

STOCKHOLM SCHOOL OF ECONOMICS
Department of Economics
5350 Master's thesis in economics
Fall 2025

When the Dollar Tightens the Belt:

How U.S. Monetary Tightening Shapes Exchange Rates in Commodity Exporting Economies via the Commodity Price Channel

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Abstract

This thesis examines the short run contribution of commodity price movements to the transmission of U.S. monetary policy into the exchange rates of commodity exporting economies. High-frequency U.S. monetary policy surprises are combined with daily data for a panel of Latin American exporters. The empirical strategy integrates local projection estimates with a proxy SVAR in which orthogonal monetary policy surprises are used as an instrument, allowing commodity prices and exchange rates to respond endogenously. This design yields a decomposition of exchange rate responses into a component attributable to shock induced commodity price adjustments. The results show that a surprise U.S. monetary tightening generates sizeable declines in industrial and energy commodity prices. The effect on exchange rates is already mixed. Examining those that show a significant negative exchange rate reaction, Brazil, Chile and Colombia, yields no significant estimate of that channel. These findings indicate that, for the sampled economies, short run external vulnerability to U.S. monetary policy does not primarily arises through commodity price channels.

Keywords: High-Frequency Monetary Policy Shocks, Commodity Prices, Exchange Rates, Commodity Currencies, Local Projection, Strucutral Vector Autoregression

JEL: F42, C32, E52, F31, Q02,

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Date submitted:	08.12.2025
Date examined:	15.12.2025
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Acknowledgements

I would like to express my sincere gratitude to my supervisors Álvaro Jañez Garcia, Assistant Professor of Economics at the Stockholm School of Economics, and Martin Wolf, Assistant Professor of International Macroeconomics at the Swiss Institute for International Economics and Applied Economic Research (SIAW) at the University of St. Gallen, for their valuable feedback. Finally, I wish to thank Paul Metzler whose feedback and encouragement greatly enriched both my work and experience.

AI Declaration

During the preparation of this thesis, I made use of ChatGTP. Primarily to support R coding and to improve the clarity and readability of written text. Their role was strictly auxiliary. In empirical work, these tools helped identify syntax issues, interpret error messages, and adapt existing code to slightly modified tasks. Before reuse, the code was therefore fully understood and, if necessary, adapted. Typical prompts included: "What does this error mean", "Is there a function that XYZ", "Why does this code not execute". ChatGTP was used to refine wording through targeted prompts such as requesting clearer formulations or alternative phrasing. Typical prompts included: "Give me an alternative phrasing of this sentence" or "How is that sentence understood". At no point did the tools replace substantive analytical work. Further I used the AI enhanced feature of Overleaf, to point to orthographical and grammatical or syntax errors.

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1 Introduction

Commodity exporting economies are some of the most exposed countries to external shocks. Exports of one third of developing economies consist of more than 60% in commodities comprising energy, mining, and agricultural goods (UNCTAD, 2025). Exchange rates in commodity exporting economies show large and systematic movements in response to shifts in global financial conditions, especially those originating from the United States (U.S.) (Chen and Rogoff, 2003), which issues the main commodity currency, the U.S. Dollar. How much of the exchange rate reaction of commodity exporting economies to U.S. monetary shocks is transmitted specifically through the commodity price channel is the central question of this thesis.

Commodity price movements are a fundamental source of global macroeconomic variation, inflation dynamics, business cycles, and external balances (Kilian, 2008; Anzuini et al. 2010; Miranda-Pinto et al., 2023). A large body of evidence shows that commodity prices co-move systematically with global macroeconomic conditions, particularly shifts in U.S. interest rates (Barsky and Kilian, 2002; Miranda-Agrippino and Rey, 2020). Because most internationally traded commodities are priced in U.S. Dollars, changes in the value of the Dollar constitute an additional transmission channel through which U.S. monetary policy affects global commodity markets.

A substantial empirical literature has established each component of this mechanism separately. First, U.S. monetary policy shocks generate immediate and persistent appreciation of the U.S. Dollar, producing corresponding depreciation of the foreign currency (Eichenbaum and Evans, 1995; Kim and Roubini, 2000). Second, commodity prices respond systematically to changes in U.S. interest rates, with tighter policy depressing a wide range of energy, metals, and agricultural prices (Barsky and Kilian, 2002; Anzuini et al., 2013; Miranda-Pinto et al., 2023). Third, the exchange rates of commodity exporting economies co-move closely with the prices of their key export commodities, reflecting their concentration in the production of export goods (Chen and Rogoff, 2003; Cashin et al., 2004; Ferraro et al., 2015). This thesis provides a decomposition of exchange rate movements into a component driven by commodity price adjustments and a component driven by broader financial channels such as interest rate differentials, global risk premiums, and Dollar liquidity conditions. Economies that rely heavily on commodity exports are particularly exposed to these external forces because their external balance, fiscal revenues, and exchange rates respond strongly to fluctuations in global commodity prices. Past episodes, such as the sharp boom–bust cycle around the 2008 Global Financial Crisis and Covid-19 in 2020, illustrate the rapid and volatile response of commodity prices to global economic and financial shocks.

Despite substantial literature on each individual link, first, U.S. monetary policy shocks on exchange rates, second, U.S. monetary policy shocks to commodity prices, and third, commodity prices to exchange rates, there is no integrated evidence on the relative contribution of these channels for commodity export dependent economies. Recent research on international macroeconomics

mainly treats exchange rate responses as arising from a combination of interest rate differentials, global risk premium adjustments, and Dollar funding conditions (Rey, 2016; Miranda-Agrippino and Rey, 2020). While this approach might be promising for developed or trade diversified economies, it overlooks a crucial source of macroeconomic fluctuations for commodity export dependent economies. Nevertheless, the commodity currency literature estimates exchange rate elasticities with respect to commodity prices but generally treats commodity prices as exogenous fundamentals or as generic global shocks (Chen and Rogoff, 2003; Cashin et al., 2004; Bermpei et al., 2024), rather than as endogenous outcomes of identified U.S. monetary policy surprises. However, commodity prices are not exogenous with respect to the macroeconomy (Barsky and Kilian, 2004; Jacks and Stuermer, 2020). This leaves a central question unanswered:

How much of the exchange rate depreciation experienced by commodity exporting economies after a contractionary U.S. monetary policy shock is mediated specifically through the decline in commodity prices and how much is attributable to other financial channels?

The theoretical mechanisms suggest mixed effects: On the one hand, the dominant open economy models imply that tighter U.S. monetary policy raises U.S. yields and produces an appreciation of the U.S. Dollar through uncovered-interest-parity deviations and global risk premium adjustments (Obstfeld and Rogoff, 1995; Gabaix and Maggiori, 2015; Miranda-Agrippino and Rey, 2020). On the other hand, established commodity market theory links commodity prices to real interest rates through storage and inventory demand (Frankel, 2008), while business cycle theories emphasize the role of global demand in driving commodity prices (Barsky and Kilian, 2002). For commodity exporting economies whose external balances are heavily concentrated in a small set of primary goods, these channels may reinforce rather than substitute for each other.

Understanding the empirical relevance of these transmission mechanisms is crucial for at least two reasons. The first reason is the degree to which commodity price movements mediate external monetary shocks. If the majority of the exchange rate movement is explained by the commodity price channel, then these economies are exposed primarily through their export concentration. If, instead, commodity effects are small, the dominant mechanisms must lie in financial channels such as Dollar liquidity and global risk premium. Identifying the relative strength of the respective channels is necessary to understand how an economy can become more resilient to external shocks. Second, the appropriate fiscal and monetary policy response depends on whether external shocks operate either through commodity price linked revenues and external balances or through capital flow and interest rate channels. While the former should be addressed by fiscal stabilization, the latter should be addressed by monetary adjustments, such as the interest rate.

This thesis exploits a combination of high-frequency U.S. monetary policy shocks (Gerltner and Karadi, 2015) and daily data to quantify the price component in the exchange rate for a panel of commodity exporting economies. I focus on Latin America because these countries are relatively stable, mostly operate under free floating exchange rates, and with few exceptions are commodity dependent. This thesis contributes to the international macroeconomic literature by examining whether, for commodity exporting economies, the response of exchange rates to U.S. monetary policy shocks is a singular phenomenon or the outcome of interacting channels. It separates the

share driven by commodity price adjustments from the share driven by financial channels. To the best of my knowledge, I am the first one to conduct this decomposition in general, and specifically for developing commodity export dependent countries.

The empirical analysis confirmed that U.S. monetary tightening generates a significant decline in global commodity prices, with the strongest effects for storable and industrial commodities. The short term exchange rate depreciation could only be observed for a small subset of countries, namely Brazil, Chile and Colombia. For other countries commodity price movements fail to explain a significant share of the short-term exchange rate depreciation. These findings indicate that the effects of external monetary shocks on the exchange rate arise primarily from global financial conditions rather than from movements in commodity prices.

The remainder of the thesis is structured as follows. In section two I review the relevant literature. In section three I explain the theoretical framework and further motivate the research gap. In section four I present the data I used, followed by the methodology in section five. In section six I present the results, followed by a discussion in section seven. Finally, section eight presents a conclusion.

2 Literature Review

This section provides an overview of the existing literature that underpins the decomposition of U.S. monetary policy spillovers into a direct exchange rate channel and a commodity price mediated channel. The review is organized into four components: (i) identification of monetary policy shocks, (ii) the effects of U.S. monetary policy shocks on exchange rates, (iii) the effects of U.S. monetary policy shocks on global commodity prices, and (iv) the effects of commodity price movements on the exchange rates of commodity exporting economies.

2.1 Monetary Policy Shocks and Identification

The recent literature has evolved substantially by developing identification strategies that separate exogenous monetary policy shocks from endogenous policy responses to shifting macroeconomic conditions.

Eichenbaum and Evans (1995) isolated monetary policy shocks by modeling the Federal Reserve's policy rate decisions and eliminating predictable responses to contemporaneously available macroeconomic information. The residual of the resulting regression constitutes their measure of the monetary policy shock. Kuttner (2001) used federal funds futures to decompose Federal Open Market Committee (FOMC) target rate changes into anticipated and unanticipated components. Only the unanticipated component moves these yields. The anticipated part is essentially neutral, as they were already priced in. This first established the idea that changes in the price of futures are valid measures of unexpected monetary policy shocks. It also demonstrated that most of the observed policy rate changes are anticipated by financial markets. Romer and Romer (2004) extended this identification strategy by constructing a narrative-based series of intended policy rate changes around FOMC meetings and then purging these intended moves of all forecast driven anticipated components using the Federal Reserve's internal projections. The resulting shock measure isolates unanticipated policy actions over a much longer historical period and eliminates both endogenous responses to economic conditions and forward-looking behavior by the Federal Reserve. The key insight is that only the truly unanticipated component of policy changes provides a credible measure of monetary policy shocks.

Gürkaynak et al. (2005) introduced a high frequency approach by showing that FOMC announcements embed at least two distinct factors: a "target" shock, which is a surprise in the current short term policy rate, and a "path" shock, which is a surprise in the expected future path of short rates. This distinction matters because asset prices, including exchange rates, respond more strongly to revisions in the expected policy path than to changes in the current short term policy rate. Gertler and Karadi (2015) use high frequency surprises in future prices as external instruments in a proxy SVAR. They find that these surprises create modest movements in short rates but large movements in credit costs due to strong responses of term premia and credit spreads. This find-

ing is inconsistent with standard frictionless models. Nakamura and Steinsson (2018) used high frequency movements in nominal and real interest rates, expected inflation, and expected output growth around Federal Reserve announcement windows to identify monetary policy news. They showed that monetary announcements contain systematic information about future fundamentals, making the argument that central bank information effects must be separated from genuine policy shocks. Jarociński and Karadi (2020) further refined identification by separating pure monetary policy shocks from central bank information shocks, using intraday comovement of interest rate movements and stock price movements: A contractionary monetary policy shock raises interest rates and lowers stock prices, while an information shock raises both. Distinguishing these shocks in a SVAR, they show that ignoring information shocks biases estimates of monetary non neutrality. Pure monetary policy shocks show stronger transmission, while information shocks resemble news about current and future financial conditions. The central bank responds to positive news by tightening, and the economy reacts through credit condition (interest rates) and asset price (stocks) channels. The main finding from this development is that high frequency data allows one to cleanly separate the types of monetary policy shocks: information shocks and pure monetary policy shocks to get unbiased estimates of policy transmission.

Finally, several papers used these insights to analyze monetary policy shocks. Miranda-Agrippino and Rey (2020) identified U.S. monetary policy shocks with high frequency external instruments controlling for global financial variables. Dedola, et al. (2015) estimated a VAR designed which matches the impulse responses in Gertler and Karadi (2015), and ensuring robustness through the zero lower bound period. I will rely on the economic policy shocks derived from Swanson and Bauer (2022) and Jarociński and Karadi (2020).

This strand of literature provides the foundation for the construction of shock measures of monetary policy. Early narrative approaches focused on isolating intended policy actions from contemporaneous macroeconomic conditions. Market based methods then introduced price changes in futures as real time measures of unanticipated policy changes. High-frequency intraday identification subsequently refined this framework by separating pure policy shocks from central bank information effects. This development provides the principle for the literature and establishes the methodological foundation on which my thesis builds on.

2.2 U.S. Monetary Policy Shocks and Exchange Rates

Exchange rate responses to monetary policy shocks have long challenged standard open economy models. Fama (1984) showed that regressions of subsequent exchange rate changes on interest rate differentials yield negative slopes, a deviation from the prediction of uncovered interest parity. High interest rate currencies do not systematically depreciate, as uncovered interest parity implies, but even appreciate. This implies that exchange rate movements must also be driven by non-interest-rate forces. One of those is the risk premium reflect compensation for bearing the currency risk. Eichenbaum and Evans (1995) showed that a contractionary U.S. monetary policy shock leads to an immediate and persistent appreciation of the U.S. Dollar, including persistent deviations from uncovered interest parity favoring U.S. assets. Obstfeld and Rogoff (1995) developed a

two country sticky-price intertemporal model which demonstrates how monetary shocks generate short-run output effects that can amplify exchange rate movements beyond predictions of models with price flexibility. Clarida and Waldman (2007) show that news about higher inflation actually results in an appreciation of the nominal exchange rate, if the announcing central bank follows a Taylor Rule. Under this rule, information on inflation can be interpreted as a proxy for a future higher interest rate.

More recent work emphasizes financial market channels. Gabaix and Maggiori (2015) proposed an intermediary based model in which global financiers with limited risk bearing capacity absorb international capital flows. In this setting exchange rate movements compensate intermediaries for holding risky positions. Exchange rate responses to monetary policy depend on the risk bearing capacity of intermediaries, so the liquidity and balance sheet constraints of banks are determinant and not only the interest rate differentials. Itskhoki and Mukhin (2021) also demonstrate that exchange rate movements arise endogenously from risk bearing constraints of intermediaries. Rey (2015) and Miranda-Agrippino and Rey (2020) show that U.S. monetary tightening causes broad appreciation of the Dollar and tightening of global financial conditions. These findings imply that domestic exchange rate flexibility offers limited protection from U.S. monetary shocks, since global financial conditions adjust with them. Their contribution also establishes that U.S. monetary policy shocks systematically appreciate the U.S. Dollar.

A complementary literature decomposes exchange rate movements. Feunou et al. (2022) decompose the U.S.-Canadian Dollar exchange rate into expected future exchange rates, cross-country differentials in expected inflation, yields and term premia, and an exchange rate risk premium. They find that the exchange rate risk premium dominates and that monetary policy and macroeconomic news primarily affect the real exchange rate through this channel. Fink and Frei (2020) find a similar result, looking at the Swiss Franc, they find that the risk factor dominates, especially in periods of heightened global uncertainty.

The literature across the board demonstrates that monetary policy shocks appreciate the U.S Dollar, but their transmission operates through different financial channels.

2.3 U.S. Monetary Policy Shocks and Global Commodity Prices

Historical evidence shows that monetary conditions play a central role in shaping global commodity price dynamics by affecting demand, financial conditions, and the value of the Dollar.

Mishkin (1996) presented three main channels through which monetary policy affects the broader economy: (i) the interest rate channel, (ii) other asset price channels, and (iii) the credit channel. These mechanisms are widely accepted in the literature. According to this definition commodities are part of the other asset price channel.

Looking at historical data, Barsky and Kilian (2002) argued that the “Great Stagflation” of the 1970s cannot be explained primarily by exogenous oil supply shocks. They show that industrial commodity prices started rising before the main OPEC price increases and that monetary expan-

sions, not oil shortages, better account for the persistent rise in the GDP deflator. It therefore overturns the standard interpretation of the 1970s as a predominantly exogenous oil supply shock episode and instead frames commodity and inflation dynamics as largely monetary in nature. Kilian (2008) and Hamilton (2009) both stressed that oil prices are driven mainly by global demand and precautionary demand, not by isolated supply disruptions. Kilian (2009) used a VAR model to decompose oil price movements into supply shocks, global aggregate-demand shocks, and oil specific precautionary demand shocks, and shows that the 2000s oil boom was largely demand-driven. Hamilton (2009) documented that the 2007–08 oil price spike reflected strong global demand paired with stagnant production. This reiterates that global demand, as established, dependent on U.S. monetary policy, is the dominant driver of oil price fluctuations. Similarly, Juvenal and Petrella (2015) found that global demand is the dominant driver of oil prices and cross-commodity comovement, and speculative shocks to commodity markets are the second most important force and materially contributed to the 2004–2008 oil price surge and subsequent collapse. If financial speculation amplifies demand-driven commodity cycles, it could explain why booms and busts more pronounced than fundamentals alone would suggest.

Frankel (2008) developed a model of storable commodities in which real interest rates affect real commodity prices through cost-of-carry, extraction incentives, and speculative channels. Higher real interest rates decrease desired inventories and discourage speculators from taking commodity contracts, lowering commodity prices. Higher interest rates increase extraction incentives as future extraction profits are discounted higher, also lowering prices. The empirical evidence of his paper supports a strong negative relationship between real interest rates and a wide range of commodity prices.

Anzuini et al. (2013) provided direct evidence on monetary policy and non-oil commodity prices. They investigate the empirical relationship between U.S. monetary policy and commodity prices using a VAR estimation and show that expansionary U.S. monetary policy shocks raise global non-oil commodity prices and argue that monetary policy contributed to the commodity price boom of the 2000s via lower real rates, cost of carry, and global demand. Dedola et al. (2015) complemented this by arguing that U.S. monetary tightening reduces global commodity prices alongside world industrial production and global equity prices, reinforcing the view that commodity prices are a central component of the international transmission of U.S. policy. Building on this evidence, recent work moves to high-frequency identification to quantify the commodity price response to U.S. monetary shocks more precisely. Miranda-Agrippino and Rey (2020) document that a U.S. monetary tightening depresses global risky-asset prices, credit and cross-border flows, with commodity prices moving as part of this global financial cycle.

Miranda-Pinto et al. (2023), the paper this thesis largely builds on, quantified this commodity price channel explicitly. Using daily data on commodity futures and Jarociński–Karadi (2020) monetary policy shocks, they find that a 10-basis point U.S. monetary tightening reduces commodity prices by roughly 0.5–2.5% in 24 trading days, with the largest responses for highly storable and industrial commodities such as base metals and crude oil. They emphasize four different channels:

- Cost-of-carry channel: Higher interest rates raise the opportunity cost of holding invento-

ries, reduce storage demand, and depress prices of storable commodities. For exhaustible resources, tighter policy makes early extraction relatively more attractive.

- Real-economy channel: Higher interest rates lower investment and consumption, reducing expected future commodity demand. Forward-looking traders immediately incorporate this into prices.
- Liquidity and portfolio channel: A tighter U.S. monetary policy restricts global financial conditions, reduces market liquidity and speculative positions, and accelerates downward price adjustments, especially in derivatives-intensive commodities.
- Exchange-rate channel: A policy-induced Dollar appreciation raises foreign currency commodity prices, compresses global demand, and pushes down Dollar denominated commodity prices across the board.

This strand of literature shows how U.S. monetary policy is a determinant and driver of global commodity prices, operating through multiple channels that link interest rates, demand, financial conditions, and the Dollar to commodity price dynamics.

2.4 Global Commodity Prices and Effects on Commodity Exporting Countries

This section reviews how global commodity prices affect exchange rates and why this is important for long-term structural dynamics in commodity exporting economies.

Chen and Rogoff (2003) focused on Australia, Canada and, New Zealand, where primary commodities constitute a significant share of their exports. They constructed country specific commodity price indices and show that real exchange rates for these economies are strongly linked to their commodity terms of trade: for Australia and New Zealand, commodity prices explain a large fraction of real exchange rate movements, with long-run elasticities close to 1. For Canada, a similar long-term relationship exists, though short-term comovement is weaker. These results imply that, for major commodity exporters, any account of exchange rate dynamics must explicitly incorporate commodity price movements. Cashin et al. (2004) generalized this approach to 58 commodity-exporting countries using new monthly country specific commodity price indices. They found a long-term positive relationship between the real exchange rate and the real commodity export price for roughly one-third of these countries. For these "commodity currencies" the real exchange rate is not constant, as a purchasing power parity model would require, but depends on movements in the real price of their commodity exports. However, both leave a gap for further research.

Ferraro et al. (2015) used the example of Canada to examine the relationship between daily movements in a country's key commodity export price and whether it can predict its nominal exchange rate over a short horizon. Using high-frequency data, they showed that contemporaneous daily commodity price changes are strongly correlated with daily exchange rate movements, while lagged commodity prices offer only weak and time-varying predictive power, and all predictive

power disappears at monthly or quarterly frequencies. This implies that the news of the commodity price is immediately incorporated into exchange rates. In particular, that evidence motivates using high frequency commodity price movements as the relevant measure, since any predictive content at lower frequencies may be quickly arbitrated.

Beyond these bilateral commodity exchange rate links, a complementary literature investigates how global financial conditions and U.S. monetary policy shape the environment in which commodity exporters operate. Rey (2015) and Miranda-Agrippino and Rey (2020) showed that U.S. monetary policy drives a global financial cycle in which risky-asset prices, leverage, and credit co-move. Commodity exporters, whose terms of trade and fiscal positions depend on commodity prices, are particularly exposed to this cycle. Dedola et al. (2015) documented that U.S. monetary shocks have stronger and more persistent effects on both macroeconomic and financial variables in emerging economies than in advanced economies. For commodity exporting emerging economies, it implies that U.S. monetary tightening tends to depress commodity prices and tighten financial conditions simultaneously.

Theoretical work analyzes how commodity booms affect sectoral structure and long-term growth in developing economies that export commodities. Dutch disease refers to the structural pressures arising when a booming sector, mostly natural resource based, appreciates the real exchange rate and reallocates labor and capital in ways that contract other sectors. Corden and Neary (1982) derived the Dutch disease model in a multi-sector small open economy, distinguishing booming tradable, lagging tradable, and non-tradable sector. A positive commodity price shock triggers a commodity movement effect and a spending effect, appreciates the real exchange rate, and tends to contract the lagging tradable sector, mostly manufacturing. Matsuyama (1992) embeds learning-by-doing in manufacturing in a two-sector model and shows that, in an open economy, higher productivity in agriculture or resources can lower long-run growth by shifting labor away from the learning sector, thereby formalizing a growth version of Dutch disease. Recent empirical work for resource rich developing economies confirms that resource booms are often accompanied by these Dutch disease mechanisms (Habib, 2024; Petreski and Wong, 2014).

This strand of literature shows that commodity price movements transmit rapidly into exchange rates and expose exporters to global financial conditions that are dominantly shaped by U.S. monetary policy. It also underscores the importance of commodity prices for commodity exporting countries.

3 Theoretical Framework

In this section, I link the relevant strands of the literature and motivate the theoretical plausibility of a commodity price mediated transmission channel and the resulting empirical strategy. The framework integrates three elements: the financial transmission of U.S. monetary policy, the forward looking nature of commodity price formation, and the particular external structure of commodity export dependent economies.

3.1 Transmission Mechanism

In models of commodity markets with forward looking traders, monetary policy affects prices not only through financial channels but also through a real economy transmission. Miranda-Pinto et al. (2023) showed that monetary tightening lowers expected global demand, compresses investment activity, and increases nominal interest rates. These shifts change the intertemporal arbitrage conditions that govern storage and extraction decisions, reducing the value of holding inventories. Forward looking traders update their expectations about future demand conditions as soon as monetary policy news arrives. They do not wait for news about physical quantities, like production, consumption, or inventory levels, to arrive. Instead, they immediately adjust their bids and offers in the futures market. Throughout, it is important to distinguish the financial transmission of monetary policy, operating through interest rates and risk premium, from the real-economy channel, which operates through expected global demand and intertemporal storage incentives.

This anticipatory pricing behavior implies that the effects of monetary policy on commodity prices materialize quickly. Initial reactions can vanish within days as liquidity normalizes or the arrival of new information overshadows the commodity specific information gained from the monetary policy shock. The real economy channel of monetary policy, therefore, has a short horizon component in the immediate aftermath of the policy shock.

For these commodity exporting economies, a narrow set of commodity exports constitutes the primary source of foreign exchange earnings, fiscal revenue, and adjustment of the external balance. Price changes in these commodities therefore directly affect the valuation of export income, the fiscal position, and the supply of foreign currency for these countries. Parts of the exchange rates should therefore inherit the volatility of commodity prices almost mechanically. The commodity price channel thus would serve as a direct transmission mechanism linking U.S. monetary tightening to the external value of commodity exporting currencies. Evidence from Ferraro et al. (2015) showed a response in exchange rates empirically, but also emphasizes that these reactions are short-lived. This is a main motivation to look at daily changes in commodity prices.

3.2 Empirical Strategy

An empirical strategy consistent with this framework must isolate a transmission mechanism that operates within days. Therefore, I rely exclusively on daily data, which reflect the information set available to market participants at the time of the shock and avoid the contamination inherent in monthly first differences. This inevitably prevents the inclusion of contemporaneous controls such as inflation or output, which are only reported monthly or quarterly. Still, this omission is consistent with the information set relevant at the time of the shock, since changes in these macroeconomic indicators are not yet observable at the moment pricing decisions are made. High-frequency identification based on exogenous monetary policy surprises provides the source of variation. Impulse responses of commodity prices and exchange rates are first estimated to characterize the short-run effects of monetary policy shocks. Once these dynamics are established, a daily proxy SVAR is used to decompose the exchange rate response into a component driven by commodity price movements and a residual financial component. This two-step design aligns identification with the forward looking behavior of commodity traders and preserves the short run structure required to separate the commodity channel from other financial channels. The design follows Miranda-Pinto et al. (2023). The two step design, to first identify the currencies that show a significant depreciation following a U.S. monetary policy shock using local projection is primarily driven by the fact that local projections deliver more robust results (Olea et al. 2024).

This line of argument does not contradict the established evidence that monetary policy shocks can generate persistent movements in commodity prices and real exchange rates. The focus on short-run dynamics instead reflects the identification environment: high-frequency shocks must be matched with high-frequency outcomes to avoid bias from unrelated news, and structural SVARs at daily frequency already carry substantial uncertainty, as reflected in the wide 90% or even 68% confidence intervals typically reported, next to that effects also vanish quickly. Extending the horizon would compound these issues by introducing additional sources of contamination and amplifying identification bias.

This framework integrates the three components into a coherent transmission mechanism. The financial response to U.S. monetary policy shapes global risk premia and Dollar conditions, forward looking commodity traders translate these shifts into immediate adjustments in futures prices, and the heavy external dependence of commodity exporting economies ensures that such price movements directly affect their exchange rate. Together, these elements motivate the empirical strategy that follows and establish the theoretical basis for the identification of the commodity price channel.

4 Data

In this section, I describe the construction of the datasets used for analyzing the transmission of U.S. monetary policy shocks to commodity prices and the exchange rates of commodity exporting economies. The following three sets of data are required: monetary policy shocks, commodity prices and exchange rates. The data sources and transformations closely follow Miranda-Pinto et al. (2023). The data is collected on a daily basis from 1990 to 2023.

4.1 Monetary Policy

The identification of U.S. monetary policy shocks is based on high-frequency external instruments. For the baseline analysis, I use the monetary policy surprises constructed by Swanson and Bauer (2022). These shocks are measured as changes in Euro-Dollar futures rates (ED1–ED4) within 30-minute windows surrounding Federal Open Market Committee (FOMC) announcements. The four quarterly futures contracts cover the short term interest rate path, and their joint movements are summarized by the first principal component, which captures revisions in expectations about the future stance of policy over the upcoming year. In an additional analysis, to remove the predictable variation and isolate the genuinely unanticipated component, the residuals from the principal component step are regressed onto a set of six macroeconomic and financial indicators. The resulting orthogonalized shocks constitute the final series of monetary policy surprises. Swanson and Bauer recorded 361 such shocks between 2 April 1988 and 13 December 2023.

As a robustness check, I also use the daily monetary policy shocks constructed by Jarociński and Karadi (2020), which are derived from high-frequency surprises in interest rate futures around FOMC announcements and separate policy shocks from central bank information shocks within a SVAR framework using sign-restrictions. The pure shock series isolates changes in the policy stance that raise short-term interest rates and depress stock prices on announcement days. Their series contains 309 shocks between 8 February 1990 and 31 January 2024.

I also collected data on the Effective Federal Funds Rate (EFFR) and the lower bound of the Federal Funds Target Range. Both is obtained from the Federal Reserve Bank of New York. This source provides daily data, in contrast to the Federal Reserve St. Louis monthly series, but is only available from 1 January 2000.

4.2 Commodity Prices

The commodity dataset consists of daily front-month futures prices quoted in U.S. Dollars. The commodities are traded on the Intercontinental Exchange (ICE) and the Chicago Mercantile Exchange (CME), and obtained from Bloomberg L.P. The sample covers 40 commodities across energy, metals, agriculture, and soft commodities, consistent with the contracts examined in the

existing literature and listed in Appendix.

To analyze broader commodity groups, I construct 11 subindices. These follow the sectoral classification used by Miranda-Pinto et al. (2023), and are reported in Appendix. This approach ensures a consistent grouping of futures contracts across sectors, although some indices have incomplete historical coverage because several underlying contracts begin trading only in later years. Consequently, not all indices are available for the entire sample period. For all commodities and indices, prices are expressed as logarithms and daily returns are computed as the first differences of logarithmic prices $\Delta \log(p_t)$.

4.3 Exchange Rates

Exchange rate data is obtained at the daily frequency from Refinitiv Datastream. For each commodity exporting country, the bilateral nominal exchange rate is used against the U.S. Dollar, quoted as units of local currency per one U.S. Dollar. An increase in the rate means a currency depreciation of the commodity exporting country. The selection of countries is based on the degree of dependence on commodity exports, measured by the share of commodities in total merchandise exports as reported by UNCTAD (2025). The sample includes all Latin American economies whose commodity export share exceeds 60% of total exports.

Several countries are excluded for identification and data quality reasons: Ecuador is omitted because it is fully Dollarised, while Belize and Panama are excluded due to their U.S.-Dollar pegs. All other currencies are omitted for periods when they had a peg. Venezuela is excluded because its exchange rate series is unreliable and contains extended periods of missing or non-informative observations. For comparison, I also include Australia, Norway, Canada, and New Zealand, which are advanced commodity exporters with freely floating exchange rates. To capture broad movements in the value of the U.S. Dollar, I use the DXY Dollar Index, which consists of the U.S. Dollar exchange rate against the Euro, Japanese Yen, British Pound, Canadian Dollar, Swedish Kronor, and the Swiss Franc. The complete list of countries, exchange rate series, and corresponding Datastream tickers is reported in Appendix.

4.4 Other Data

Commodity-export dependence, sectoral export shares, and country-specific commodity weights are taken from UNCTAD's Commodity Statistics Database (2025). In addition, I use the VIX Index, which measures option-implied volatility on the S&P 500 and reflects the expected scale of equity price movements over a 30 day horizon. The series is sourced from the Chicago Board Options Exchange.

5 Methodology

In this section I lay out my empirical strategy used to decompose the international transmission of U.S. monetary policy shocks into an overall exchange rate channel and a commodity price mediated channel. I proceed in three steps: (i) estimating the effect of U.S. monetary policy shocks on global commodity prices, (ii) estimating their total effect on exchange rates using local projections, and (iii) using a proxy Structural Vector Auto Regression (SVAR) to identify the transmission of these shocks through the commodity price channel. This sequence of regressions allows to identify the component of the exchange rate movement that operates through commodity price movements. Identification relies on the assumption that U.S. monetary policy shocks have an effect on the interest rate (relevance) and are uncorrelated with other shocks at daily frequency (exclusion).

5.1 Using Local Projections Instead of Structural VARs

I begin by using the local projections method (Jorda, 2005) rather than directly a SVAR because local projections provide a more robust approach for estimating impulse response functions in the presence of potential misspecification (Olea et al., 2024). VARs require to impose a structure on dynamics from a tightly parameterized law of motion, which can deliver more precise estimates, but at the cost of potentially large biases whenever the VAR is even slightly misspecified (variance-bias trade-off). In contrast, local projections estimate each horizon directly, avoid functional form extrapolation, and therefore produce unbiased impulse responses and confidence intervals that are more likely to be valid. Under correct specification, a VAR and local projection approach estimate the same impulse responses (Plagborg-Møller and Wolf, 2021). A commonly used remedy is to increase the number of lags in the VAR. As the lag order grows and approaches the length of the forecast horizon, the resulting impulse responses converge, in the limit, to those obtained from a local projection framework (Olea et al., 2024). Given that the central objective of this thesis is to quantify the causal effects of U.S. monetary policy shocks with reliable inference, the local projection framework is methodologically appropriate for this purpose.

However, the decomposition requires structure that can only be imposed by a VAR. To mitigate the risk of misspecification, I rely on the local projection results to assess whether U.S. monetary policy has an effect on the commodity price or exchange rate, respectively.

5.2 Local Projection US Monetary Policy on Commodities

The impulse responses of commodity prices are obtained using horizon-specific local projections of the form proposed by Jordà (2005). I use the local projection set-up of Olea et al. (2025) and control for the same pre-trends as Miranda-Pinto et al. (2023). I employ the following local projection:

$$\Delta p_{i,t+h} \equiv \ln p_{i,t+h} - \ln p_{i,t-1} = \mu_{i,h} + \theta_{i,h} MPS_t + \sum_{l=1}^L \delta_{i,h,l} w_{t-l} + \xi_{i,h,t}. \quad (5.1)$$

The dependent variable $\Delta p_{i,t+h}$ is the cumulative logarithmic change in the price of the commodity i referring one period before the shock. This normalization ensures that the impulse response is anchored relative to the pre-shock level, avoids mechanical contemporaneous endogeneity when the shock occurs within a narrow intraday window and normalizes the shock relative to $p_{i,t}$. MPS_t is the monetary policy shock, around the 30-minute window of the FOMC monetary policy announcement, as first proposed by Gertler and Karadi (2015). The vector w_{t-l} contains as control variables the l^{th} lag of $\ln y_t - \ln y_{t-1}$ and the l^{th} lag of the shock MPS_t . Following Miranda-Pinto et al. (2023), I set $H = 24$ and $L = 12$. Each regression relates the h -period ahead log change in the price of a commodity to an externally identified U.S. monetary policy shock and controls for twelve lags of the dependent variable and the instrument, and a commodity- and h -specific intercept. The intercept captures the average daily log price change absent of a monetary policy shock. The regression is estimated, using robust standard errors (Olea and Plogborg-Mølle, 2021), for each commodity and commodity index.

5.3 Local Projection Commodities on Exchange Rates

Because exchange rates, like commodity futures, are forward looking financial prices that likely adjust immediately to monetary policy news and exhibit analogous high frequency dynamics, the same local-projection specification is applied:

$$\Delta e_{c,t+h} \equiv \ln e_{c,t+h} - \ln e_{c,t-1} = \mu_{c,h} + \beta_{c,h} MPS_t + \sum_{l=1}^L \delta_{c,h,l} w_{t-l} + \xi_{c,h,t} \quad (5.2)$$

The dependent variable $\Delta e_{c,h+t}$ is a cumulative logarithmic change in the price of the exchange rate i relating to one period before the shock. MPS_t , the vector w_{t-l} contains as control variables the l^{th} lag of $\ln y_t - \ln y_{t-1}$ and the l^{th} lag of shock MPS_t . I set $H = 24$ and $L = 12$. The regression is estimated, using robust standard errors, for each U.S. Dollar commodity pair.

As noted a SVAR framework is necessary for the decomposition. A regression of the exchange rate change on the predicted commodity price change generated by the monetary policy shock cannot recover the causal effect because the predicted commodity price change is itself a linear transformation of the shock. This makes the regressor perfectly collinear with the instrument. In such a setup, the regression mechanically attributes all variation in the exchange rate to the shock, leaving no independent variation in the commodity component that is not already contained in the shock. Attempting to estimate the commodity effect in this way therefore generates omitted variable bias: the exchange rate responds to multiple channels of the shock, but the regression forces the commodity component to proxy for all of them. At the same time, controlling directly for the shock is infeasible because perfect multicollinearity between the shock and its linear transformation makes the regression unidentified. A structural VAR treats both the exchange rates and commodity

prices as jointly endogenous.

5.4 Proxy SVAR and Decomposition

A proxy SVAR is a structural VAR in which the key shock is identified using an external instrument, most commonly a high-frequency shock, that is correlated with the true structural shock but not with other shocks in the system. A SVAR relies on restrictions such as short-run zero restrictions, long-run restrictions, or sign restrictions. In contrast, the proxy SVAR uses the external instrument to isolate exogenous variation in the shock of interest. The method follows Stock and Wansong (2018).

To identify monetary policy induced commodity price effects on the exchange rates, I use a proxy SVAR. I follow Miranda-Pinto et al. (2023) and use the following VAR:

$$A_0 Y_t = \sum_{i=1}^p A_i Y_{t-i} + B \varepsilon_t \quad (5.3)$$

The vector Y_t contains all variables of interest, A_i is the dynamic matrix, ε_t is a vector of zero mean white noise processes and B contains the coefficients of the effect of the structural shocks. It can be transformed into the following reduced form:

$$Y_t = \sum_{i=1}^p D_i Y_{t-i} + \mu_t \quad (5.4)$$

The vector μ contains the reduced form residuals of the form $\mu_t = A_0^{-1} B \varepsilon_t$ and $D_i = A_0^{-1} A_i$.

My specification considers the following other variables:

Variable	Description
MPS	Monetary Policy Shock
$\ln FX$	Log of nominal Exchange Rate in terms of 1 USD
$\ln CP_1$	Log Price of 1st most important Commodity Export
$\ln CP_2$	Log Price of 2nd most important Commodity Export
$\ln CP_3$	Log Price of 3rd most important Commodity Export

Table 5.1: Variables in the vector Y_t

Except the monetary policy shock, none of the variables is stationary, such that I will use the first difference. I use the Bauer and Swanson (2022) orthogonal monetary policy shock instrument to identify the structural monetary policy shock. As in standard IV settings, the shock must be relevant $Cov(\varepsilon_t^{MP}, z_t) \neq 0$. It can be used to identify the SVAR if the instrument is correlated with the shock of the monetary policy $E[\varepsilon_t^{MP}, z_t] \neq 0$ and is not correlated with other shocks $E[\varepsilon_t^{others}, z_t] = 0$.

With the estimated impact of monetary policy shocks on the macroeconomic variables of interest,

I compute the impulse response function following Miranda-Pinto et al. (2023). The contemporaneous response is

$$IR_0 = (B)_i \quad (5.5)$$

which gives the instantaneous effect of the structural shock on the variable i . The dynamic responses for subsequent horizons are obtained from

$$IR_t = D_i \cdot IR_{t-1}, \quad t = 1, 2, \dots, 24 \quad (5.6)$$

The final step is the decomposition of the impulse response function and also follows Miranda-Pinto et al. (2023). First, I estimate the proxy SVAR described above to obtain the baseline impulse responses of exchange rates to a monetary policy shock. To isolate the transmission through the commodity price channel, I then restrict the structural matrix by setting the elements corresponding to the exchange rate to commodity prices to zero. Recomputing the impulse responses with this restricted matrix produces a counterfactual in which commodity prices do not react to the shock. Comparing the unrestricted baseline with this counterfactual identifies the share of the exchange rate response that is attributable specifically to movements in commodity prices.

6 Results

In this section, I will provide the results from my local projection and proxy SVAR analysis. First, I will show the main results of the local projections on commodity prices. Second, I will show how the currencies of the commodity exporting countries react to a U.S. monetary policy shock. Third, I will show the proxy SVAR results to decompose the effect of the commodity price channel for those currencies that show significant reaction to the local projection.

6.1 Local Projection Effect of Monetary Policy Shocks

As Miranda-Pinto et al. (2023), I first examined the response of the Federal Funds Rate and the Dollar Broad Index (DXY) and additionally the VIX Index as a measure for uncertainty. Figure 6.1 shows the impulse response function of a 10 basis point U.S. monetary policy shock on the exchange rate. The exchange rate is constructed out of a basket of foreign currencies, an increase in the index marks an appreciation of the Dollar. On impact the index increases by 0.32%, with a peak response of 0.38% two days after the shock. The magnitude of this effect is economically meaningful. However, the effect mostly vanishes after seven days. The reported confidence intervals are the 68% (inner) and 90% (outer), respectively.

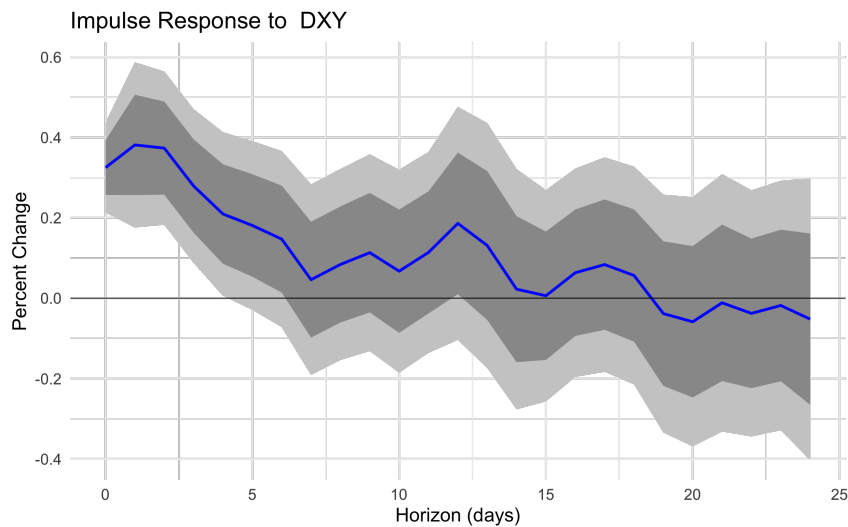


Figure 6.1: Dollar Index

The impulse responses for the Federal Funds Target Range (Lower Bound) and for the Effective Federal Funds Rate (EFFR) are reported in Figures 6.2 and 6.3. The target rate increases by approximately 12 basis points on impact and remains elevated throughout the month. The EFFR also increases by about that magnitude, although its response occurs with a delay of one day.

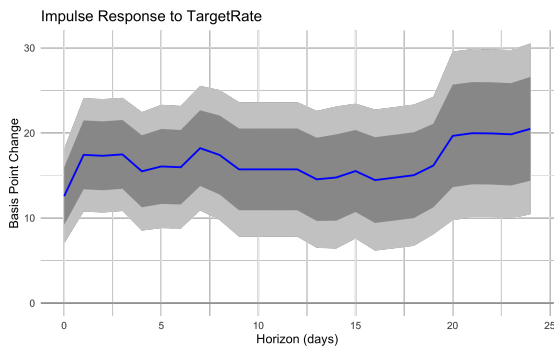


Figure 6.2: Target Rate (Lower Band)

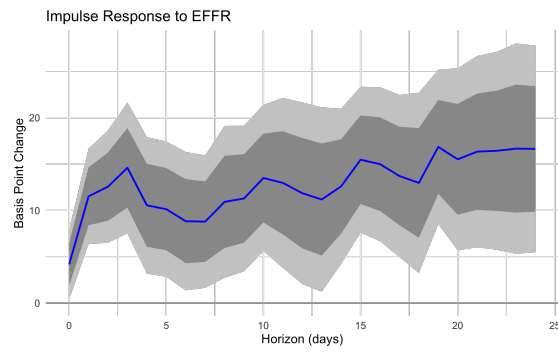


Figure 6.3: Effective Federal Funds Rate

Figure 6.4 illustrates the response of the VIX Index to a 10 basis point monetary policy tightening. The shock induces an immediate increase of roughly 3% in the VIX, and this elevated level persists throughout the month. This pattern indicates a sustained increase in perceived short-term risk in the equity-market. The persistence allows the interpretation that tighter policy compresses financial conditions not only through higher interest rates differentials but also through heightened uncertainty, that can be interfered from expected equity volatility. The magnitude of the response aligns with existing evidence that volatility measures react more strongly and more persistently than the price of the equity itself, reflecting the forward looking nature of the implied risk of the option.

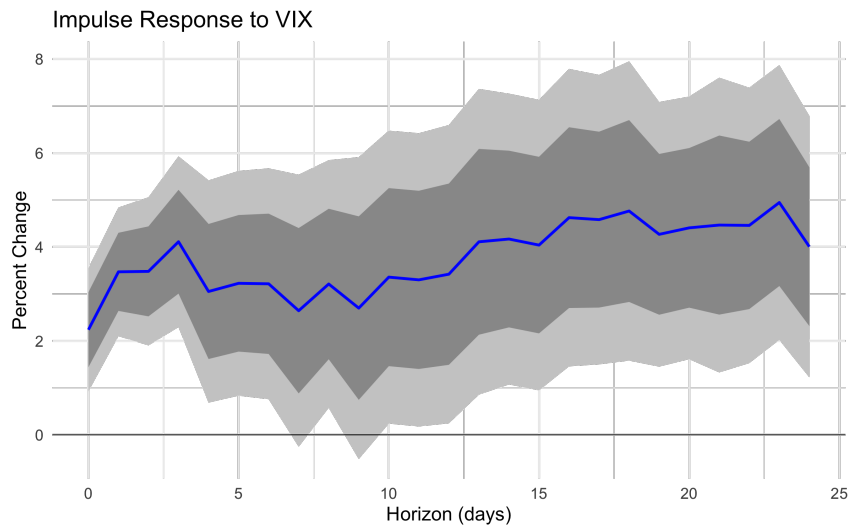


Figure 6.4: VIX Index

6.2 Local Projection Effect of Monetary Policy Shocks on Commodity Prices

Figure 6.5 reports the peak response of the commodity price sub-indices to a 10 basis point U.S. monetary policy shock. The plotted coefficient, $\theta_{i,h}$, captures the cumulative percent change from $t - 1$ to $t + h$. The numbers displayed above or below each confidence interval indicate the horizon h , within the 24 day window, at which the peak response occurs, alongside the plotted 90% confidence interval. The estimated effects exceed the size of the underlying policy shock, consistent with the amplification mechanisms discussed earlier. The overall commodity index decreases cumulatively by 3.3% within 9 days. The largest and most persistent declines arise in the mining commodity indices, including "Base Metals" and "Metals", which decrease by almost 5% and "Precious Metals", which decline by 1.3%. The peak effects occur relatively late in the window, indicating that prices remain depressed throughout the 24 day horizon. Energy prices also exhibit sustained negative responses. In contrast, agricultural and food related indices show much weaker reactions, suggesting substantially lower sensitivity to monetary policy shocks. The full 24 day impulse response function for each sub-index is provided in the Appendix, as well as a robustness check with the monetary policy shocks from Jarociński and Karadi (2020).

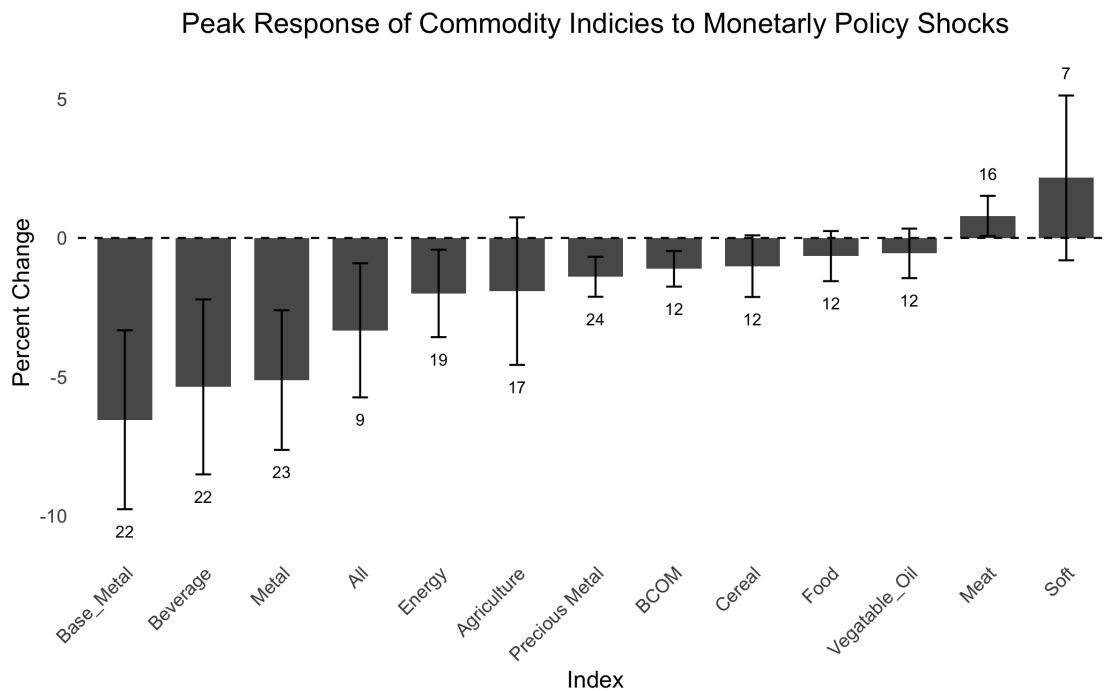


Figure 6.5: Commodity Indices

Figure 6.6 presents the peak response of the individual commodities to a 10 basis point monetary policy shock. At the individual level, 17 out of 40 commodities display a significant negative coefficient, with all of them being negative. Those that exhibit a positive point estimate are insignificant across the board. The division between commodities with pronounced negative reactions and those with muted responses closely mirrors the patterns observed in the sub-indices.

Strong and significant declines are concentrated in mined materials, whereas farmed commodities and some energy commodities generally exhibit weaker and often insignificant responses. The full 24 day impulse response functions for each commodity is provided in the Appendix.

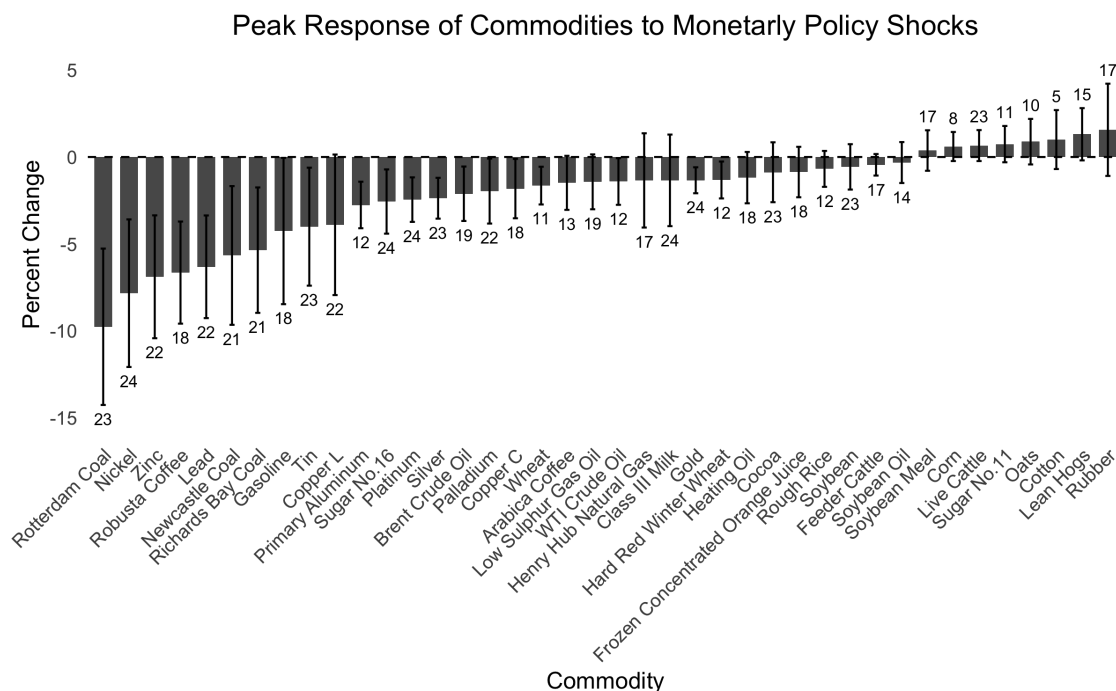


Figure 6.6: Individual Commodities

6.3 Local Projection Effect of Monetary Policy Shocks on Exchange Rates

Figure 6.7 shows the bilateral exchange rate responses of Latin American commodity exporting economies to a 10 basis point contractionary U.S. monetary policy shock, alongside the advanced commodity linked currencies AUD, NOK, and NZD. Because all exchange rates are expressed per U.S. Dollar, a positive coefficient denotes a depreciation of that currency and an appreciation of the Dollar. Consistent with the literature the developed country commodity exporters show a depreciation in their currency. Also consistent with the literature, no Latin American currency exhibits a significant appreciation after the shock, but the subset displaying a significant depreciation is also limited: only Chile (CLP), Colombia (COP), Brazil (BRL) show a statistically significant weakening.

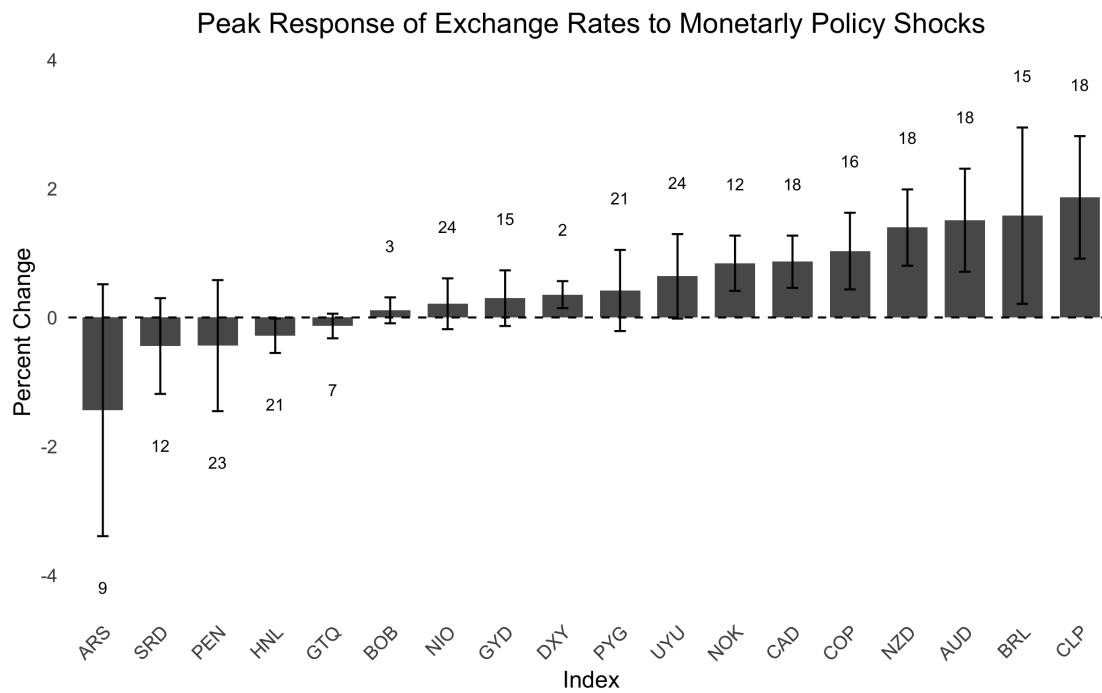


Figure 6.7: Exchange Rate

For the three Latin American currencies that show a significant depreciation the full impulse response functions are plotted below. The Chilean Peso depreciates by roughly 1.5% over 18 days. The impulse response function shows that the cumulative effect is significant and persistent for all periods. The Colombian Peso also exhibits a significant and persistent depreciation for all periods except the first. Its maximum depreciation is at 1%. The Brazilian Real's response is more volatile. Even though it also depreciates up to 1.5% within the 24 days window, it is not significant for all days. The impulse response function for all other currencies can be found in the Appendix.

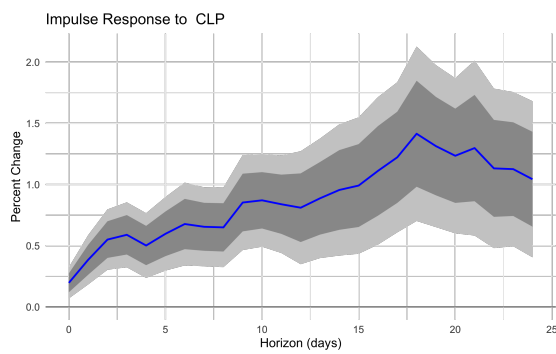


Figure 6.8: Exchange Rate Reaction Chile

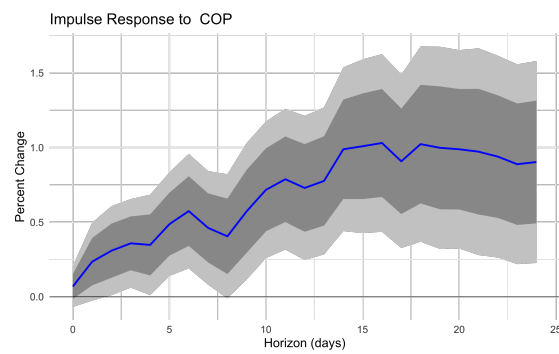


Figure 6.9: Exchange Rate Reaction Colombia

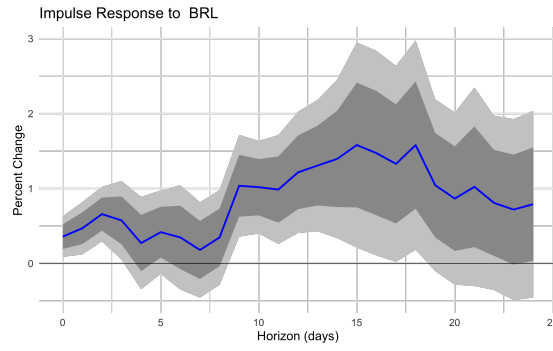


Figure 6.10: Exchange Rate Reaction Brazil

For the SVAR decomposition, we will thus focus only on these three currencies, as the other do not exhibit a significant response to the monetary policy shock that is necessary to identify the commodity transmission channel.

6.4 Proxy SVAR Commodity Price Channel

Building on the previous results, I estimate a proxy SVAR to isolate the commodity price component of exchange rate movements. In addition to the monetary policy shock, the specification incorporates the principal commodity exports of each economy. For Chile, these consist mainly of copper, copper ores, and fish. Consequently, the model includes copper prices from both major commodity exchanges. Fish products are excluded because there is no globally traded benchmark price. Figure 6.11 reports the day by day impulse responses (not the cumulative as in the previous section) following the shock, together with the associated 90 % confidence interval. The estimated response is again for a 10 basis point shock. The solid line displays the baseline response, while the dotted line shows the response when commodity price adjustments are muted. The solid line closely matches the impulse pattern obtained from the local projection estimates, which confirms the validity of the specification (Plagborg-Møller and Wolf, 2021). The dotted line remains, with only minor exceptions, within the 90 % confidence band, indicating that it is not statistically distinguishable from the baseline response. Cumulatively, the depreciation is slightly slower in the early days and, apart from day 5, remains below the cumulative response of the baseline specification. The peak response of the baseline model is at a depreciation of the Chilean Peso of roughly 1.25 %, while it peaks at roughly 0.75 % for the counterfactual model, that excludes commodity price movements.

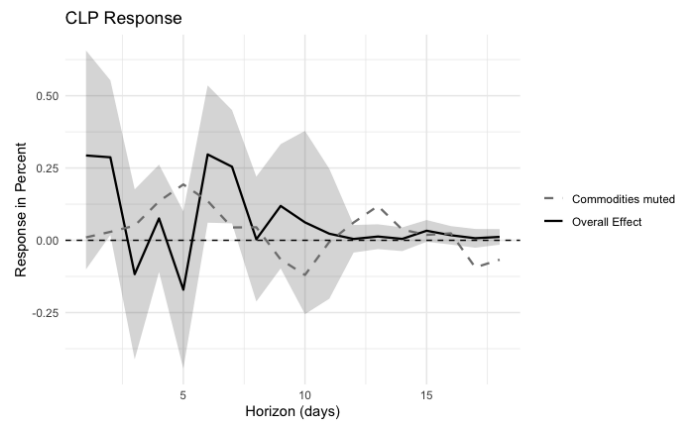


Figure 6.11: Individual Impulse Response CLP

Colombia's three primary commodity export goods are crude oil, coal, and coffee. The estimated day by day impulse response function is shown in Figure 6.12. The responses are statistically insignificant throughout the horizon. The dotted line fluctuates closely around the baseline specification and displays a pronounced negative outlier in the first two days, that would imply a temporary appreciation of the Colombian peso, met by a sharper depreciation in the following days. This yields the impression, that this mostly captures noise. The estimated path of the baseline model indicates a similar appreciation of the Colombian Peso than in the local projection model.

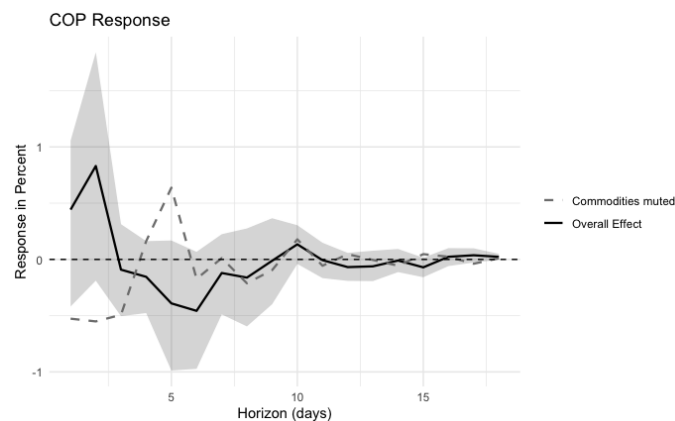


Figure 6.12: Individual Impulse Response COP

Brazil's primary export commodities are oil seeds, crude oil, and metal ores. The analysis therefore includes soybean prices to represent oil seeds and the Base Metal Index as a proxy for metal ores. The estimated day by day impulse response function is reported in Figure 6.13. The individual daily responses are uniformly insignificant, and the counterfactual responses that mute commodity price adjustments do not differ significantly from the baseline, albeit they are consistently lower. The cumulative exchange rate change peaks at roughly 0.8 % after eight days.

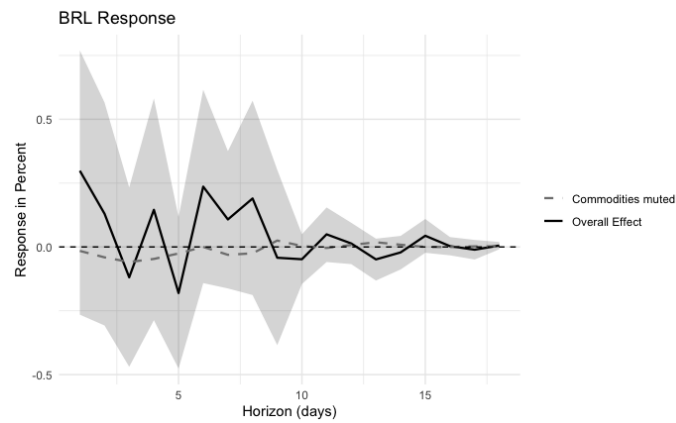


Figure 6.13: Individual Impulse Response BRL

The proxy SVAR results show that the commodity price channel plays almost no role in the short run exchange rate response to U.S. monetary tightening across Chile, Colombia, and Brazil. For Chile, commodity prices react strongly, yet the counterfactual exchange rate path, where commodity price adjustments are muted, remains within the confidence band of the baseline response but produces a noticeably smaller peak depreciation. For Colombia, the daily changes are already statistically insignificant, and the counterfactual model exhibits no meaningful deviation from the baseline, with short run fluctuations driven by noise rather than identifiable commodity effects. For Brazil, daily impulse responses are again insignificant, and show a substantially smaller magnitude. Across all three countries, the proxy SVAR provides no evidence that commodity price reactions significantly mediate the exchange rate response to U.S. monetary policy shocks.

7 Discussion

This section evaluates the empirical findings. I first compare the estimated commodity price responses with those documented by Miranda-Pinto et al. (2023). I then examine the exchange rate responses using the local projections followed by the proxy SVAR analysis. I briefly discuss the implication of my findings. Finally, I discuss the main limitations of the analysis.

7.1 Main Results

Commodity Reaction in Local Projection Setting

The results show great heterogeneity in the response of commodity prices to a contractionary U.S. monetary policy shock. Industrial materials and all kinds of metals react the strongest and negatively across the board. On the other side of the spectrum are all sorts of food and agricultural products. In light of the transmission mechanism presented by Miranda-Pinto et al. (2023), this is perfectly plausible.

First, the cost-of-carry channel reduces the price of storable goods. An increase in the interest rate increases the opportunity costs of holding a commodity. However, this is only relevant for commodities that one can actually store. So, it is relevant for storable goods such as metals and energy and is not relevant for non-storable goods such as meat and agriculture. Notably, the index Beverages consists of Coffee and Cocoa, which explains why one could count it toward the storable commodities. Interestingly, the Precious Metal index, mostly consisting of gold, also depreciates. That inhibits the higher opportunity costs of holding gold, the forgone interest, outweighs the heightened uncertainty that was shown in the VIX index. Second, the real-economy channel reduces the demand for commodities through lower consumption and investment. Again, the goods can be separated into those that show rather volatile demand, such as materials used for investments like construction and machinery, and those that have a rather stable demand, such as Food.

Beyond the cost-of-carry and real-economy mechanisms, several additional factors reinforce the heterogeneity in price responses. First, the market structure: commodities such as oil are heavily shaped by strategic supply decisions and oligopolistic market structures, which can dampen or delay the transmission of monetary policy even when storability would predict stronger price declines. In contrast, changes in agricultural product supply is driven primarily by weather.

By and large, my results resemble those of Miranda-Pinto et al.(2023), the ordering of the responses is almost identical, with industrial materials and metals showing the strongest declines, and agricultural commodities responding only weakly. The main deviation is that I find magnitudes almost twice as high for Metals. These differences do not imply any systematic reversal of their conclusions: there are no indices in my results that exhibit significant positive responses where

Miranda-Pinto et al. (2023) find negative ones, nor any cases where a negative response in their analysis turns positive in mine. The overall pattern, therefore, confirms the robustness of the underlying transmission mechanisms and forms a good basis for my further analysis.

Exchange Rate Reaction in Local Projection Setting

Despite the dominant role of the United States in global financial conditions, most bilateral exchange rates in the sample do not exhibit a statistically significant depreciation following a contractionary monetary policy shock. Only the Chilean Peso, the Colombian Peso, and, to a lesser extent, the Brazilian Real display the expected pattern of a persistent and economically meaningful weakening. This divergence shows that short term exchange rate responses might not be primarily driven by monetary policy shocks. Chile and Colombia stand out as economies with a relatively high dependence on commodities. Their commodity exports are 25% and 12% of GDP. Respectively, Brazil exhibits a weaker and more volatile response and still has a substantial dependence on commodities with 13% of GDP (UNCTAD, 2025). For the remaining currencies, the absence of significant responses underscores that commodity dependence alone does not guaranty a strong exchange rate reaction. Peru, for example, whose commodity exports also accumulate to 22% of its GDP, shows no such reaction. This already hints that the commodity price transmission channel might be small. The heterogeneity has direct implications for identifying the commodity price channel: only currencies that display a clear and persistent response to U.S. monetary policy provide usable variation for decomposing the transmission mechanism. The focus on Chile, Colombia, and Brazil therefore reflects not a deliberate choice but results from my empirical findings. The remaining currencies do not display the systematic comovement between monetary policy shocks and exchange rate responses that would be required for a valid proxy SVAR identification. In absence of a clear and statistically robust link between the external instrument and the commodity specific component, the proxy loses relevance for the structural equation it is intended to identify. Estimating such a model would attribute variation in exchange rates to a channel that is not empirically present.

Exchange Rate Decomposition

The proxy SVAR analysis is the main analysis on the transmission of U.S. monetary policy to exchange rates by explicitly separating the commodity price component. In contrast to the local projection results, which reveal clear exchange rate responses for Chile, Colombia, and Brazil, the proxy SVAR yields predominantly insignificant effects. For all three economies, the day by day impulse response functions display wide confidence intervals, muted systematic movements, and counterfactual paths that suppress commodity price adjustments, which remain statistically indistinguishable from the baseline specification. Chile shows the result that is most aligned with the hypothesis of the thesis. Although the response is not significantly different, the impulse response function of the counterfactual follows that of the baseline model that includes commodity responses. The commodity price channel accounts for 40% of the depreciation after 15 days.

Additionally, Chile exports mainly copper, which is, as discussed in the previous section, one of the commodities that show a strong response to monetary policy shocks. In contrast, 66% of Colombia's exports are energy commodities that show a weaker response to monetary policy shocks. Brazil's commodity exports consist of 44% of agricultural products that did not show a response at all. In addition, it appears implausible that without commodity reactions, these currencies would show an appreciation against the Dollar. The proxy SVAR framework has, therefore, mostly captured noise. The commodity prices seem to absorb substantial high frequency noise unrelated to the monetary policy shock, making the structural decomposition markedly more volatile.

Taken together, these findings show that while U.S. monetary policy clearly affects both commodity prices and exchange rates, but the overlap between the two channels is limited in the short run. Commodity exporting economies may experience meaningful total exchange rate adjustments, but only a minor, if at all, fraction is attributable to contemporaneous commodity price movements. This reinforces the view that external vulnerability for these economies is shaped predominantly by financial exposure.

7.2 Implications

The combined results imply that short-run external vulnerability in commodity exporting economies is driven mainly by the established financial channels (Rey, 2015) rather than commodity price channels. Although U.S. monetary tightening depresses industrial and energy commodity prices, these declines do not translate significantly into exchange rate movements. This has the following policy implication: Stabilizing the macroeconomic effects of external shocks cannot rely on shielding the economy from commodity price volatility alone. Instead, it depends on the exposure to global financial conditions. For empirical research, the results caution against interpreting commodity currency behavior as primarily terms-of-trade driven and underscore the importance of identification strategies capable of identifying other potential transmission channels.

7.3 Limitations

Empirical Limits

The empirical design is constrained by several structural limitations. First, the identification strategy relies on high frequency monetary policy shocks that are valid only around specific FOMC announcement windows. Although these shocks isolate exogenous policy surprises, they capture only a narrow subset of monetary policy information and may miss anticipatory channels from broader communication. Second, reliance on commodity futures prices introduces measurement noise that arises from the liquidity variation of the instrument itself. Third, the proxy SVAR relies on the orthogonality condition between the external instrument and structural shocks other than the monetary policy shock. Any residual correlation between the instrument and non-political disturbances, such as risk premium shocks or news releases that comove with US monetary

decisions, can bias the estimated impulse responses and distort the decomposition. Even though, the orthogonal monetary policy shock is design to abstract from those, this issue remains. Fourth, the empirical specification assumes stable transmission mechanisms throughout the sample period. However, all Latin American countries have experienced substantial growth during the examined period. Structural breaks linked to the zero lower bound, post great financial crisis unconventional monetary policy, or shifts in the importance of the commodity market for the country itself may generate parameter instability that the linear models do not accommodate.

Data

Data availability was not a central issue. The daily frequency restricts the set of controls that can be incorporated for robustness. However, the decision to work with daily futures prices and high-frequency monetary policy shocks implies that key macroeconomic variables, like inflation, output, industrial production, are not observed at a compatible frequency. Including them would have required a mixed frequency VAR. The restriction was accepted because, over such short horizons, these variables are not expected to move meaningfully and the orthogonal monetary policy shock is designed to control for these. In addition, it aligns with the information set relevant for exchange rate and commodity traders. The selection of the commodities and sample period (1990 to 2023) is restricted mainly by the availability of the monetary policy shocks.

Scope

During the course of the analysis, several scope limits were adopted. First, the study focuses exclusively on Latin American countries. This restriction was chosen because these economies were comparatively stable compared to other developing commodities dependent countries, particularly in Africa. In particular, they did not operate under currency pegs for most of the sample. Second, the analysis is restricted to the short run because extending the horizon would mix the monetary policy shock with anticipation effects and endogenous domestic responses. Short-run dynamics isolate the immediate transmission mechanism and avoids the structural breakdowns and long-run feedbacks that distort estimates over longer horizons. This restriction is consistent with Ferraro et al. (2015), who show that the linkages may be statistically relevant only over short horizons.

Internal and External Validity

Internal validity issues arise mainly from misspecification, omitted variable bias, or if the instrument was not exogenous. An issue is the general sensitivity of the results to VAR modeling choices such as controls, lag length, and forecast horizon, even when these follow established practice. External validity is limited because the findings cannot be generalized beyond the countries examined. Cross-country heterogeneity in trade structures, degrees of commodity dependence, and the distinction between storable and non-storable commodities imply that transmission mechanisms

differ materially across economies.

Further Research

The Federal Reserve remains by far the most influential central bank. Thus, the literature overwhelmingly focuses on U.S. monetary policy shocks. However, with increasing fragmentation and desires to move away from the Dollar, it would be interesting to examine whether regional monetary centers such as the European Central Bank or the Peoples Bank of China start to exert similar global influence. A further extension is to incorporate proxy for global trade conditions to test if there are other transmission channels apart from the financial ones. On such proxy could be container data or shipping-rate indices (like the Baltic Dry Index), to test whether logistics costs form an independent channel of monetary policy transmission. Lastly, in light of Itskhoki and Mukhin (2021), one could try to fit a theoretical model where commodity prices, as exchange rates, are, at least partially, driven by risk bearing financial intermediaries that react to changes in monetary policy conditions.

8 Conclusion

This thesis examined the extent to which exchange rate depreciations in commodity exporting economies following U.S. monetary policy shock are mediated through the commodity price channel rather than through broader financial channels. The analysis was motivated by the observation that commodity exporting economies remain among the most externally exposed worldwide, with their exchange rates systematically responding to global financial conditions and, in particular, to U.S. monetary policy. While prior research has established each leg of the transmission mechanism separately, there has been no integrated decomposition of these channels for economies whose export structure is highly concentrated in primary goods. This thesis addressed that gap by combining high-frequency monetary policy shocks with daily futures prices and exchange rate data for a set of Latin American commodity exporters.

The empirical results show that the effect of U.S. monetary tightening to exchange rates is not uniform across commodity exporting economies. Specifically, only three countries show a substantive short term reaction. The decomposition revealed no significant result in which the exchange rate depreciation can be partly explained by a commodity price channel. The analysis is subject to several limitations. The decomposition relies on high-frequency identification of U.S. monetary policy shocks, which, although well-established, captures only a subset of global financial disturbances that can influence commodity prices and exchange rates. In addition, the focus on daily futures prices restricts attention to commodities with highly liquid markets, potentially underestimating the role of export goods whose pricing is less transparent. Future research should extend the decomposition to a broader set of developing and least-developed economies and incorporate additional export and external balance dependencies beyond commodities.

In summary, the thesis demonstrates that the exchange rate effects of U.S. monetary tightening in commodity exporting economies cannot be attributed to a commodity price channel.

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9 Appendix

List of Commodities

Commodity Name	Exchange	Unit	Bloomberg Symbol	First Date	Last Date
Arabica coffee	ICE Futures US Softs	USD/lb.	KC1.COMDTY	31.12.2024	02.01.1990
Brent Crude Oil	ICE Futures Europe Commodities	USD/bbl.	CO1.COMDTY	31.12.2024	02.01.1990
Class III Milk	Chicago Mercantile Exchange	USD/cwt	DA1.COMDTY	31.12.2024	11.01.1996
Cocoa	ICE Futures US Softs	USD/MT	CC1.COMDTY	31.12.2024	02.01.1990
Copper	Commodity Exchange, Inc.	USD/lb.	HG1.COMDTY	31.12.2024	02.01.1990
Copper	London Metal Exchange	USD/MT	HG1.COMDTY	31.12.2024	02.01.1990
Corn	Chicago Board of Trade	USD/bu.	C1.COMDTY	31.12.2024	02.01.1990
Cotton	ICE Futures US Softs	USD/lb.	CT1.COMDTY	31.12.2024	02.01.1990
Feeder Cattle	Chicago Mercantile Exchange	USD/lb.	FC1.COMDTY	31.12.2024	02.01.1990
Frozen Concentrate Orange Juice	ICE Futures US Softs	USD/lb.	JO1.COMDTY	31.12.2024	02.01.1990
Gasoline	New York Mercantile Exchange	USD/gal.	XB1.COMDTY	31.12.2024	03.10.2005
Gold	Commodity Exchange, Inc.	USD/t oz.	GC1.COMDTY	31.12.2024	02.01.1990
Hard Red Winter Wheat	Chicago Board of Trade	USD/bu.	KW1.COMDTY	31.12.2024	02.01.1990
Heating Oil	New York Mercantile Exchange	USD/gal.	HO1.COMDTY	31.12.2024	02.01.1990
Henry Hub Natural Gas	New York Mercantile Exchange	USD/MMBtu	NG1.COMDTY	31.12.2024	03.04.1990
Lead	London Metal Exchange	USD/MT	LL1.COMDTY	31.12.2024	23.07.1997
Lean Hogs	Chicago Mercantile Exchange	USD/lb.	LH1.COMDTY	31.12.2024	02.01.1990
Live Cattle	Chicago Mercantile Exchange	USD/lb.	LC1.COMDTY	31.12.2024	02.01.1990
Low Sulphur Gas Oil	ICE Futures Europe Commodities	USD/MT	QS1.COMDTY	31.12.2024	02.01.1990
Newcastle Coal	ICE Futures Europe Commodities	USD/MT	XW1.COMDTY	31.12.2024	05.12.2008
Nickel	London Metal Exchange	USD/MT	LN1.COMDTY	31.12.2024	23.07.1997
Oats	Chicago Board of Trade	USD/bu.	O1.COMDTY	31.12.2024	02.01.1990
Palladium	New York Mercantile Exchange	USD/t oz.	PA1.COMDTY	31.12.2024	02.01.1990
Platinum	New York Mercantile Exchange	USD/t oz.	PL1.COMDTY	31.12.2024	02.01.1990
Rubber	Tokyo	USD/kg	JN1.COMDTY	30.12.2024	04.01.1990
Richards Bay Coal	ICE Futures Europe Commodities	USD/MT	XO1.COMDTY	31.12.2024	17.07.2006
Robusta Coffee	ICE Futures Europe Commodities	USD/MT	DF1.COMDTY	31.12.2024	14.01.2008
Rotterdam Coal	ICE Futures Europe Commodities	USD/MT	XA1.COMDTY	31.12.2024	17.07.2006
Rough Rice	Chicago Board of Trade	USD/cwt	RR1.COMDTY	31.12.2024	02.01.1990
Primary Aluminum	London Metal Exchange	USD/MT	LA1.COMDTY	31.12.2024	23.07.1997
Silver	Commodity Exchange, Inc.	USD/t oz.	SI1.COMDTY	31.12.2024	02.01.1990
Soybean	Chicago Board of Trade	USD/bu.	S1.COMDTY	31.12.2024	02.01.1990
Soybean Meal	Chicago Board of Trade	USD/T.	SM1.COMDTY	31.12.2024	02.01.1990
Soybean Oil	Chicago Board of Trade	USD/lb.	BO1.COMDTY	31.12.2024	02.01.1990
Sugar No. 11	ICE Futures US Softs	USD/lb.	SB1.COMDTY	31.12.2024	02.01.1990
Sugar No. 16	ICE Futures US Softs	USD/lb.	SF1.COMDTY	31.12.2024	26.09.2008
Tin	London Metal Exchange	USD/MT	LT1.COMDTY	31.12.2024	23.07.1997
Wheat	Chicago Board of Trade	USD/bu.	W1.COMDTY	31.12.2024	02.01.1990
WTI Crude Oil	New York Mercantile Exchange	USD/bbl.	CL1.COMDTY	31.12.2024	02.01.1990
Zinc	London Metal Exchange	USD/MT	LX1.COMDTY	31.12.2024	23.07.1997

Commodity Indices

Commodity	All	Agriculture	Energy	Metal	Food	Base Metal	Beverage	Precious Metal	Soft	Cereal	Meat	Vegatable Oil
Aluminum	0.031			0.089		0.239						
Beef	0.04	0.144			0.182						0.576	
Brent Crude	0.184		0.5									
Cocoa	0.012	0.045					0.461					
Coffee Arabica	0.014	0.052					0.539					
Copper	0.065			0.184		0.496						
Corn	0.021	0.076			0.096					0.348		
Cotton	0.016	0.057							0.517			
Gold	0.197			0.554				0.879				
Lead	0.007			0.02		0.053						
Nickel	0.013			0.037		0.101						
Oats	0.001	0.004			0.005					0.017		
Orange	0.021	0.075			0.095							
Palladium	0.006			0.016				0.026				
Platinum	0.008			0.024				0.038				
Rice	0.012	0.042			0.053					0.191		
Rubber	0.015	0.054							0.483			
Silver	0.013			0.036				0.057				
Soybeans	0.036	0.13			0.164							0.858
Soybeans Oil	0.006	0.021			0.027							0.142
Sugar No. 11	0.027	0.097			0.122							
Swine	0.029	0.106			0.134						0.424	
Tin	0.003			0.009		0.024						
Wheat	0.027	0.097			0.123					0.444		
WTI Crude	0.184		0.5									
Zinc	0.011			0.032		0.086						

Currencies

Country	Currency	Reuters Currency Code	First Date	Last Date
Argentina	Peso	ARS	15.01.91	31.12.24
Australia	Australian Dollar	AUD	19.11.90	31.12.24
Bolivia	Boliviano	BOB	02.01.95	31.12.24
Brazil	Real	BRL	07.09.94	31.12.24
Canada	Canadian Dollar	CAD	32874	31.12.24
Chile	Peso	CLP	02.01.02	31.12.24
Colombia	Peso	COP	01.10.98	31.12.24
Guatemala	Quetzal	GTQ	02.01.90	31.12.24
Guyana	Guyana Dollar	GYD	04.01.99	31.12.24
Honduras	Lempira	HNL	02.01.90	31.12.24
Nicaragua	Córdoba	NIO	07.09.94	31.12.24
Norway	Norwegian Krone	NOK	24.11.93	31.12.24
New Zealand	New Zealand Dollar	NZD	02.01.90	31.12.24
Peru	Sol	PEN	02.01.90	31.12.24
Paraguay	Guaraní	PYG	07.09.94	31.12.24
Suriname	Surinamese Dollar	SRD	24.11.94	31.12.24
Uruguay	Uruguayan Peso	UYU	24.08.93	31.12.24
Dollar Index	Dollar Index	DXY	01.01.90	31.12.24

Robustness Check Exchange Rates

Using Jarocinski and Karadi Monetary Policy Shocks

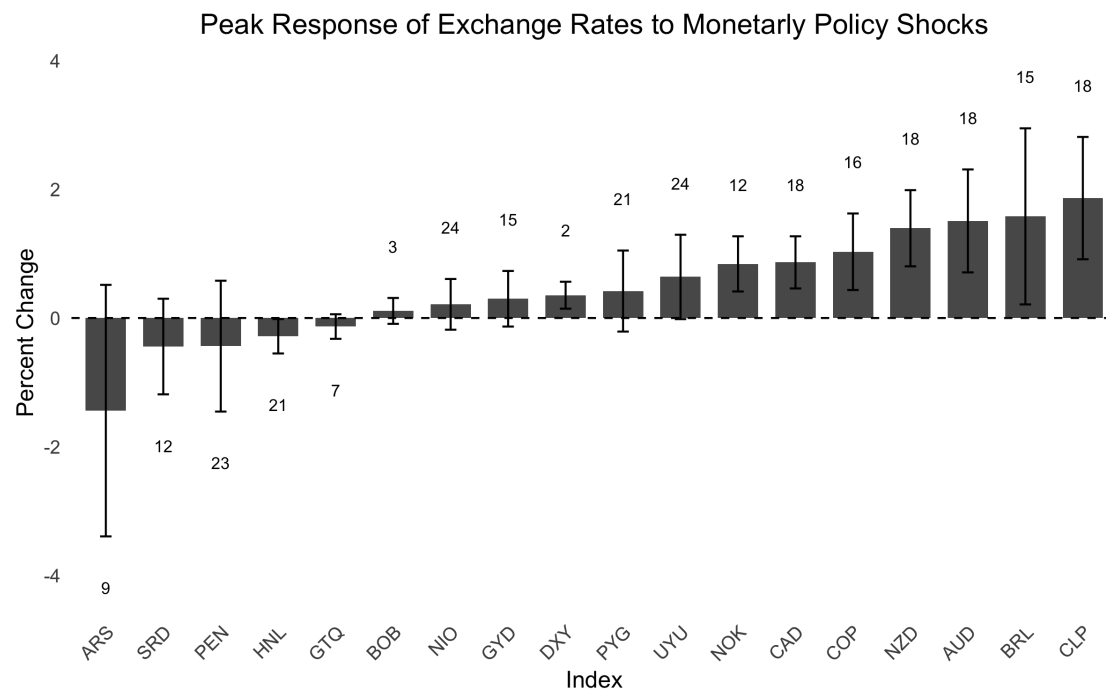


Figure 9.1: Commodity Index

Robustness Check Commodity Prices

Using Jarocinski and Karadi Monetary Policy Shocks

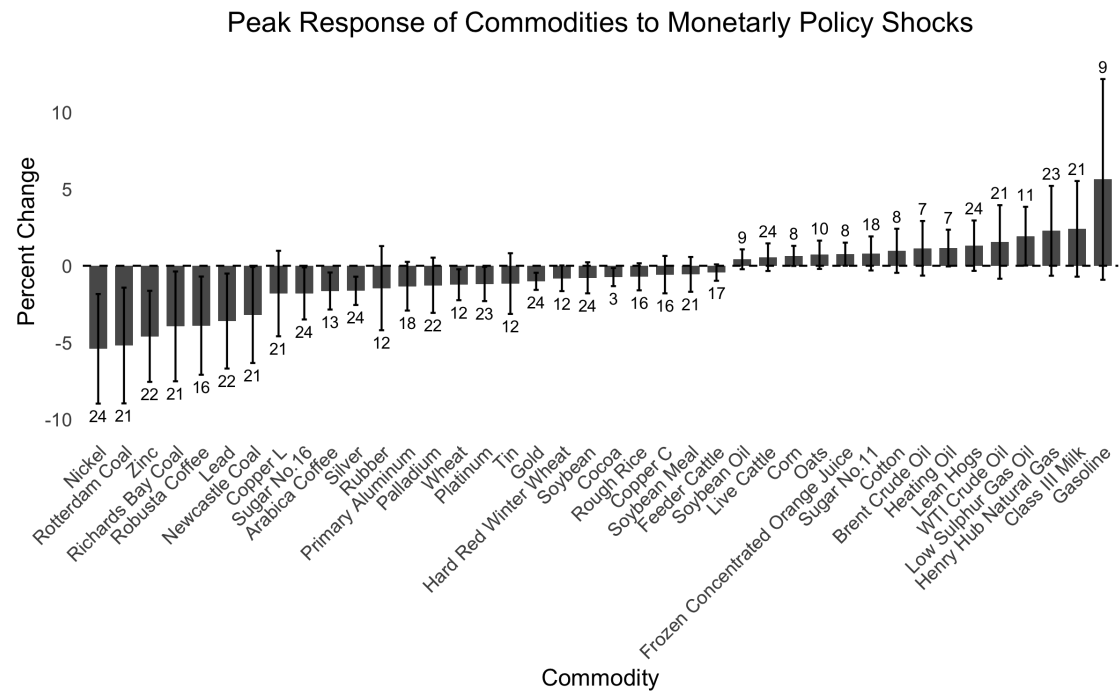


Figure 9.2: Commodity Index

Jarocinski and Karadi

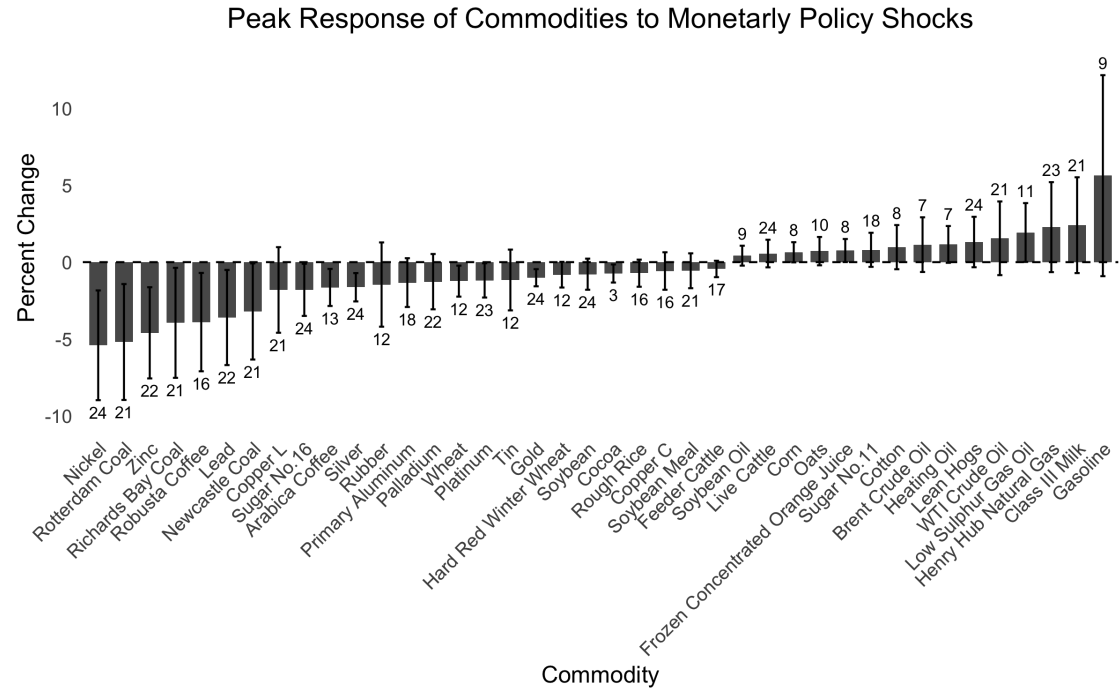


Figure 9.3: Individual Commodities

Individual Local Projection Results: Exchange Rates

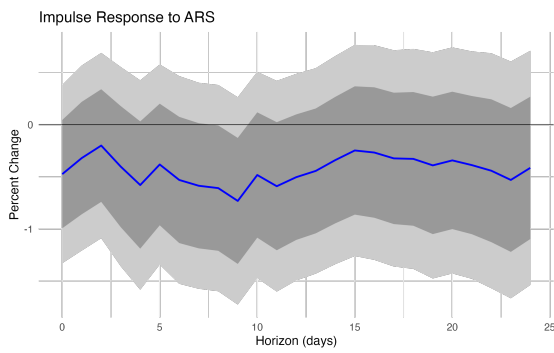


Figure 9.4: Exchange-rate reaction: ARS (Argentina)

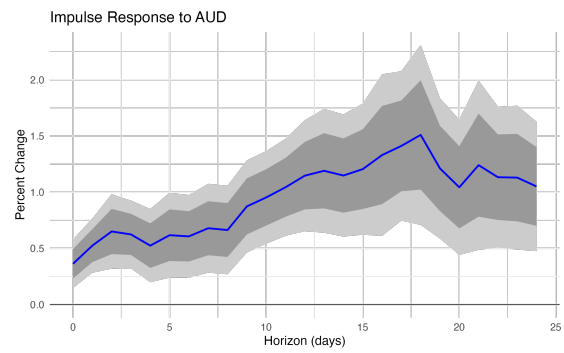


Figure 9.5: Exchange-rate reaction: AUD (Australia)

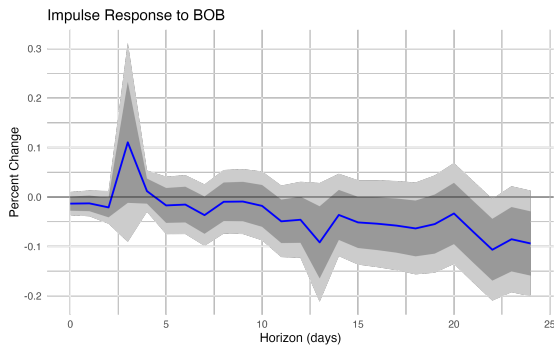


Figure 9.6: Exchange-rate reaction: BOB (Bolivia)

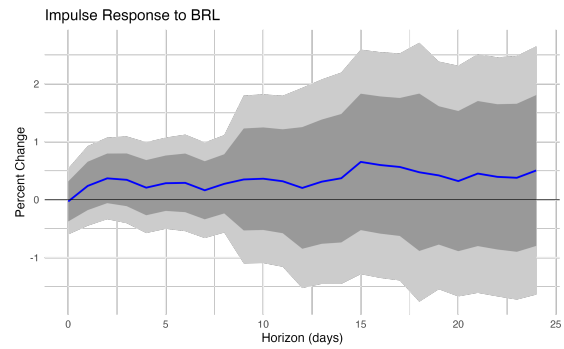


Figure 9.7: Exchange-rate reaction: BRL (Brazil)

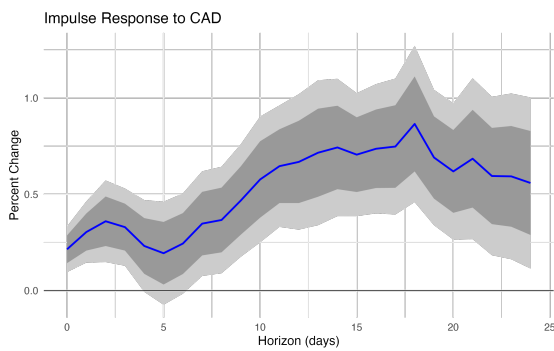


Figure 9.8: Exchange-rate reaction: CAD (Canada)

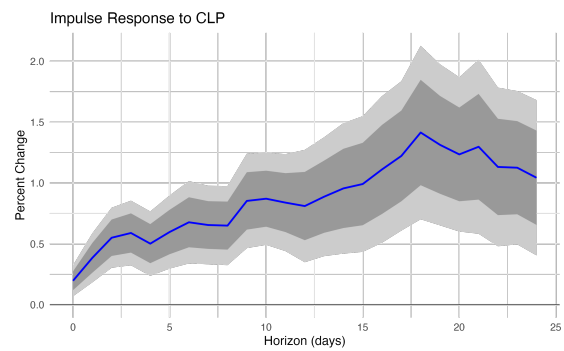


Figure 9.9: Exchange-rate reaction: CLP (Chile)

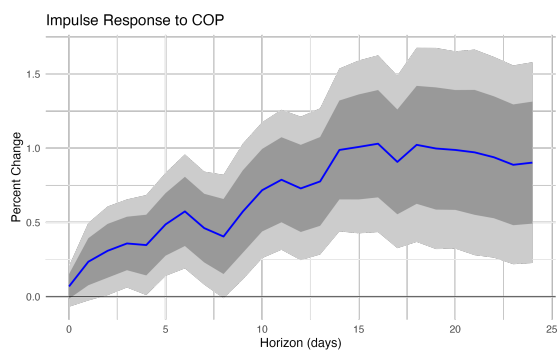


Figure 9.10: Exchange-rate reaction: COP (Colombia)

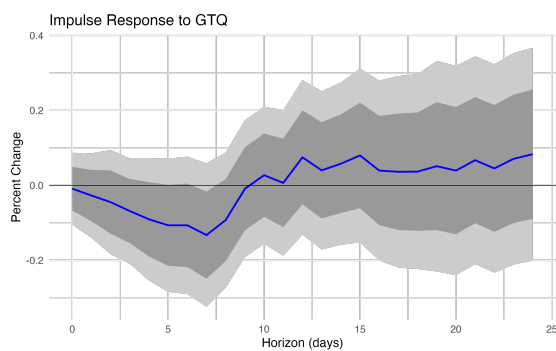


Figure 9.11: Exchange-rate reaction: GTQ (Guatemala)

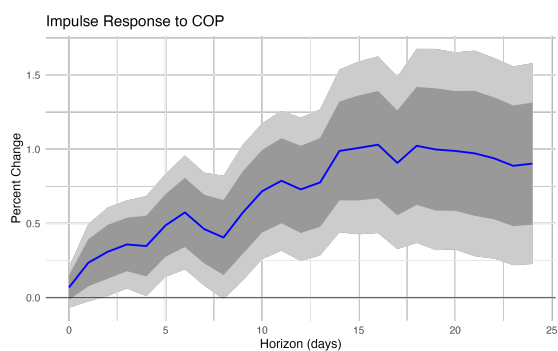


Figure 9.12: Exchange-rate reaction: COP (Colombia)

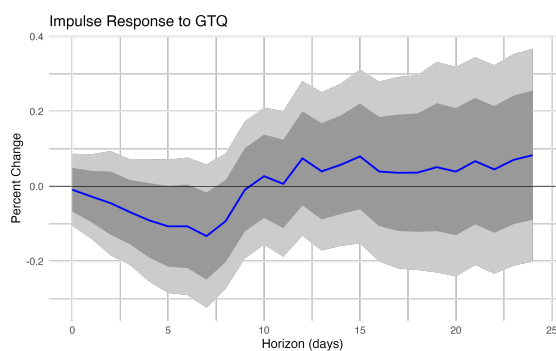


Figure 9.13: Exchange-rate reaction: GTQ (Guatemala)

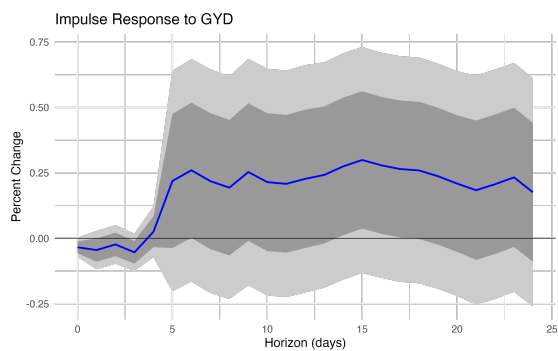


Figure 9.14: Exchange-rate reaction: CYD (Guyana)

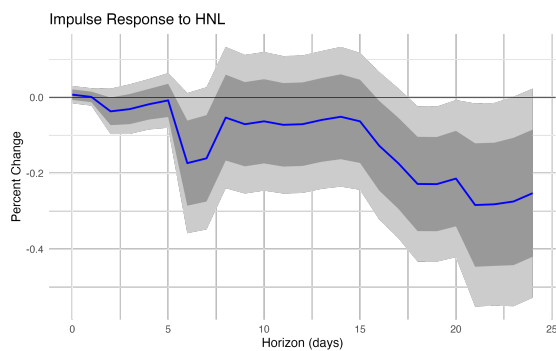


Figure 9.15: Exchange-rate reaction: HNL (Honduras)

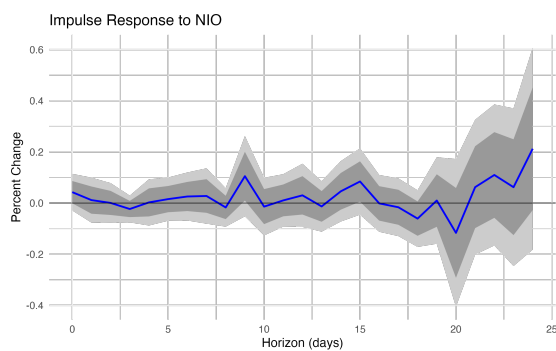


Figure 9.16: Exchange-rate reaction: NIO (Nicaragua)

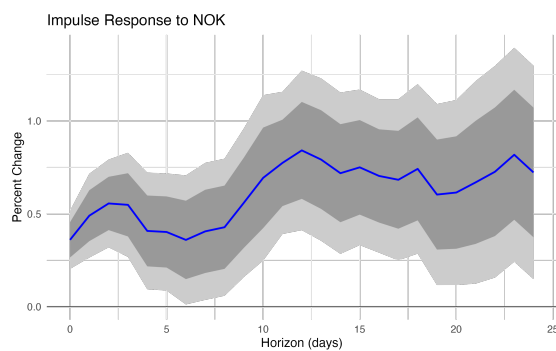


Figure 9.17: Exchange-rate reaction: NOK (Norway)

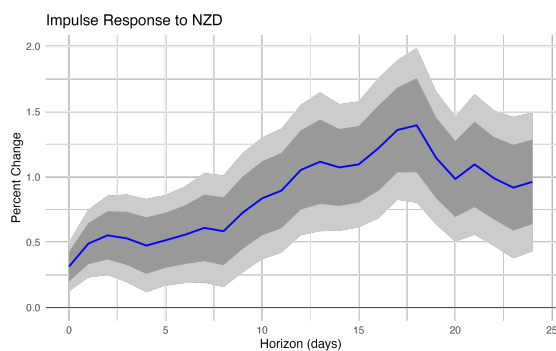


Figure 9.18: Exchange-rate reaction: NZD (New Zealand)

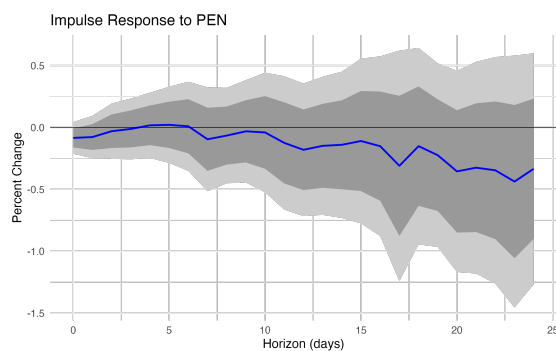


Figure 9.19: Exchange-rate reaction: PEN (Peru)

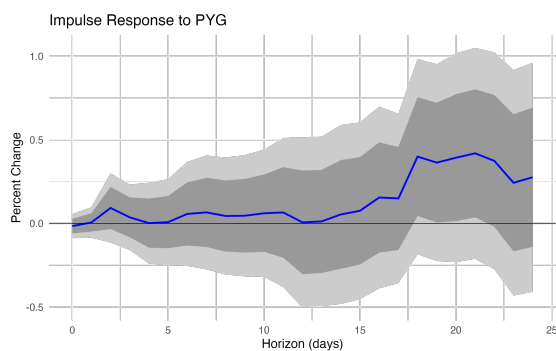


Figure 9.20: Exchange-rate reaction: PYD (Paraguay)

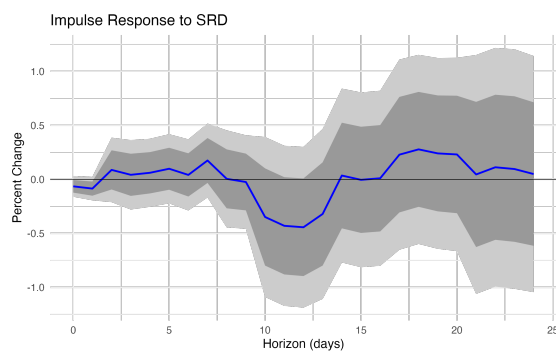


Figure 9.21: Exchange-rate reaction: SRD (Suriname)

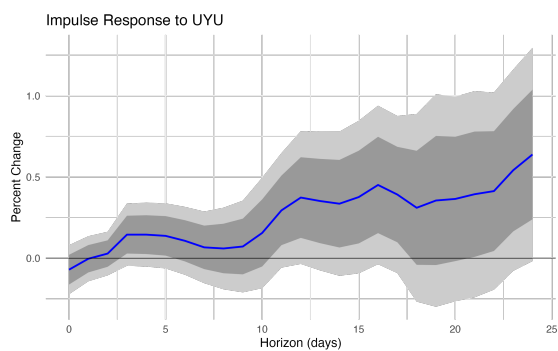


Figure 9.22: Exchange-rate reaction: UYU (Uruguay)

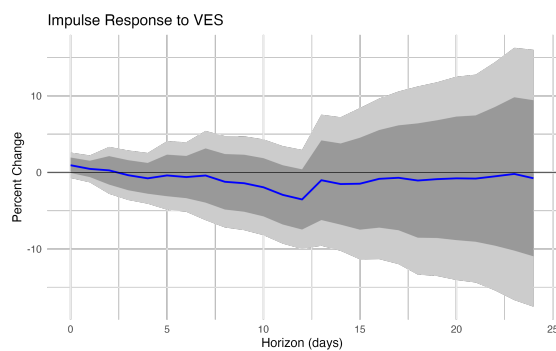


Figure 9.23: Exchange-rate reaction: VES (Venezuela)

Results: Commodity Prices

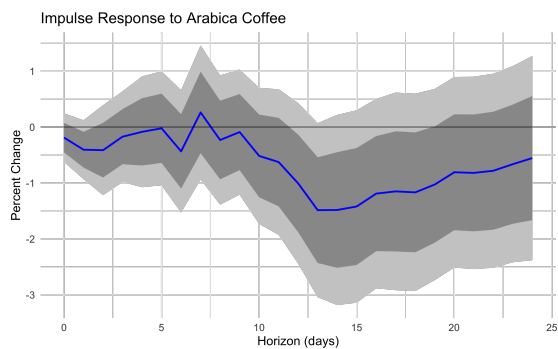


Figure 9.24: Commodity-price reaction: Arabica Coffee

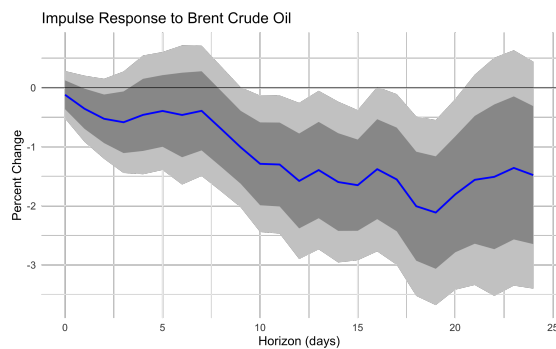


Figure 9.25: Commodity-price reaction: Brent Crude Oil

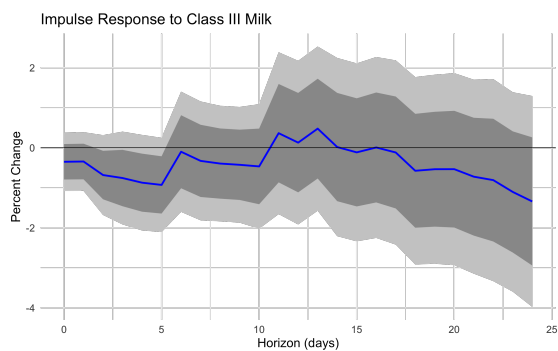


Figure 9.26: Commodity-price reaction: Class III Milk

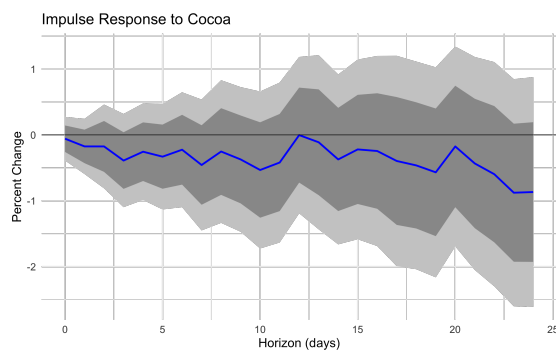


Figure 9.27: Commodity-price reaction: Cocoa

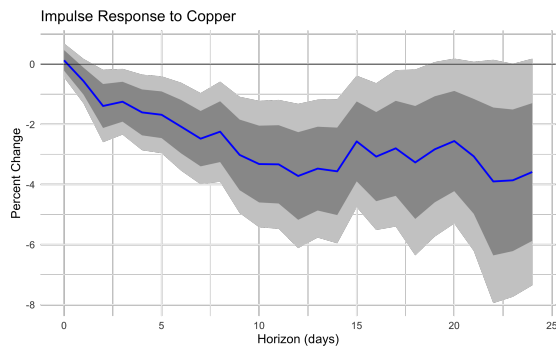


Figure 9.28: Commodity-price reaction: Copper

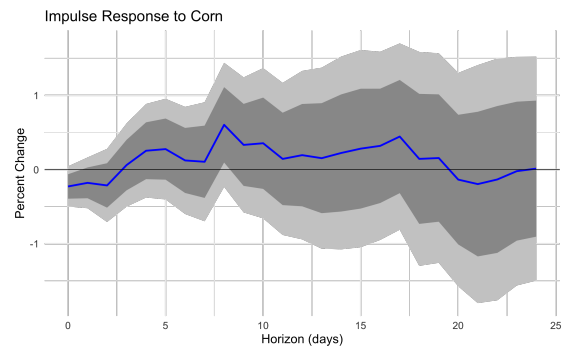


Figure 9.29: Commodity-price reaction: Corn

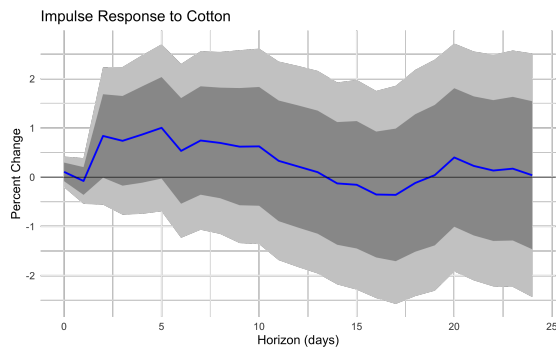


Figure 9.30: Commodity-price reaction: Cotton

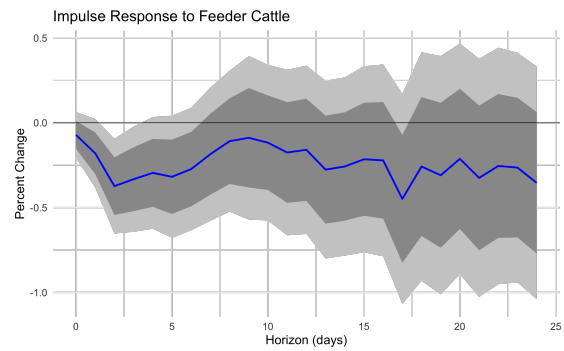


Figure 9.31: Commodity-price reaction: Feeder Cattle

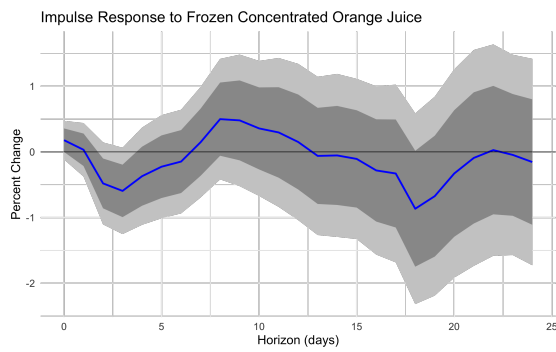


Figure 9.32: Commodity-price reaction: Frozen Concentrated Orange Juice

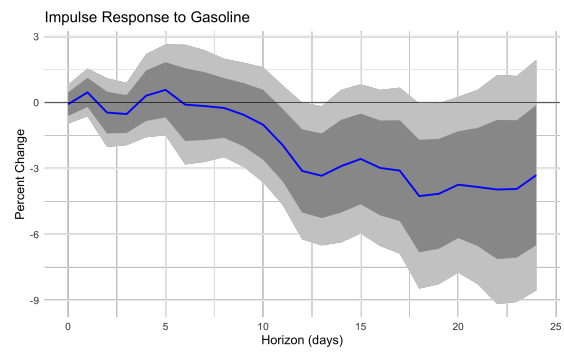


Figure 9.33: Commodity-price reaction: Gasoline

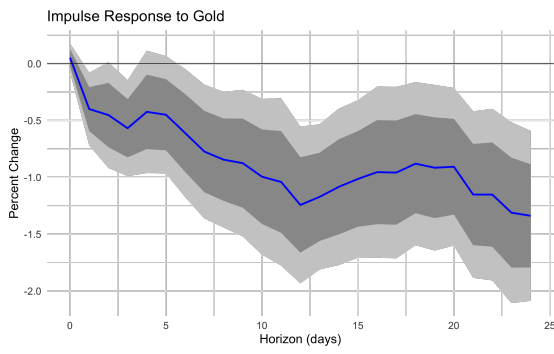


Figure 9.34: Commodity-price reaction: Gold

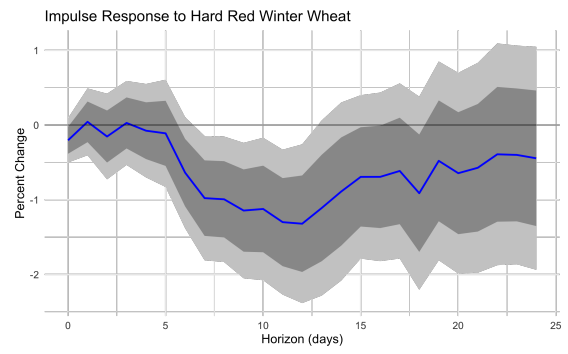


Figure 9.35: Commodity-price reaction: Hard Red Winter Wheat

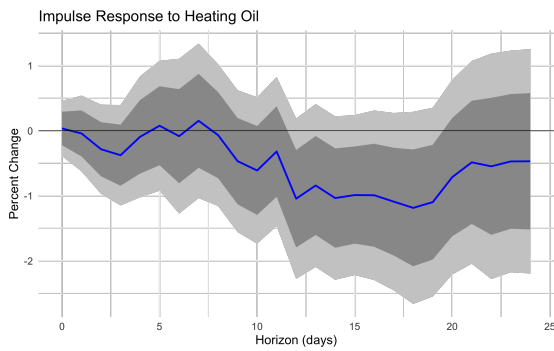


Figure 9.36: Commodity-price reaction: Heating Oil

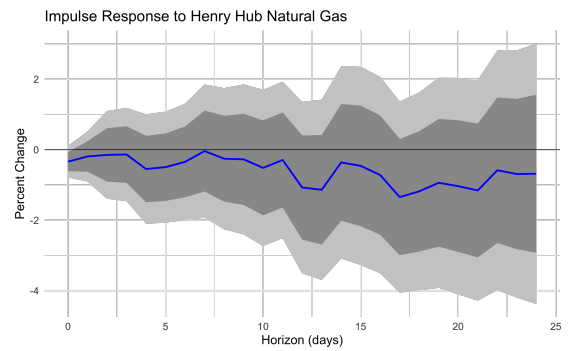


Figure 9.37: Commodity-price reaction: Henry Hub Natural Gas

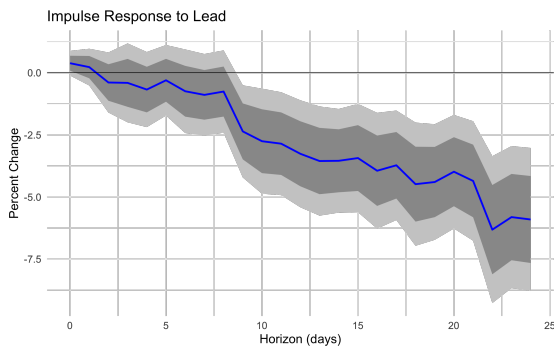


Figure 9.38: Commodity-price reaction: Lead

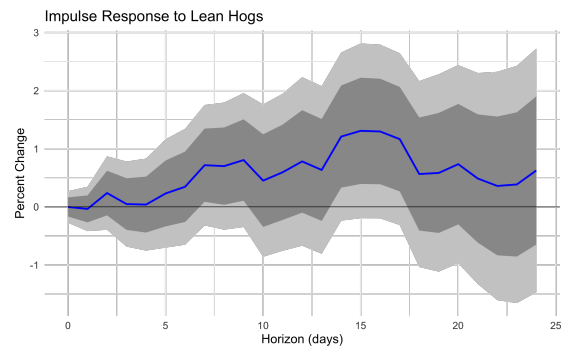


Figure 9.39: Commodity-price reaction: Lean Hogs

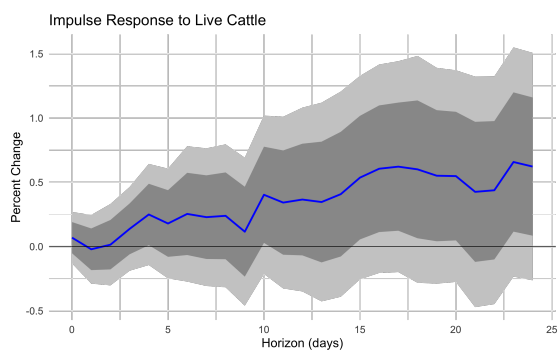


Figure 9.40: Commodity-price reaction: Live Cattle

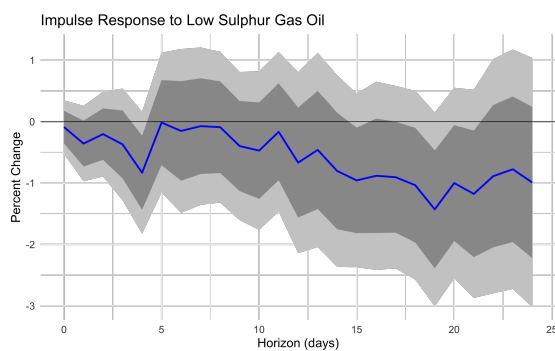


Figure 9.41: Commodity-price reaction: Low Sulphur Gas Oil

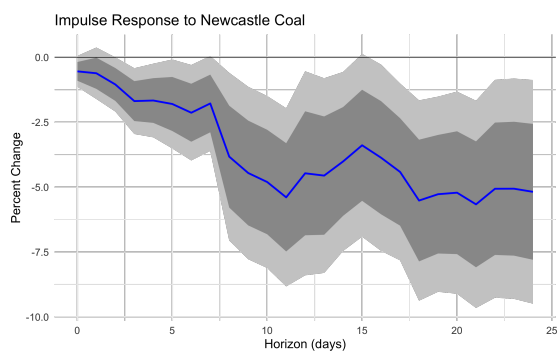


Figure 9.42: Commodity-price reaction: Newcastle Coal

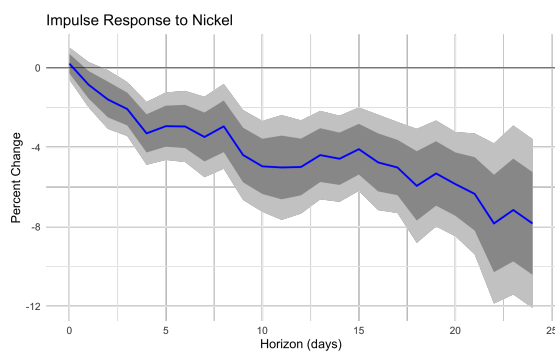


Figure 9.43: Commodity-price reaction: Nickel

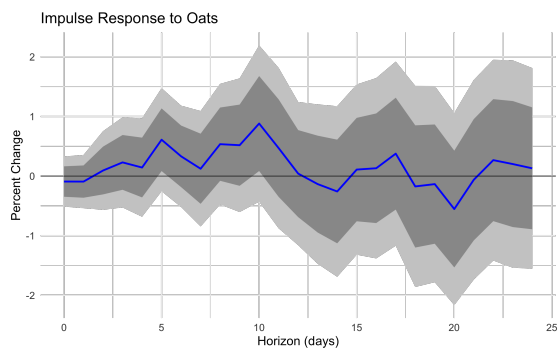


Figure 9.44: Commodity-price reaction: Oats

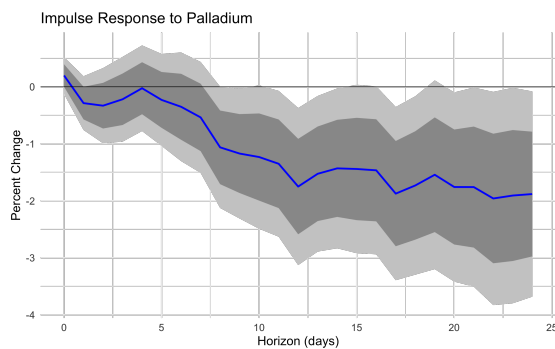


Figure 9.45: Commodity-price reaction: Palladium

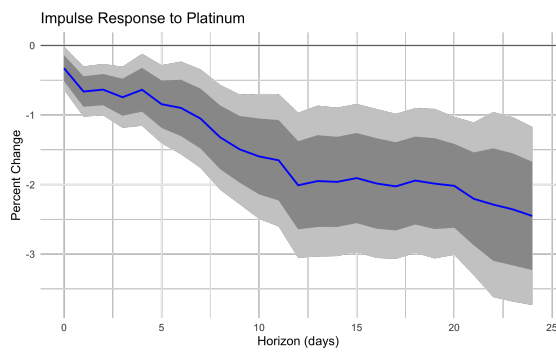


Figure 9.46: Commodity-price reaction: Platinum

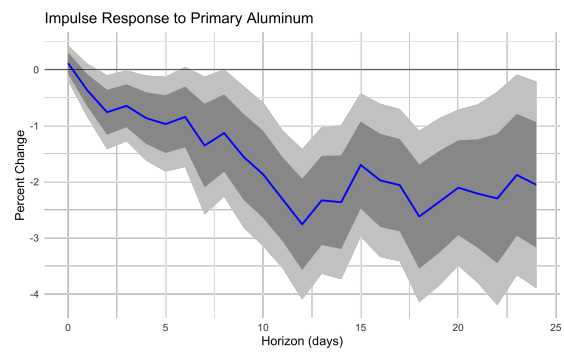


Figure 9.47: Commodity-price reaction: Primary Aluminum

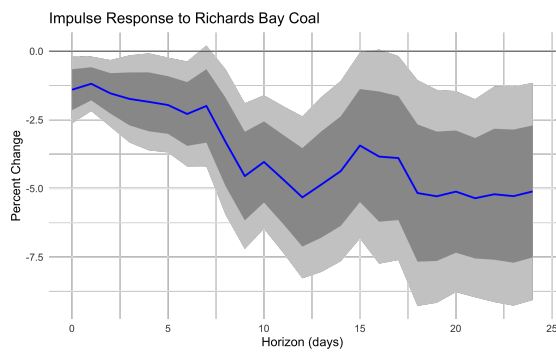


Figure 9.48: Commodity-price reaction: Richards Bay Coal

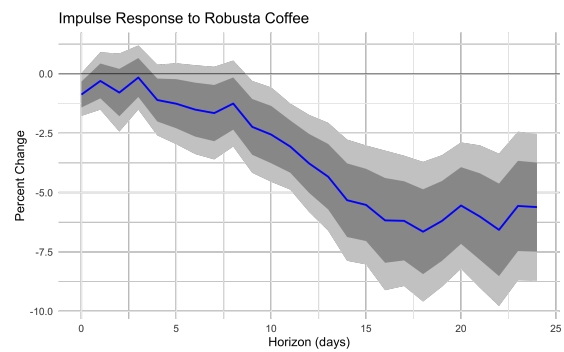


Figure 9.49: Commodity-price reaction: Robusta Coffee

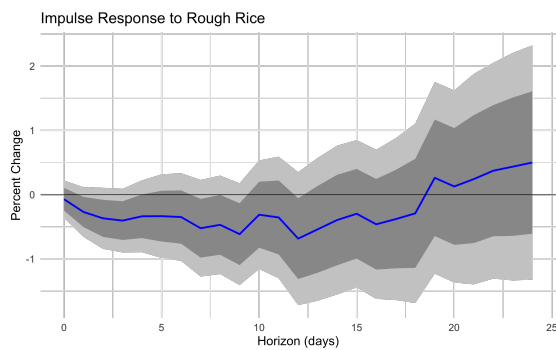


Figure 9.50: Commodity-price reaction: Rough Rice

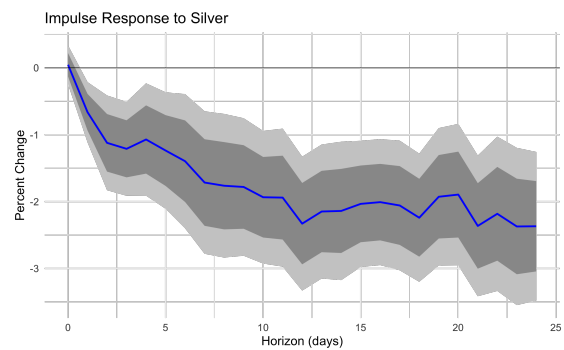


Figure 9.51: Commodity-price reaction: Silver

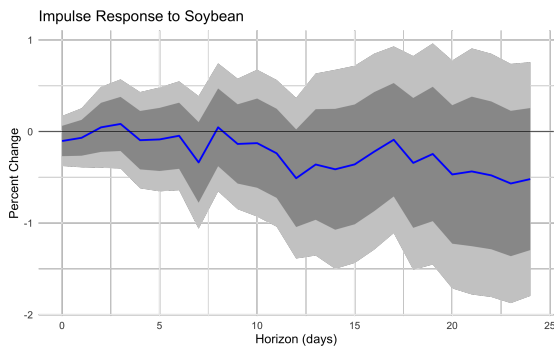


Figure 9.52: Commodity-price reaction: Soybean

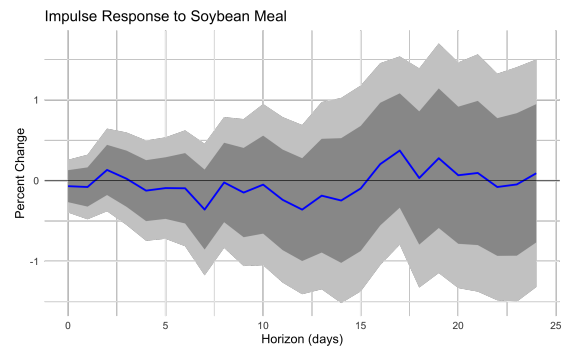


Figure 9.53: Commodity-price reaction: Soybean Meal

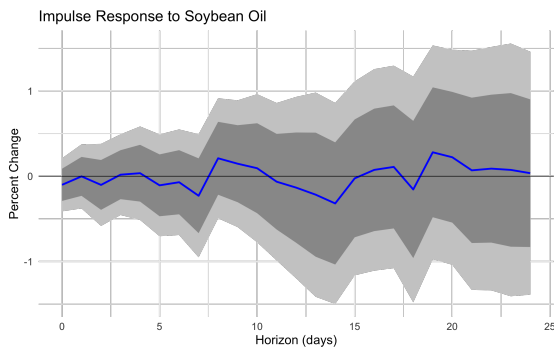


Figure 9.54: Commodity-price reaction: Soybean Oil

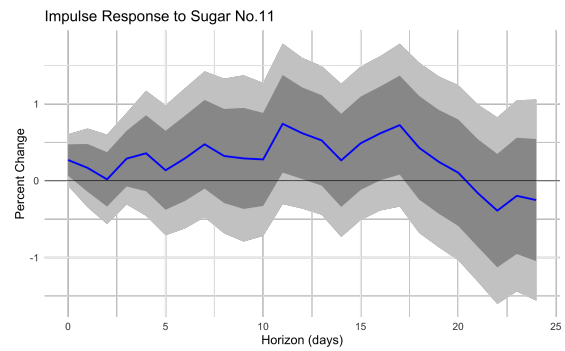


Figure 9.55: Commodity-price reaction: Sugar No.11

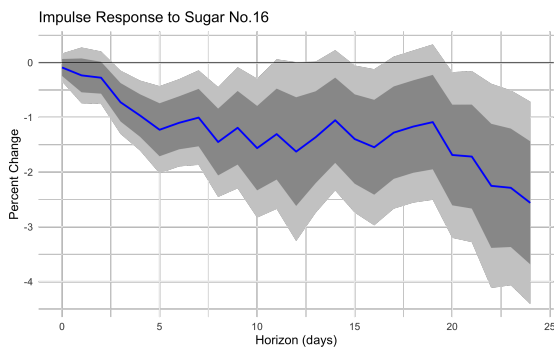


Figure 9.56: Commodity-price reaction: Sugar No.16

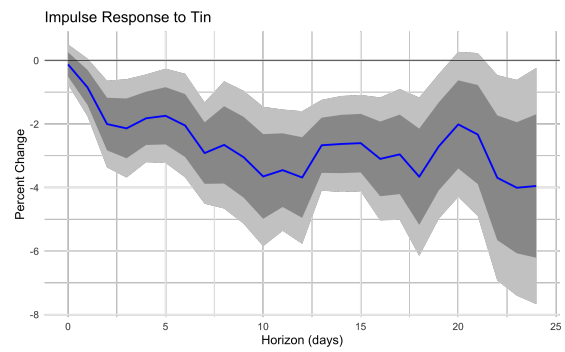


Figure 9.57: Commodity-price reaction: Tin

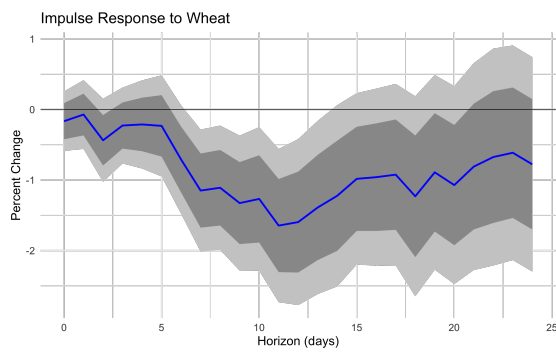


Figure 9.58: Commodity-price reaction: Wheat

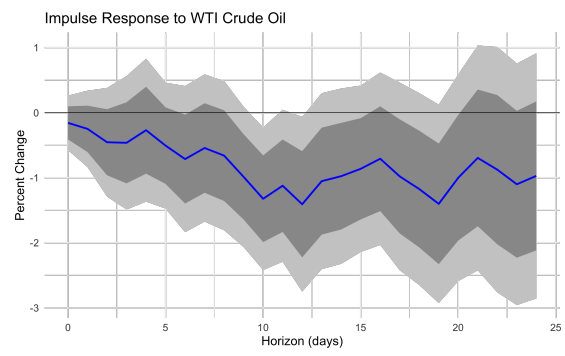


Figure 9.59: Commodity-price reaction: WTI Crude Oil

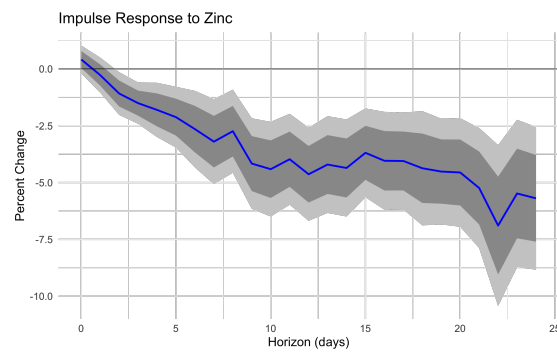


Figure 9.60: Commodity-price reaction: Zinc