truncation lag equal to $h+1$ (where $h = 0, 1, ..., 500$ is the local projection horizon). Horizons are on the x-axis (impact horizon (0) to 500th horizon). Values for the accumulated flows variables (as shares of outstanding MAKAM) are in percentage-point change units relative to the pre-shock value of the corresponding sector's share in total outstanding MAKAM bonds.

Figure 17: **FEVs Attributable to GIV Demand Shock: MFs' and FFIs' Accumulated Secondary Market Rebalancing Flows.**







Notes: This figure presents the FEV shares of the variation in MFs' accumulated secondary market government bond, corporate bond, and equity flows as shares of outstanding MAKAM attributable to a one-standard-deviation GIV demand shock. Horizons are on the x-axis (impact horizon (0) to 500th horizon). FEV share is on the y-axis (in fractional terms).