GOVERNMENT-SOURCED CATEGORICAL ECONOMIC POLICY UNCERTAINTY

Khanh Hoang*, Lincoln University (khanh.hoang@lincoln.ac.nz)

Linh Pham, Lake Forest College (lpham@lakeforest.edu)

Vu Trinh, Newcastle University (vu.trinh@newcastle.ac.uk)

Thanh Ngo, Massey University (t.ngo@massey.ac.nz)

Thuy Dao, IPAG Business School (thuy.dao@ipag.fr)

Hung Do, Massey University (H.Do@massey.ac.nz)

Hieu Doan, Saigon Securities Corporation (doanhieuneu@gmail.com)

An Duong, Ho Chi Minh University of Banking (andtt@hub.edu.vn)

Oanh Ha, National Economics University (oanhhk@neu.edu.vn)

Nhan Huynh, Griffith University (davidhuynh.mq@gmail.com)

Phuong Le, Université Paris-Saclay & Ho Chi Minh University of Banking (nguyen-minh-phuong.le@universite-paris-saclay.fr)

Trung Le, Banking Academy Vietnam (trunglh@hvnh.edu.vn)

Chi Mai, Ho Chi Minh University of Banking (chimh@hub.edu.vn)

Thoi Mai, Universidade de Lisboa (thoimai@iseg.ulisboa.pt)

Nga Nguyen, University Of The West of Scotland (nga.nguyen@uws.ac.uk)

Giang Phung, ISC Paris Business School (giang.phungth@gmail.com)

Tam Nguyen, Nottingham Trent University (tam.nguyen02@ntu.ac.uk)

Thao Nguyen, Nottingham Trent University (thao.nguyen@ntu.ac.uk)

Thao Nguyen, Edith Cowan University & Thuongmai University (thao.nh@tmu.edu.vn)

Ha Truong, RMIT University (ha.truong@rmit.edu.au)

Diem Vo, RMIT University Vietnam (diem.vo@rmit.edu.vn)

Harris Vu, Auckland University of Technology (harris.vu@aut.ac.nz)

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ABSTRACT

We construct a new government-sourced measure of Categorical Economic Policy Uncertainty (*GovCEPU,* hereafter) through textual analysis, capturing uncertainties in monetary, fiscal, and trade policies. Using the unique case of Vietnam, a country characterized by its strong government intervention in economic activities and sophisticated relationships with China and the United States, we find that compared to existing *news-based* indices, the *GovCEPU* measures consistently reflect higher levels of policy uncertainty. Impulse response analyses indicate that rising *GovCEPU* is associated with weaker macroeconomic outcomes. Further tests show that banks face heightened risks during periods of increased monetary and fiscal policy uncertainty, while manufacturing firms experience declining performance and reduced capital expenditures in response to growing trade policy uncertainty. By relying on official government sources, our approach offers a novel alternative to media-based measures of policy uncertainty.

JEL classifications: D80, E20, E62.

Keywords*:* fiscal policy; monetary policy; policy uncertainty; trade policy; Vietnam.

1. Introduction

This paper proposes a new approach to measure economic policy uncertainty via textual analysis of government-sourced text data. Existing studies have used textual analysis of online newspaper data to quantify Economic Policy Uncertainty (EPU), Categorical EPU (CEPU), and their components in different countries around the globe (Baker et al., 2016; Caldara et al., 2020; Husted et al., 2020; Arbatli et al., 2022). While this approach is common for measuring policy uncertainty, the information value of public media data regarding policy uncertainty remains a concern. Online newspapers may inadvertently capture non-policy-related uncertainties (Gulen & Ion, 2016) and public media's reflection of policy uncertainty rather than actual policy uncertainty.

Previous studies propose the classification of different categories of policy uncertainty, including uncertainty in monetary, fiscal, and trade policies (Hust et al., 2020; Bianconi et al., 2021; Arbatli et al., 2022). These policies serve as fundamental tools that governments use to manage the overall economy. Monetary policy is crucial for controlling inflation and maintaining financial stability. Fiscal policy is critical in shaping aggregate demand through taxation, spending, and borrowing. Trade policy is an important tool for protecting domestic industries, promoting exports, managing trade deficits or surpluses, and ensuring fair competition in international markets. Uncertainty in those economic policies creates significant friction in financial markets, banking systems, and both corporate and household sectors. Therefore, measuring uncertainties across various macroeconomic policy dimensions provides a set of informative indicators for policymaking and economic forecasting. Understanding and assessing different categories of the EPU is critical for a country to sustain economic growth and stability (Gu et al., 2021; Phan et al., 2021). EPU can exert significant impacts on a variety of economic activities, including investment decisions (Gulen & Ion, 2016; Drobetz et al., 2018), household spending (D'Acunto et al., 2022), employment (Caggiano et al., 2017), and international trade (An et al., 2023). High levels of uncertainty might cause investors and consumers to behave cautiously, which can restrict economic activities and limit an economy's potential. This impact may be especially significant in Vietnam, a socialist-oriented country where government intervention in economic activities remains substantial and pervasive.

Measuring Vietnam's CEPU and examining its relationship to macroeconomic factors are important due to Vietnam's unique economic and geopolitical context, particularly its complicated relationships with China and the United States. Over the past few decades, Vietnam's economic policies have shifted towards a market-oriented economy, with monetary policy focusing on macroeconomic stability, fiscal policy supporting growth through strategic investments, and trade policy emphasizing liberalization and integration into global supply chains through various free trade agreements. On the one hand, Vietnam's economic relationship with the U.S. has significantly deepened, with bilateral trade reaching $149.6 billion in 2024[1] and strategic partnerships expanding across sectors. On the other hand, Vietnam maintains a nuanced relationship with China, leveraging its geopolitical position to balance economic ties with both major powers, while navigating challenges such as trade tensions and currency management. Due to this international relations strategy, Vietnam has faced significant trade policy uncertainty, such as the impact of U.S. tariffs and trade flow diversion during the U.S.-China trade war. During the Trump administration, Vietnam has been labelled a currency manipulator twice by the U.S. government, highlighting the challenges of managing exchange rates to maintain competitiveness without triggering criticisms from the West.[2] The unique context of Vietnam implies the need to understand the monetary, fiscal, and trade policy uncertainty's impacts in a more granular approach to ensure their smooth coordination to achieve economic development. Despite its significance, the analysis of EPU impacts in Vietnam remains underexplored, particularly given the limited data tools available for policymaking in the country.

To address these measurement challenges, we develop a new and robust framework to measure EPU in Vietnam by employing textual data analysis of government bodies' websites. This approach prioritises official policy information over public media reflection of policy uncertainty. In this study, we attempt to answer three research questions: *(i) What are the trends of CEPU (monetary, fiscal, and trade) in Vietnam over time? (ii) How do Vietnam's macroeconomic factors respond to CEPU movements? (iii) How does CEPU impact micro-level business operations?*

[1] From the website of Office of the United States Trade Representative: https://ustr.gov/countries-regions/southeast-asia-pacific/vietnam

[2] See for more details: https://thediplomat.com/2020/12/us-officially-labels-vietnam-a-currency-manipulator/

To examine the developments of CEPU in Vietnam, we employ text analysis to construct government-sourced CEPU (*GovCEPU*) indices, including monetary policy uncertainty (MPU), fiscal policy uncertainty (FPU), and trade policy uncertainty (TPU). Instead of using the popular news-based approach (Baker et al., 2016; Husted et al., 2020), we use text data from the websites of regulatory bodies of the Vietnamese government, including the State Bank of Vietnam (SBV), the Ministry of Finance (MOF), and the Ministry of Industry and Trade (MOIT). Our purpose is to capture CEPU directly from the text data on the Vietnamese regulatory bodies' websites (i.e., the primary data source for measuring uncertainty) rather than online newspapers (the secondary data source). We measure MPU, FPU, and TPU using the number of related keyword combinations scaled by the total number of articles published on the websites of SBV, MOF, and MOIT, respectively.

Our *GovCEPU* indices co-move systematically with macroeconomic factors and respond to economic policy-related events in and surrounding Vietnam in three aspects of monetary, fiscal, and trade policies. This measure correlates strongly with both Vietnamese macroeconomic uncertainty proxies and global economic uncertainty measures, including the World Uncertainty Index and Global Economic Policy Uncertainty. To compare our approach with the traditional *news-based* approach in the literature, we construct alternative CEPU measures using the same methodology but using data from major Vietnamese newspapers (i.e., the news-based CEPU indices for Vietnam). While our *GovCEPU* indices correlate highly with news-based indices, they capture more volatility in Vietnam's monetary, fiscal, and trade policies. In addition, we find that while the MPU and FPU measures are highly correlated, the TPU measures appear less correlated with the other two indices.

To investigate how macroeconomic factors respond to CEPU shocks, we examine impulse response functions (IRFs) of six macroeconomic variables: MPU, FPU, and TPU. The macroeconomic variables include GDP growth, inflation, the economic uncertainty index of Vietnam (Ahir et al., 2022), exports, imports, and USD/VND exchange rate. We document that MPU shocks significantly impact macroeconomic variables, with inflation showing persistent responses within the first five months, reflecting MPU's direct impact on consumer price dynamics. Delayed effects on Vietnam's economic uncertainty and trade indicators (exports/imports) suggest MPU propagates through sectors over time, affecting decision-making

and international commerce. Interestingly, there are no significant responses in GDP and exchange rates to MPU. Perhaps, the impact of MPU on growth and currency valuation may operate indirectly through channels such as investment and consumption.

Nevertheless, the macroeconomic responses seem to be more heterogeneous when it comes to FPU shocks. Specifically, IRFs show that FPU shocks have significant but transitory effects on macroeconomic variables, with the strongest impacts typically occurring within the first six months. Inflation responds immediately to FPU shocks, but this effect is short-lived, suggesting that economic agents quickly adjust their expectations in response to fiscal policy changes. The delayed response of certain variables, such as imports and overall economic uncertainty, indicates that FPU information takes time to be fully absorbed into economic decision-making processes, and FPU tends to influence domestic demand more directly than overall economic output or exports.

Interestingly, Vietnam's TPU uniquely impacts inflation with a four-month persistence - longer than FPU's transient price effects but shorter than MPU's sustained influence - reflecting direct trade policy impacts on import costs and domestic competition. Unlike MPU shocks, which broadly affect exports and imports with delays, TPU shocks drive an asymmetric response: imports react sharply in the fourth month while exports remain unaffected, together with immediate exchange rate volatility. Collectively, contrasting with MPU/FPU's economy-wide uncertainty and growth impacts, TPU's impacts remain sector-specific, underscoring its distinct role in destabilizing trade-linked sectors without significantly altering GDP or broader economic uncertainty.

To address the impact of CEPU on firm-level outcomes, we provide empirical evidence from multivariate regression analysis at the bank-level and non-financial firm-level. Analysis at the bank level reveals that MPU significantly affects the risk-taking behavior of Vietnamese commercial banks, consistent with the findings of Greenspan (2004), Paligorova and Santos (2017), and Ge et al. (2023). Furthermore, our empirical results show how FPU influences loan loss provisions of banks, following Ng et al. (2020), Silva (2020), and Tran and Houston (2021) using both our government-sourced and news-based measures. Again, we document a significantly higher predictive power when using the government-sourced FPU measure compared to the news-based measures. We further test the impacts of TPU on profits and

investment of Vietnamese non-financial firms that are more sensitive to trade policy uncertainty. Our regression findings, using both government-sourced and news-based TPU measures, align with existing literature (Imbruno, 2019; Benguria et al., 2022; Chen et al., 2024). In all regressions, our government-sourced and news-based CEPU indices similarly capture the intended impact of MPU and FPU on bank risk and loan-loss provisions. However, when it comes to non-financial firms' performance analysis, the government-sourced TPU index seems to outperform its news-based peers in capturing the negative impact of TPU on firm performance in Vietnam.

Our study offers two important contributions to the literature. Firstly, we propose an alternative text-based approach to construct *GovCEPU* indices using official text data instead of text data from public media outlets as commonly used in previous studies (Baker et al., 2016; Caldara et al., 2020; Husted et al., 2020; Ahir et al., 2022; Arbatli et al., 2022). We leverage the use of text data from regulatory bodies' websites (i.e., the primary sources of data for policy changes and uncertainty), offering a more direct approach to quantify government policy uncertainty. This approach offers several advantages. First, regulatory websites provide the most timely information, as they are the first and official outlets to publish the government's announcements about policy changes or rule proposals. The data from these primary sources is highly authoritative and reliable as they come directly from policymaking bodies. Secondly, government text data is open to access with no charges. While most studies in news-based EPU literature construct their EPU-related indices using data from major online newspapers with paid subscriptions to the publications or to databases such as Factiva, LexisNexis, among others. The subscriptions come with certain dollar costs ranging from a few hundred to a few thousand USD on a monthly basis, depending on subscription plans and the number of users per subscription.[3] Third, the time cost to collect and process text data from government sources is lower than the conventional approach using online newspaper data. Generally, online newspapers are not only about economic policies since they cover all aspects of socio-political and daily events, including entertainment and other non-economic content, leading to an enormous number of articles published per month in each of the publications. As most EPU and CEPU indices are constructed

[3] Quotes for Factiva subscription cost are achievable from: https://www.dowjones.com/professional/factiva/pricing-page/

by calculating the frequency of number of EPU-related articles scaled by the number of articles published during the same period, then normalizing the results (Baker et al., 2016; Caldara et al., 2020; Husted et al., 2020; Ahir et al., 2022), the time costs of scraping and processing text data, plus human auditing costs, are significant. As the content in each government website is concentrated and related to its regulatory assignments, the amount of text data to collect and process is generally lower and therefore requires less time in comparison to the conventional news-based approach.[4]

The second contribution we offer to the literature is the *GovCEPU* indices of Vietnam. These measures provide valuable insights into the dynamics of policy uncertainty across different sectors and policy domains, offering important understanding for policymakers, businesses, and researchers to assess how *GovCEPU* factors affect economic outcomes, investment decisions, and overall performance in Vietnam. As we document no prior studies proposing a measure of categorical policy uncertainty for Vietnam, this study is the first to provide government-sourced measurements of MPU, FPU, and TPU in the country and analyze their impacts on macroeconomic factors as well as on corporate outcomes. Our indices and findings from them promise a new avenue of research on the impacts of *GovCEPU* in the unique context of Vietnam, especially amid the contemporary era of increasing economic uncertainty and geopolitical tensions across the globe.

The rest of the paper proceeds as follows. Section 2 reviews the literature on measuring policy uncertainty. Section 3 presents our research methodology and data. Section 4 evaluates the effectiveness of the constructed *GovCEPU* indices through empirical tests. Section 5 concludes the paper and highlights potential areas for future research.

2. Literature review

This section discusses the methods employed in the literature to measure uncertainty, including dummy indicators, text-based or survey-based approaches, and using macroeconomic or financial

[4] See Table 4 for more details about the numbers of text articles from government websites versus major online newspapers.

market data as proxies. It will also review the impact of EPU on the economy, particularly on financial institutions, firms, and households.

2.1. Existing EPU measures

Previous studies have examined uncertainty's impact using event dummy variables for occasions such as national elections, global summits (Bhattacharya et al., 2017; Julio and Yook, 2012; Kelly et al., 2016), financial crises, and Brexit (Abreu & Gulamhussen, 2013; Ahir et al., 2018; Buigut & Kapar, 2023; Minford & Zhu, 2024). However, this method may overlook the presence of uncertainty in non-event periods, which can lead to a lack of detail and precision.

Researchers have also employed macroeconomic and financial indicators as continuous proxies for uncertainty, including stock market volatility (Connolly et al., 2005; Bloom, 2009), government consumption volatility (Afonso & Furceri, 2010), price volatility (Kellogg, 2014), and money growth (Kim, 1993). These indicators are often used in VAR (Vector Auto-regression) models, where uncertainty is quantified through stochastic volatility in the error structure (Aizenman & Marion, 1993; Bloom, 2009; Fatás & Mihov, 2013; Jurado et al., 2015). However, these indicators may reflect a confluence of factors, not solely policy-related uncertainty, thereby complicating the isolation of specific policy impacts. Furthermore, potential endogeneity issues may arise, as macroeconomic and financial variables can be simultaneously determined with policy uncertainty.

Survey-based approaches offer a more direct measure for quantifying uncertainty by gathering assessments and forecasts from expert respondents (Bachmann et al., 2013; Jurado et al, 2015). A prominent example is the Survey of Professional Forecasters, which provides data for uncertainty measures used by Abel et al. (2016), Boero et al. (2015), Jo and Sekkel (2019), and Sill (2012). While these surveys can capture nuanced views on policy uncertainty, they may be limited by sample size, respondent bias, and the frequency of data collection, which may not fully represent the broader economy (Jurado et al., 2015).

Finally, the text-mining approach has become one of the most prevalent methods for measuring EPU in recent studies (Baker et al., 2016; Ghirelli et al., 2019; Husted et al., 2020; Elkamhi et al., 2024). Baker et al. (2016) construct the EPU index using news coverage, tax code

expiration data, and forecaster disagreements, assigning specific weights to each component. Since then, this approach has been developed globally, with similar indices created for various US states and countries by expanding newspaper coverage and refining term sets (Alexopoulos & Cohen, 2015; Azzimonti, 2018; Caldara & Iacoviello, 2018; Hassan et al., 2019; Husted et al., 2020; Baker et al., 2022; Elkamhi et al., 2024). While effective, this method faces challenges with language requirements and limited country coverage (Ahir et al., 2018; Kupfer & Zorn, 2020). To address these, the World Uncertainty Index (WUI) (Ahir et al., 2018) and Energy-related uncertainty index (Dang et al., 2023) have been created using Economist Intelligence Unit (EIU). Based on newspaper articles, Davis (2016) builds a Global Economic Policy Uncertainty index, a GDP-weighted average of national EPU indices for 16 countries that account for two-thirds of global output. More recently, Google Economic Policy Uncertainty (GEPU) indices have been suggested as an alternative to overcome language barriers (Kupfer & Zorn, 2020).

2.2. Impacts of EPU on the economy

The literature shows that economic policy uncertainty (EPU) affects various economic actors in different ways. Previous studies have documented its diverse impacts on financial institutions, firms, and households, with significant implications for the broader economy (Eberly, 1994; Gulen et al., 2016; Ng et al., 2020; Ge et al., 2023; D'Acunto et al., 2022; Zhou & Wen, 2022). Understanding these impacts is important for developing effective policies to mitigate the adverse effects of EPU and promote economic stability.

First, EPU significantly influences *financial institutions* by affecting banks' lending behavior, risk-taking, and profitability. During periods of higher policy uncertainty, banks increase loan loss provisions (Ng et al., 2020) in anticipation of adverse economic conditions (Paligorova & Santos, 2017), but this effect is mitigated by stakeholder oversight (Tran & Houston, 2021). Parallelly, Ge et al. (2023) find that higher monetary policy uncertainty (MPU) increases bank risk-taking to maintain profitability margins, particularly for banks operating in more competitive markets. During times of increased policy uncertainty, banks tend to become more conservative, tightening their credit standards and reducing the volume of new loans (Acharya & Naqvi, 2012). Additionally, EPU can affect banks' profitability by influencing interest rate spreads and the demand for various financial products (Bordo et al., 2016).

Second, *firms'* investment decisions and innovation activities are also significantly affected by EPU. Researchers have established a negative link between policy uncertainty and firm-level capital investment, as evidenced by both theoretical modeling and empirical data (Bloom et al., 2007; Julio & Yook, 2012; Gulen & Ion, 2016). The uncertainty regarding future policy directions makes it difficult for firms to forecast returns on investment accurately, thereby increasing the perceived risk (Bloom, 2009), leading to short-term investment bias, higher capital prices, and lower long-run investment and output (Jeong, 2002). Furthermore, government economic policy uncertainty can reduce innovation activity by increasing firms' cost of capital (Xu, 2020) or through risk tolerance, financial, and information channels (William & Fengrong, 2022). Small and medium-sized enterprises (SMEs) might be more adversely affected by policy uncertainty compared to larger firms because they often have fewer financial resources and less access to capital markets (Ballantine et al., 1993). Sector-wise, firms in heavily regulated industries or those dependent on government contracts, such as healthcare, energy, and defense, may exhibit greater investment volatility in response to policy shifts (Baker et al., 2016; Kellogg, 2014). Trade policy uncertainty (TPU), a specific type of EPU, particularly impacts firms engaged in international trade. In China, higher TPU reduces firms' innovation investments (Chen et al., 2024), negatively impacts Chinese firms' export behavior (Zhou & Wen, 2022) and increases financial constraints and operational risks (Wang et al, 2021). In contrast, trade liberalization, specifically China's WTO accession, reduces TPU and encourages corporate patent application (Liu & Ma, 2020). Handley and Limão (2015) demonstrate that TPU reduction following Portugal's accession to the European Community spurred export growth. Similarly, reduced TPU following China's WTO accession is accompanied by a significant increase in US-China trade, lower prices, and higher real income for US consumers (Handley & Limão, 2017).

Finally, EPU influences household consumption and investment decisions. There is theoretical and empirical evidence that heightened uncertainty encourages households to postpone costly-to-reverse purchases of durable goods (Eberly, 1994; Aaberge et al., 2017). Furthermore, greater uncertainty raises household precautionary savings, which can reduce consumption and output, (Fernández-Villaverde et al., 2015; Wu & Zhao, 2022). Increased political uncertainty has been empirically shown to lead to higher household savings and adjustments in labor supply, ultimately hindering economic growth (Giavazzi & McMahon, 2012). Moreover, uncertainty decreases the potency of countercyclical policies, as households

become less responsive to policy stimuli such as cuts in interest rates and taxes, in line with predictions of real options theory (Bloom et al., 2007; Bloom, 2009).

In this study, to enhance the understanding of policy uncertainty within the Vietnamese context, we develop original government-sourced categorical indices: Trade Policy Uncertainty (TPU), Monetary Policy Uncertainty (MPU), and Fiscal Policy Uncertainty (FPU). These indices offer a granular perspective on the proximate sources of policy uncertainty and facilitate a comprehensive examination of its effects on industry- and firm-level economic outcomes.

3. Methodology and data

3.1. Index construction

We follow the established text-based methodology proposed by Baker et al. (2016) to construct the *GovCEPU* indices for Vietnam. Baker et al. (2016) count the number of articles published in the top ten leading US newspapers containing word combinations that represent US economic policy uncertainty. Our approach differs primarily in terms of data sources. While Baker et al. (2016) and a line of following-up literature (Caldara et al., 2020; Husted et al., 2020; Ahir et al., 2022; Arbatli et al., 2022) use data from major online newspapers to capture policy uncertainty reflected in the public's perception, we measure *GovCEPU* using official data from the websites of regulatory bodies in Vietnam. We advocate for the government's text-based measures due to the public accessibility of these documents and their smaller corpus size, in contrast to the higher costs associated with various media news subscriptions. This approach uses publicly accessible documents, offering a cost-effective and time-efficient alternative to expensive news subscriptions. The smaller corpus size of government documents further reduces the time investment required for analysis. Specifically, we scrape data from the websites of the State Bank of Vietnam (SBV), the Ministry of Finance (MOF), and the Ministry of Industry and Trade (MOIT) for the construction of the monetary policy uncertainty index (MPU), fiscal policy uncertainty index (FPU), and trade policy uncertainty index (TPU), respectively.

To construct government-sourced MPU, FPU, and TPU indices, we count the frequencies of specific keywords representing uncertainty in the relevant categories of economic policy from

previous literature (Baker et al., 2016; Husted et al., 2020). We adapt these keyword lists to the Vietnamese context to ensure their relevance. The keyword combinations are structured as follows:

*{any keyword in the **Keyword Group 1** – Uncertainty/ status terms} and*
*{any keyword in the **Keyword Group 2** – Object (instrument) terms} and*
*{any keyword in the **Keyword Group 3** – Policy and policymaking terms} and*
*{any keyword in the **Keyword Group 4** - Identification terms for Vietnamese policymaking and regulatory bodies}*

Exhibit 1. The structure of keyword combinations used to construct the categorical policy uncertainty indices.

We compute the monthly frequency with which specific keyword combinations appear in the articles published on the regulatory body's website.[5] The indices are constructed using Vietnamese language keywords. The keywords and combinations are presented in Tables 1-3.

<<< Insert Table 1 here >>>

<<< Insert Table 2 here >>>

<<< Insert Table 3 here >>>

There are two main differences between our approach and the original approach of Baker et al. (2016). First, we focus on the data from official sources (e.g., regulatory bodies) rather than public media. Public media articles often contain varying personal opinions from journalists, analysts, interviewees, and specialists about policy, politics, and uncertainty. As those opinions do not always support one another, they may generate biases in the public perception of uncertainty in unknown directions. By only using official data sources, we can eliminate this sentiment factor from our constructed indices.

Second, existing literature on text-based policy uncertainty (Baker et al., 2016; Caldara et al., 2020; Husted et al., 2020; Arbatli et al., 2022) measures uncertainty by counting uncertainty-

[5] The Python libraries used to construct the indices in this study include BeautifulSoup, VnCoreNLP, Pandas, Matplotlib, and Wordcloud.

related keywords scaled by the number of newspaper articles in the same period. This approach may cause additional biases since newspapers cover diverse topics, with the increasing coverage of entertainment, technology, and other trendy topics. In contrast, official websites of regulatory bodies in Vietnam only deliver official statements of those bodies, official news related to their field, changes in related regulations and policies, without including public opinions.

Using three sets of keyword combinations, we calculate the relative frequency of uncertainty-related keywords for each policy type (MPU, FPU, TPU). For each dataset obtained from the authorised government agencies' websites, we divide the raw monthly count of keyword combinations related to MPU, FPU, and TPU by the total monthly article count of the website, respectively. This method accounts for variations in publication volume over time.

$$pu(t) = \frac{pu\_frequency(t)}{total\_articles(t)} \quad (1)$$

where $pu(t)$ stands for the corresponding categorical policy uncertainty index (e.g., MPU, FPU, or TPU) during month t.[6]

For a robustness check, we further scrape data from two leading online Vietnamese newspapers (Vietnamnet (VNN) and CafeF (CFF)) and use the same method to construct alternative news-based indices: MPU_VNN, MPU_CFF, FPU_VNN, FPU_CFF, TPU_VNN, and TPU_CFF. We compared these newspaper-based indices with the MPU, FPU, and TPU indices to examine the differences between our approach and that of Baker et al. (2016).[7]

3.2. Data

The text data for constructing the *GovCEPU* indices comes from different sources. We extract Vietnamese text data from the websites of the State Bank of Vietnam (https://sbv.gov.vn/), the Ministry of Finance (https://mof.gov.vn/), and the Ministry of Industry and Trade (https://moit.gov.vn/) of Vietnam to construct the monthly government-sourced MPU, FPU, and

[6] We do not further normalise the data using the time-series' standard deviation and average value of the time-series as suggested in Baker et al. (2016) because of one main reason: the outputs of the normalised index will change as we update new values to the index in the future update, and such changes will cause difficulties for users in referencing and comparing empirical results.

[7] The text data processing workflow is presented in Appendix A1, and examples of text from the text data vendors are presented in Appendix A2.

TPU indices, respectively. The data for constructing news-based indices comes from two major Vietnamese online newspapers: Vietnamnet (https://vietnamnet.vn/), a state-owned newspaper, and CafeF (https://cafef.vn/), owned by VCCorp, a major private multimedia corporation in Vietnam. Table 4 shows the number of news articles with identified keyword combinations from different sources of data:

<<< Insert Table 4 here >>>

We use different data to validate our proposed indices. Bank-level data are from a database of the Vietnamese banking sector contributed by Le et al. (2022).

Firm-level data on Vietnamese public firms are from the COMPUSTAT database. Macroeconomic data are from DataStream, Asian Development Bank, and Trading Economics databases. Uncertainty measures, including World Uncertainty Indices (Ahir et al., 2022), Global Economic Policy Uncertainty Index (Baker et al., 2016), and Geopolitical Risk Index (Caldara & Iacoviello, 2022), are obtained from https://policyuncertainty.com/. We annualize the MPU, FPU, and TPU indices by calculating the average monthly values of each index for each year. We merge the annualized indices with other datasets for analyzing the impact of CEPU on macroeconomic factors, bank risk, and non-financial firms' performance in Vietnam.

The initial bank-level dataset covers 45 commercial banks in Vietnam from 2002 to 2023. After merging with *GovCEPU* indices' data and excluding observations with missing values, the final bank sample consists of 549 bank-year observations of 45 commercial banks in Vietnam during 2004-2022. The initial non-financial firm dataset covers 687 Vietnamese listed firms during the 2002-2022 period. After merging with *GovCEPU* indices' data and excluding observations with missing values, the final non-financial firm sample consists of 5,048 firm-year observations of 555 Vietnamese firms listed in the Ho Chi Minh Stock Exchange and the Hanoi Stock Exchange during 2006-2022. All variable descriptions and summarized statistics are presented in Appendix A3.

4. Evaluating the GovCEPU indices

4.1. Matching with macroeconomic events

We first evaluate our measures of *GovCEPU* (MPU, FPU, and TPU) by examining their correlation with other proxies of uncertainty and testing the responses of macroeconomic factors to each type of *GovCEPU*. Our indices are constructed using data from official government sources to reflect the real and immediate changes in government policies relating to monetary, fiscal, and trade matters.

Figure 1 presents the time-series plot of the MPU index. Figure 1 shows that our MPU index fluctuates with drops and spikes, reflecting significant monetary policy changes in Vietnam during the 2004-2023 period. MPU is particularly sensitive to major monetary policy shifts and uncertainty shocks. Key examples include policy decisions to raise interbank rates to deal with the elevated inflation in February 2005, constraints placed on commercial banks' mobilising interest rates in February 2008, and the currency devaluation by 8.5% against the USD in February 2011. The MPU index also reacts to other events such as the adoption of Basel II in 2019, the quantitative easing in early 2020, the stimulus announced in January 2022, and the Saigon Commercial Bank fraud and following-up bank run at the end of 2022. Additionally, broader global events like the Russia-Ukraine conflict in 2022 and the pressure from high interest rates worldwide during the post-COVID-19 period have their impacts on the MPU index.

<<< Insert Figure 1 here >>>

Figure 2 illustrates the changes in our FPU index during the 2014-2023 period. There were two major fluctuations during the 2015-2016 and 2020-2023 periods. In the first period, several factors contributed to FPU's variations, including the rising public debt, fiscal deficit, and state-owned enterprises privatization reform in the country. During this period, global oil prices fluctuated and led to a marked decrease in Vietnam's fiscal income, high levels of non-performing loans in the banking sector, and a decrease in income from tariffs due to new free trade agreements. During 2020 – 2023, the FPU index showed an overall upward trend with multiple fluctuations. The main reason for this increase are the economic slowdown and fiscal fluctuations caused by the COVID-19 pandemic, along with an expansionary fiscal policy to boost domestic

demand, resulting in a large fiscal deficit.[8] Several new regulations and policies were announced during 2021-2023, including the Resolution 43/2022/QH15 to implement a large fiscal and monetary stimulus package and Value-Added Tax reduction from 10% to 8%, the Decision 508/QD-TTg on tax system reform, the Decree 91/2022/ND-CP on changes in income tax, and Decree 12/2023/ND-CP on tax payment deferrals, EPT and other tax cuts that increase revenue pressure for the government.

<<< Insert Figure 2 here >>>

Figure 3 shows how our TPU index changes over the 2012-2023 period. The index is highly volatile from 2014 to 2020, reflecting the developments in trade policy and trade-related external shocks to the economy. During this period, Vietnam expanded its global economic integration through key trade agreements, including the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the European Union-Vietnam Free Trade Agreement (EVFTA). The TPU's volatility can be explained by the changes in the trade-related regulations and laws, trade talks, the trade war between the US and China in 2018-2019, and the COVID-19 pandemic in 2020 – 2022, causing trade disruptions across the globe. During, the US-China trade war, trade rerouting to the US via Vietnam invited tight scrutiny over tariff evasion and current undervaluation, and therefore caused the trade tension between Vietnam and the U.S.

<<< Insert Figure 3 here >>>

4.2. Comparison and correlation with other uncertainty measures

Comparing our *GovCEPU* indexes with the news-based CEPU indices constructed for monetary, fiscal, and trade policy uncertainty using data from Vietnamnet and CafeF, we document some similarities and differences. While the *GovCEPU* indices (i.e., MPU, FPU, and TPU) are significantly and positively correlated with most of their news-based counterparts (i.e., MPU_VNN, MPU_CFF, FPU_VNN, FPU_CFF, TPU_CFF), there is an exception in the case of TPU and TPU_VNN. Table 5 shows the correlation matrix between the *GovCEPU* indices. The correlation matrix shows that TPU is not strongly correlated with the MPU and FPU measures.

[8] According to https://mof.gov.vn/webcenter/portal/btcen/pages_r/l/newsdetails?dDocName=?dDocName=MOFUCM254899anddID=257728

While trade policy, monetary policy, and fiscal policy serve as key government instruments for economic influence, they function in distinct domains with separate objectives. This explains why trade policy shows an independent movement of monetary and fiscal policies.

<<< Insert Table 5 here >>>

We also find the differences between government-sourced and news-based measures in Figures 4-6. The figures show the correlations between our main, *GovCEPU* measures and their news-based alternatives. However, the volatilities of the government-sourced measures are visually much higher than those of the news-based measures. These differences suggest that the *GovCEPU* measures seem to capture more uncertainty in economic policies than the news-based ones. This finding further strengthens our argument on how the choice of data source influences the information content of CEPU measures.

<<< Insert Figure 4 here >>>

<<< Insert Figure 5 here >>>

<<< Insert Figure 6 here >>>

4.3. The interplay between categorical economic policy uncertainty and macroeconomic factors

We examine the responses of macroeconomic variables to shocks in MPU, FPU, and TPU using the Impulse Response Functions (IRFs) in Figures 7, 8, and 9. IRFs illustrate how economic variables respond over time to a sudden shock in another variable. IRFs quantify how variables in a dynamic system (e.g., an economy) react over time to an unexpected "shock" or one-time disturbance, such as a policy change or an external event. By isolating orthogonalized shocks in the model, IRFs map the magnitude, direction, and persistence of these effects.

In this analysis, the shocks represent a one standard deviation change in the categorical policy uncertainty indices (MPU, FPU, or TPU). The IRFs track the responses of various macroeconomic indicators (i.e., GDP growth, inflation, world uncertainty index of Vietnam,

exports, imports, and exchange rates) to these shocks over a period of several months. The figures reveal the magnitude, direction, and statistical significance of these responses, showing the dynamic relationships between policy uncertainty and economic outcomes.

<<< Insert Figure 7 here >>>

Figure 7 shows that the IRFs for the MPU suggest complex interactions within Vietnam's economy. All examined macroeconomic variables respond to MPU shocks, with the most pronounced effects occurring in the first five months. Inflation shows significant responses at the 10% level during this period, indicating MPU's substantial and persistent impact on consumer prices. This suggests that businesses and consumers may adjust their expectations and behaviours in response to MPU, leading to fluctuations in prices. The World Uncertainty Index (WUI) of Vietnam shows significant responses in the fourth and ninth months following an MPU shock, implying that MPU contributes to overall economic uncertainty with both immediate and delayed effects. This WUI delayed response indicates that the full impact of monetary policy uncertainty takes time to spread through various sectors of the economy. The significant responses of exports in the fifth month and imports in the fourth and seventh months suggest that international trade is sensitive to MPU, possibly due to its effects on exchange rates and credit conditions. Furthermore, the lack of significant responses in GDP and the VND/USD exchange rate suggests that MPU may impact overall economic growth and currency valuation indirectly, possibly through other channels such as investment and consumer spending.

<<< Insert Figure 8 here >>>

FPU shocks also affect the macroeconomic variables, with the strongest effects appearing in the first six months, as shown in Figure 8. However, the patterns and magnitudes of these responses differ from those observed with MPU. Inflation responds significantly at the 10% level, but only in the first month, suggesting that FPU may have a more immediate but less persistent effect on price levels compared to monetary policy uncertainty. This suggests that economic agents quickly adjust their short-term expectations in response to fiscal policy changes, but these effects may be more transitory. WUI shows a significant response in the fourth month following an FPU shock, indicating that FPU contributes to overall economic uncertainty with a slight delay. This delayed response might reflect the time needed for fiscal policy information to be fully

absorbed into economic decision-making processes. The significant response of imports in the fourth month contrasts with muted reactions in GDP, exports, and exchange rates, aligning with established patterns of fiscal policy uncertainty transmission (Fernández-Villiverde et al., 2015; Hong et al., 2024). This differential impact likely reflects fiscal policy's direct influence on domestic demand components and intermediate goods procurement, while export-oriented sectors appear more insulated from short-term fiscal uncertainty shocks. The absence of significant responses in exports and GDP is particularly noteworthy, suggesting that fiscal policy uncertainty may have less direct influence on overall economic output and international competitiveness than other forms of policy uncertainty.

<<< Insert Figure 9 here >>>

Different from MPU and FPU shocks, TPU shocks show a distinct pattern of macroeconomic responses, highlighting the unique role of trade policy in shaping Vietnam's economic landscape. Inflation significantly responds at the 10% level for the first four months, indicating that trade policy uncertainty has a substantial and relatively persistent impact on consumer prices. This might come from the direct effects of trade policies on import prices and domestic competition, which can quickly translate into consumer prices. The asymmetric response between imports and exports is particularly intriguing, with imports showing significant responses in the fourth month, while no significant responses are found for exports. This suggests that TPU has a more pronounced effect on import activities than export activities, possibly due to the immediate impact of trade policies on import costs and availability. The significant responses of the VND/USD exchange rate in the first and second months following a TPU shock imply that trade policy uncertainty can quickly influence currency valuation, likely due to its direct impact on international trade flows and investor sentiment. However, the lack of significant responses in GDP and the WUI is somewhat surprising. This may indicate that the effects of trade policy uncertainty are more sector-specific rather than economy-wide. The overall pattern of responses to TPU shocks underscores the importance of stable and predictable trade policies for maintaining economic stability, particularly in areas directly linked to international commerce and currency markets.

The IRF analysis reveals distinct patterns in how Vietnam's economy responds to different types of policy uncertainty. MPU shows the most widespread and persistent effects, particularly

on inflation and international trade, while FPU has more immediate but transient impacts. TPU shows significant influence on inflation and currency valuation, with asymmetric effects on imports and exports. These findings showcase how policy uncertainties interact with Vietnam's macroeconomic indicators.

4.4. The effects of MPU and FPU on banks' operations

In this section, we examine the impacts of *GovCEPU* on bank risk in Vietnam. We expect there might be significant impacts of policy uncertainty on loan loss provisions and bank risk following the findings in the current literature (Greenspan, 2004; Paligorova & Santos, 2017; Ng et al., 2020; Silva, 2020; Ge et al., 2023). Scholars have shown evidence that FPU increases loan loss provisions in banks (Ng et al., 2020; Silva, 2020; Tran & Houston, 2021). This positive relationship exists because bank managers are concerned about the expected depressive effects of fiscal policy uncertainty on the economy and realise this expectation through higher estimates of loan loss provisions (Tran & Houston, 2021). From the monetary policy perspective, higher MPU increases bank risk-taking and risk exposure (Greenspan, 2004; Paligorova & Santos, 2017; Wu et al., 2022; Ge et al., 2023). Higher MPU affects different dimensions of bank risk, leading to higher non-performing loans, shorter distance to default, and higher expected loan losses. Following these findings, we conduct empirical tests to assess the convergence between our government-sourced FPU and MPU indices.

Using the Vietnamese bank's annual data, we regress the loan loss provision ratio on the FPU measures, i.e., the government-sourced FPU index (FPU), controlling for common bank-level characteristics such as bank size, bank performance, cost-to-income ratio, non-performing loan ratio, and fixed effects. In our regressions, FPU is lagged by one period. Standard errors are clustered by year following Nguyen and Phan (2017). To compare the effect across different measures of FPU, we conduct two additional tests using the news-based FPU indices (MPU_VNN and MPU_CFF) as the alternative explanatory variables. In all three regression specifications, the FPU variables are lagged by one period. Panel A of Table 7 reports the regression results. The coefficient of FPU is 28.925 and significant at a 1% significance level (Column 1), suggesting that FPU is positively associated with banks' average loan loss provision ratio. Columns 2 of Panel A, Table 7, show a smaller impact of FPU measured by Vietnamnet news data (FPU_VNN) at 1.960 and significant at a 5% significance level. In Column 3, the regression results using

FPU_CFF, another news-based FPU measure using CafeF data, show a positive but insignificant coefficient. The results indicate that the government-sourced measure of FPU outperforms news-based measures in predicting loan loss provision by Vietnamese banks. The adjusted R-squared of the regression using the government-sourced FPU (FPU) as the explanatory variable is 0.491, while the R-squared of the regressions using the news-based measures FPU_VNN and FPU_CFF are 0.488 and 0.450, respectively.

<<< Insert Table 7 here >>>

Panel B of Table 7 presents the regression results of our MPU variables on bank risk-taking measured by Z-score. The higher Z-score value indicates greater bank risk-taking in normal operations. Similar to the analysis in Panel A, we use the government-sourced MPU measure (MPU) for the main analysis and the news-based MPU measures (MPU_VNN and MPU_CFF) for comparisons. We regress Z-score (ZSCORE) on MPU, where the MPU variables are lagged by one year. In general, the regression results align well with the findings in the literature. Specifically, the coefficients of the MPU variables (i.e., MPU, MPU_VNN, and MPU_CFF) remain positive and statistically significant in all regressions in Panel B of Table 7, suggesting that our measures effectively capture the effects of MPU on bank risk. The adjusted R-squared of the regression using the government-sourced MPU (MPU) as the explanatory variable is 0.952, which is higher than those of the regressions using the news-based measures MPU_VNN and MPU_CFF (0.823 and 0.873, respectively). This means our models effectively explain the variations of bank risk in Vietnam commercial banks.

To summarise, our government-sourced MPU and FPU measures capture the impacts of monetary and fiscal policy uncertainty on bank loan loss provisions and bank risk-taking, consistent with those reported in the literature.

4.5. The firm-level effects of TPU

The literature on the impact of uncertainty in trade policy suggests TPU has e significant economic impacts on firms that are dependent on international trade (Bianconi et al., 2021). Specifically, TPU negatively affects corporate investment and profitability (Benguria et al., 2022; Chen et al., 2024) via increasing compliance and regulatory costs for firms involved in trade activities. Benguria et al. (2022) show that a one-standard-deviation increase in TPU during the

China-US trade war led to a 2.3% decrease in corporate investment and an 11.5% decrease in profits of Chinese firms. Similarly, Graham et al. (2024) and Chen et al. (2024) suggest that TPU negatively affects the investment of non-financial firms in the U.S. and China, as more uncertainty generally discourages firms from making investment decisions (Dixit and Pindyck, 1994; Gulen & Ion, 2016). Moreover, Imbruno (2019) argues that Chinese firms facing the risk of a drastic change in tariffs following their importing activities generally suffer a decrease in profitability. Collectively, there are consistent findings on the impact of TPU on corporate profitability and investment, but not in the context of Vietnam because of the lack of measures of Vietnam's TPU. Given the similarity in the contexts of Vietnam and China, we expect similar impacts of TPU from our TPU indices.

To evaluate how well our measures capture the impacts of TPU on corporate profitability and investment of non-financial firms in Vietnam, we conduct empirical tests by regressing firm profitability (ROA) and corporate investment (CAPEX) on TPU measures. We control for common firm-level characteristics, including firm size (SIZE), financial leverage (LEVERAGE), and cash flow (CASHFLOW). We expect that our TPU measure has a negative impact on profit margins and capital expenditure. In our model, TPU variables are lagged by one period. Standard errors are clustered by year following Nguyen and Phan (2017). The regression results are presented in Table 8.

<<< Insert Table 8 here >>>

In Column 1, the coefficient of the government-sourced TPU variable is negative and statistically significant at the 1% significance level, which is consistent with the findings in the literature (Imbruno, 2019; Benguria et al., 2022) that TPU is detrimental to non-financial firms' performance. Interestingly, the coefficients of the news-based TPU variables in Columns 2 and 3, Table 8, are insignificant (TPU_VNN), and only significant at the 10% level (TPU_CFF), respectively. The findings suggest that the government-sourced TPU index captures the expected impact of TPU on firm performance, while the impact remains ambiguous for news-based TPU indices.

Despite the differences between government-sourced TPU and news-based TPU in capturing TPU's impact on firm performance, the corporate investment analysis yields consistent

results. The coefficients of all TPU measures are negative and statistically significant at the 1% level in Columns 4-6, Table 8, suggesting a negative impact of TPU on corporate investment of Vietnamese firms. This finding is consistent with the previous literature of TPU (Benguria et al., 2022; Chen et al., 2024; Graham et al., 2025) that non-financial firms become more cautious when making investment decisions under increased TPU and international trade disputes.[9]

The results suggest that our TPU indices effectively capture the impact of TPU on corporate profitability and capital expenditure. The findings align with the literature on how policy uncertainty affects corporate decision-making and outcomes, further corroborating the reliability of our measures.

5. Concluding remarks

This study measures economic policy uncertainty in Vietnam by developing categorical EPU in three different aspects: monetary, fiscal, and trade policy from government sources. The measurement follows the news-based textual analysis approach in the economic literature (Baker et al., 2016; Caldara et al., 2020; Husted et al., 2020; Arbatli et al., 2022), however, using text data from corresponding government agencies' websites instead of major online newspapers. Our focus is on the governmental sources rather than news media to attenuate the noise in public media and more directly reflect the official policy signal. The *GovCEPU* indices (MPU, FPU, and TPU) capture uncertainties in government policies in Vietnam and provide interesting insights. This is the first study to propose this approach to measure policy uncertainty indices.

The empirical results suggest that *GovCEPU* indices capture more policy uncertainty than the news-based measures, highlighting the unique role of state policy communication in shaping economic expectation in Vietnam and the differences in reflecting policy uncertainty information between government agencies and news media. The key findings show that increases in *GovCEPU*, especially regarding monetary and fiscal policy uncertainty, adversely affect macroeconomic stability, significantly influence bank risk, and firm performance in the manufacturing sector.

[9] Further tests to show the heterogeneity of impacts of TPU on firm performance of different sectors can be found in Appendix A4.

We offer some implications from our findings. First, in managing macroeconomic stability, Vietnamese authorities should enhance the clarity of policy implications, especially during times of economic adjustment or international uncertainty. More specifically, enhancing the transparency in monetary policy objectives and outcomes may reduce the adverse reactions from the investors and banks, leading to a reduction in the risk in the financial sector. Second, the fiscal policy should provide consistent and clear guidance on expenditure and taxation to bolster firm confidence. Finally, regarding the trade policy, Vietnamese policymakers should consider the effects of geopolitical shifts and trade disputes on domestic industries. Also, increasing engagement with diverse international trade partners and implementing a proactive trade policy can shield Vietnamese firms from global trade concerns, and promote a more robust economic landscape.

This study contributes to the literature by offering a more direct, government-derived measure of categorical policy uncertainty in Vietnam. In this vein, our findings suggest that text data extracted from government agencies' websites is informative about policy uncertainty and is useful for future research. By this study, we provide a new tool for future research to investigate the economic impacts of EPU in the unique context of Vietnam. Further studies may explore how this approach can be applied in other economies, specifically developing countries, to support the policy decision-making process during the uncertain period.

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Table 1. Keyword combinations for the construction of the MPU index

Keyword group	Vietnamese keywords	English equivalents
Group 1 – uncertainty/status terms	"bất ổn"	“uncertainty”
	"căng thẳng"	“uncertain”
	“biến động”	“uncertainties”
	“áp lực”	“pressure”
	“thắt chặt”	“tighten”
	“nới lỏng”	“loosen”
Group 2 – object (instrument) terms	“tỷ giá”	“exchange rate”
	“lãi suất”	“interest rate”
	“lạm phát”	“inflation”
	“giảm phát”	“deflation”
	“dự trữ bắt buộc”	“mandatory reserve”
	“tiền tệ”	“monetary”
	“dự trữ ngoại hối”	“foreign currency reserve”
	“ngoại tệ”	“foreign currency”
Group 3 – policy and policymaking terms	"chính sách"	“policy”
	"quy định"	“regulation”
	“điều hành”	“adjustment”
	“điều chỉnh”	“regulate”
	“quản lý”	“manage”
Group 4 – Vietnamese policy maker and regulatory bodies identification terms	"Hà Nội"	“Hanoi”
	“Việt Nam”	“Vietnam”
	“Quốc hội”	“Congress”
	"Nhà nước"	“Federal”
	"Chính phủ”	“Government”
	“Ngân hàng Nhà nước”	“State Bank”

Table 2. Keyword combinations for the construction of the FPU index

Keyword group	Vietnamese keywords	English equivalents
Group 1 – uncertainty/status terms	"bất ổn"	“uncertainty”
	"căng thẳng"	“uncertain”
	“biến động”	“uncertainties”
	“áp lực”	“tense”
	“thắt chặt”	“pressure”
	“nới lỏng”	“tighten”
		“loosen”
Group 2 – object (instrument) terms	“đầu tư công”	“state investment”
	“cân đối thu chi”	“state budget balance”
	“ngân sách”	“government budget”
	“chi thường xuyên”	“recurring government expenditure”
	“chi đầu tư phát triển”	“development investment expenditure”
	“trái phiếu”/“công trái”	“bond”/“government bond”/“municipal bond”
Group 3 – policy and policymaking terms	"chính sách"	“policy”
	“chính sách tài khóa”	“fiscal policy”
	"quy định"	“regulation”
	“điều hành”	“adjustment”
	“điều chỉnh”	“regulate”
	“quản lý”	“manage”
Group 4 – Vietnamese policy maker and regulatory bodies identification terms	"Hà Nội"	“Hanoi”
	“Việt Nam”	“Vietnam”
	“Quốc hội”	“Congress”
	"Nhà nước"	“Federal”
	"Chính phủ”	“Government”
	“Bộ Tài chính”	“Ministry of Finance”

Table 3. Keyword combinations for the construction of the TPU index

Keyword group	Vietnamese keywords	English equivalents
Group 1 – uncertainty/ status terms	"bất ổn"	“uncertainty”
	“căng thẳng”	“uncertain”
	“biến động”	“uncertainties”
	“thâm hụt”	“deficit”
	“thặng dư”	“surplus”
	“ảnh hưởng”	“affect”
Group 2 – object (instrument) terms	“thuế quan”	“tariff”
	“hạn ngạch thương mại”	“quota”
	“xuất khẩu”	“export”
	“nhập khẩu”	“import”
	“chống bán phá giá”	“anti-dumping”
	“tự do hóa thương mại”	“trade freedom”
	“bảo hộ mậu dịch”	“trade protectionism”
	“hiệp định thương mại”	“trade agreement”
	“thương mại”	“trade”
	“cán cân vãng lai”	“balance of payments”
	“cán cân thương mại”	“balance of trades”
	“hàng hóa”	“goods”
	“độc quyền”	“monopoly”
	“cạnh tranh”	“competition”
	“thị trường”	“market”
Group 3 – policy and policymaking terms	“chính sách"	“policy”
	"quy định"	“regulation”
	“điều hành”	“adjustment”
	“điều chỉnh”	“regulate”
	“quản lý”	“manage”
	“hàng rào kỹ thuật”	“technical barrier”
Group 4 – Vietnamese policy maker and regulatory bodies identification terms	"Hà Nội"	“Hanoi”
	“Việt Nam”	“Vietnam”
	“Quốc hội”	“Congress”
	"Nhà nước"	“Federal”
	"Chính phủ”	“Government”
	“Bộ Công Thương”	“Ministry of Industrial and Trade”
	“Tổng cục Hải quan”	“General Department of Vietnam Customs”

Table 4. Text-based data sources and availability

Source	Number of articles	Data availability period
SBV	15,474	Jul 2004 – Jun 2023
MOF	5,618	Mar 2014 – Jun 2023
MOIT	22,756	Jan 2012 – Jun 2023
Vietnamnet	69,835	Nov 2010 – Jun 2023
CafeF	305,542	Oct 2007 – Jun 2023

This table reports the sources and availability of text-based data used for the constructions of the categorical policy uncertainty indices. Data availability period is determined by the longest period of time the article archiver can be accessed.

Table 5. Correlation between GovCEPU and news-based CEPU indices

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) MPU	1.000								
(2) MPU_VNN	0.516***	1.000							
(3) MPU_CFF	0.574***	0.422***	1.000						
(4) FPU	0.237**	0.184*	0.255***	1.000					
(5) FPU_VNN	0.391***	0.790***	0.315***	0.224**	1.000				
(6) FPU_CFF	0.606***	0.615***	0.767***	0.295***	0.538***	1.000			
(7) TPU	0.156*	0.126	0.273***	-0.062	0.089	0.230***	1.000		
(8) TPU_VNN	0.306***	0.719***	0.184**	0.315***	0.747***	0.369***	0.085	1.000	
(9) TPU_CFF	0.477***	0.530***	0.643***	0.307***	0.452***	0.756***	0.192**	0.497***	1.000

This table reports the pairwise correlation matrix of MPU, FPU, TPU, and news-based alternatives (i.e., MPU_VNN, MPU_CFF, FPU_VNN, FPU_CFF, TPU_VNN, and TPU_CFF). Variable descriptions are in Appendix A3. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

Table 6. Correlation between GovCEPU indices and other macro-level uncertainty indicators

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) MPU	1.000							
(2) FPU	0.237**	1.000						
(3) TPU	0.156*	-0.062	1.000					
(4) WUI_VN	-0.118	0.061	0.009	1.000				
(5) VNINDEX_VOL	0.229**	0.227**	0.136	0.290***	1.000			
(6) WUI_WORLD	0.134*	0.002	-0.073	-0.143**	0.047	1.000		
(7) EPU_GLOBAL	0.235***	0.321***	-0.065	-0.228***	0.344***	0.451***	1.000	
(8) GPR	0.106	-0.101	-0.014	-0.157**	0.045	0.496***	0.172***	1.000

This table reports the pairwise correlation matrix of MPU, FPU, TPU, and other uncertainty proxies, including the World Uncertainty Index for Vietnam, World Uncertainty Index (Global), global economic policy uncertainty index, and Geopolitical risk for Vietnam. Variable descriptions are in Appendix A3. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

Table 7. Impacts of MPU and FPU on Vietnamese banks

Panel A. Impact of FPU on loan loss provisions

VARIABLES	(1) LLP	(2) LLP	(3) LLP
FPU	28.925***		
	(10.623)		
FPU_VNN		1.960**	
		(0.783)	
FPU_CFF			0.238
			(0.545)
SIZE	-0.005	-0.039	0.155
	(0.170)	(0.111)	(0.115)
CIR	0.018	0.013**	0.012***
	(0.011)	(0.005)	(0.004)
PROFIT	0.235	0.187**	0.142**
	(0.144)	(0.069)	(0.050)
NPL	0.063	0.091***	0.141***
	(0.036)	(0.024)	(0.027)
Constant	-75.469**	-0.313	-3.072*
	(24.366)	(1.851)	(1.649)
Fixed effects	Yes	Yes	Yes
Observations	213	358	471
Adjusted R-squared	0.491	0.488	0.450

This table presents the regression results of the loan loss provision on FPU variables. The dependent variable is the loan loss provision ratio (LLP). FPU is lagged by one year. Variable descriptions are in Appendix A3. Numbers in parentheses are standard errors. Standard errors are clustered by year following Nguyen and Phan (2017). ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

Panel B. Impacts of MPU on bank risk-taking

VARIABLES	(1) ZSCORE	(2) ZSCORE	(3) ZSCORE
MPU	14.224***		
	(3.832)		
MPU_VNN		10.072***	
		(2.766)	
MPU_CFF			5.153***
			(1.269)
SIZE	-6.434***	-6.142***	-5.908***
	(1.813)	(1.014)	(1.637)
CIR	-0.134*	0.006	0.075
	(0.077)	(0.049)	(0.066)
ROA	1.254	3.034***	3.792***
	(0.865)	(0.534)	(0.631)
NPL	-0.123	-0.310**	-0.285
	(0.144)	(0.118)	(0.164)
Constant	84.162***	110.499***	109.666***
	(23.220)	(16.211)	(33.446)
Fixed effects	Yes	Yes	Yes
Observations	549	475	361
Adjusted R-squared	0.952	0.823	0.873

This table presents the regression results of bank risk-taking on MPU variables. The dependent variable is bank risk-taking (ZSCORE). MPU is lagged by one year. Variable descriptions are in Appendix A2. Numbers in parentheses are standard errors. Standard errors are clustered by year following Nguyen and Phan (2017). ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

Table 8. Impact of TPU on non-financial firms in Vietnam

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) CAPEX	(5) CAPEX	(6) CAPEX
TPU	-0.009***			-0.014***		
	(0.002)			(0.004)		
TPU_VNN		-0.011			-0.167***	
		(0.027)			(0.034)	
TPU_CFF			-0.040*			-0.211***
			(0.020)			(0.029)
SIZE	0.011***	0.015***	0.011**	0.021**	0.021**	0.021**
	(0.003)	(0.004)	(0.004)	(0.010)	(0.009)	(0.009)
LEVERAGE	-0.166***	-0.165***	-0.165***	0.221***	0.197***	0.217***
	(0.023)	(0.029)	(0.024)	(0.029)	(0.043)	(0.029)
CASHFLOW	0.064***	0.073***	0.070**	0.048**	0.056***	0.042***
	(0.012)	(0.016)	(0.013)	(0.017)	(0.011)	(0.016)
Constant	-0.012	-0.132**	-0.016	-0.207*	-0.159	0.030
	(0.039)	(0.055)	(0.048)	(0.111)	(0.111)	(0.102)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,722	3,536	4,559	5,048	3,654	4,846
Adjusted R-squared	0.618	0.642	0.621	0.274	0.271	0.261

This table presents the regression results of firm performance and capital expenditure on TPU variables. The dependent variables are return-on-assets (ROA) in model specifications in Columns 1-3, and capital expenditure scaled by lagged total assets (CAPEX) in Columns 4-6. TPU is lagged by one year. Variable descriptions are in Appendix A3. Numbers in parentheses are standard errors. Standard errors are clustered by year following Nguyen and Phan (2017). ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

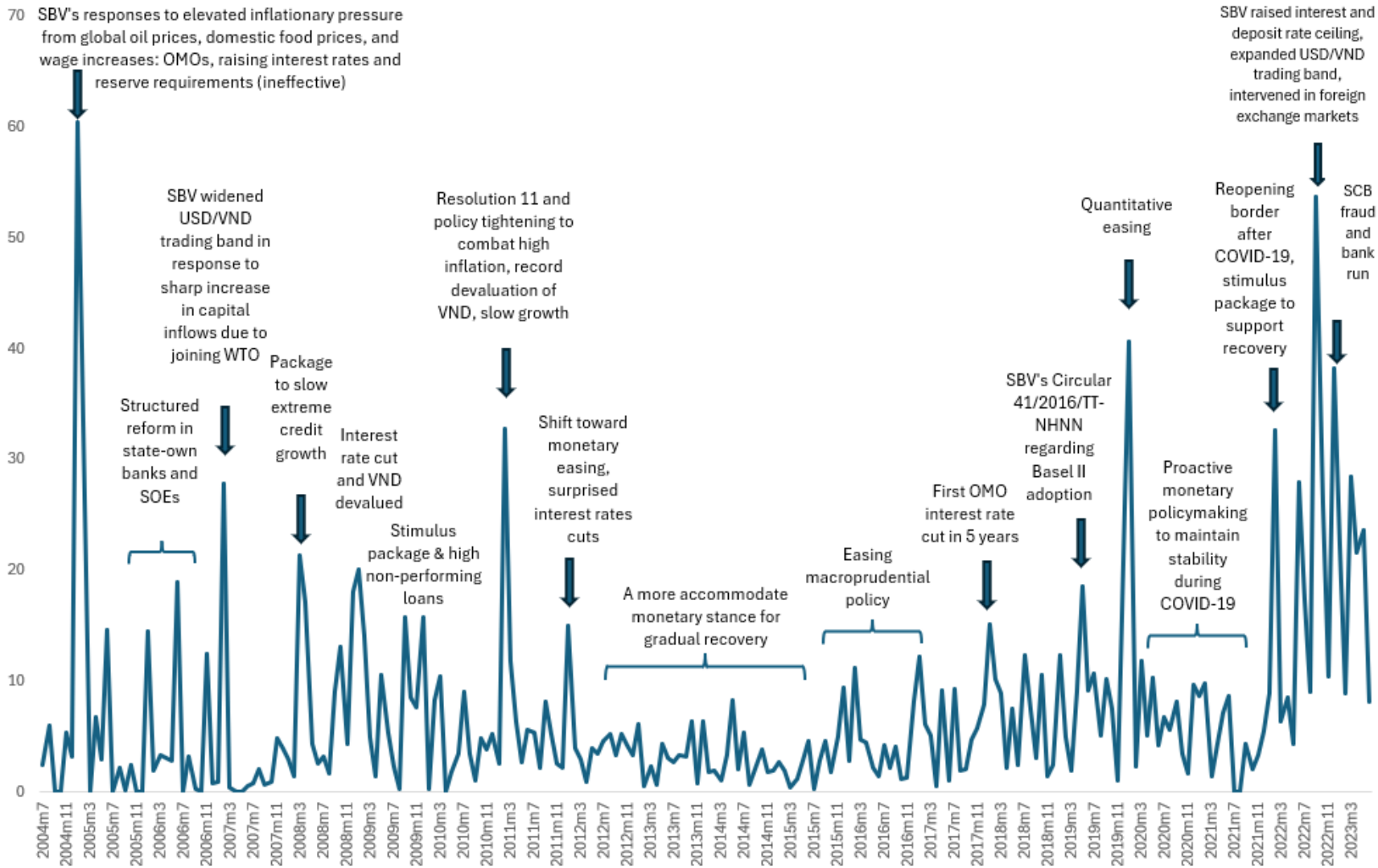


Figure 1. Annotated chart of the monthly Monetary policy uncertainty (MPU) index.

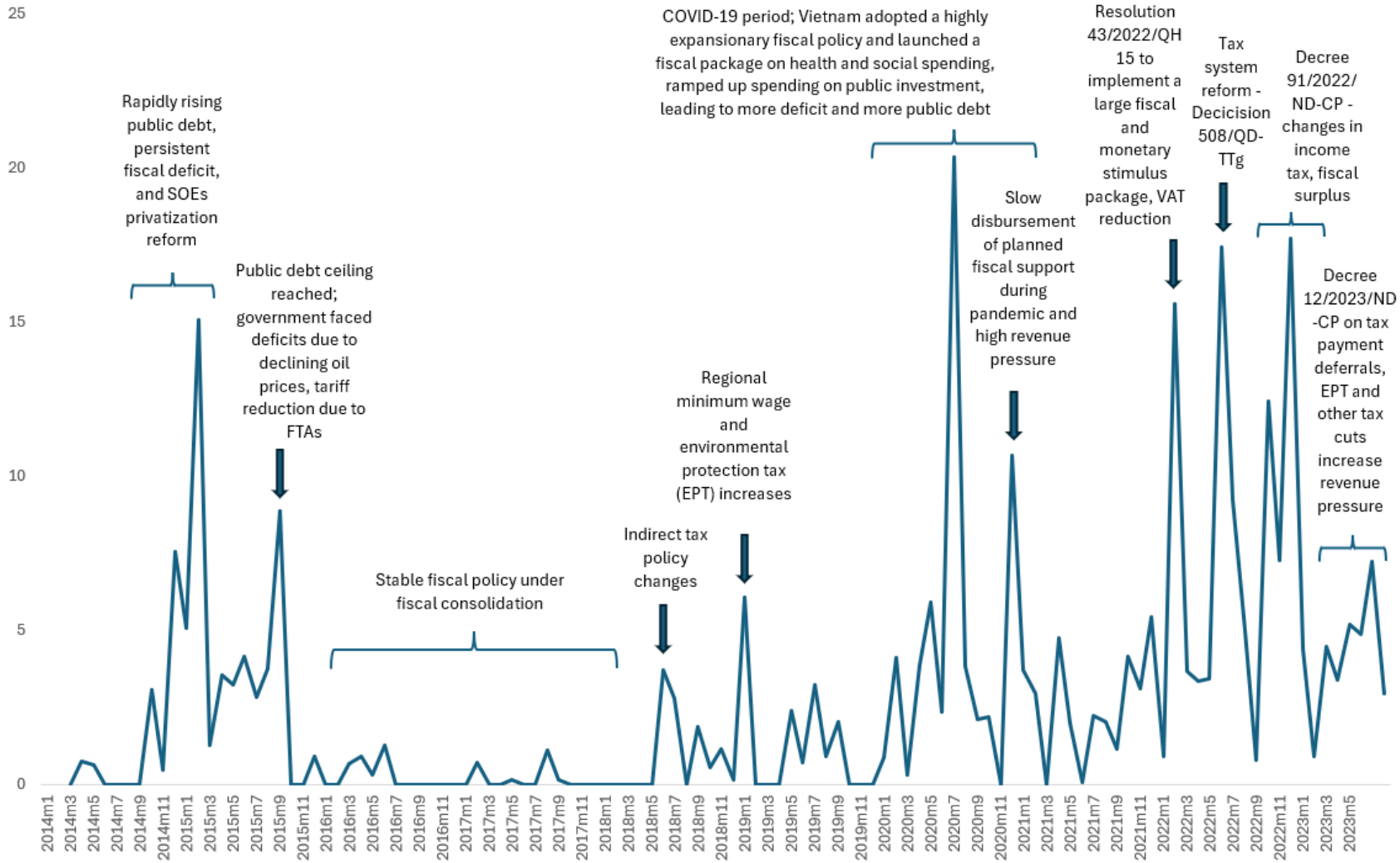


Figure 2. Annotated chart of the monthly Fiscal policy uncertainty (FPU) index.

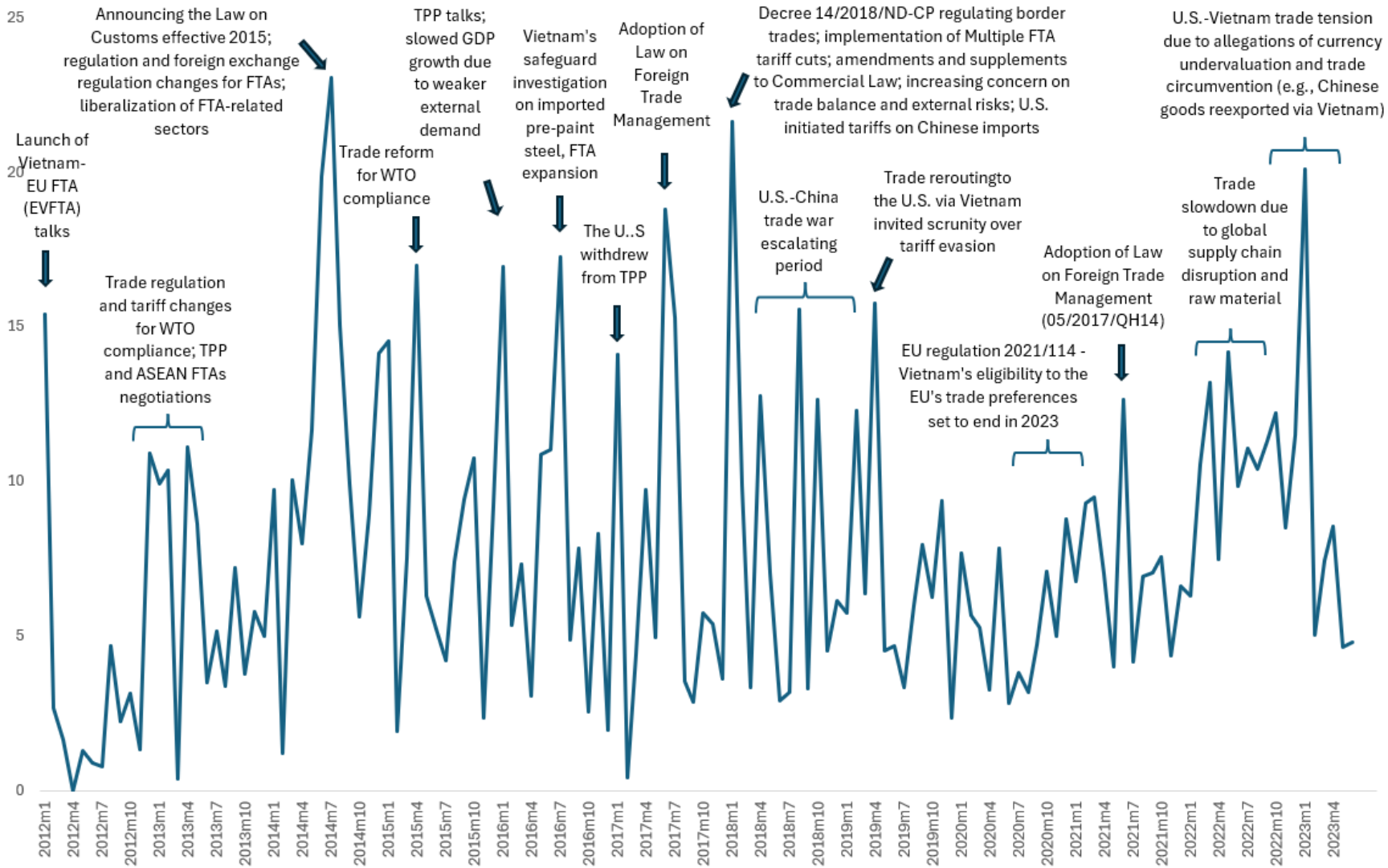


Figure 3. Annotated chart of the monthly Trade policy uncertainty (TPU) index.

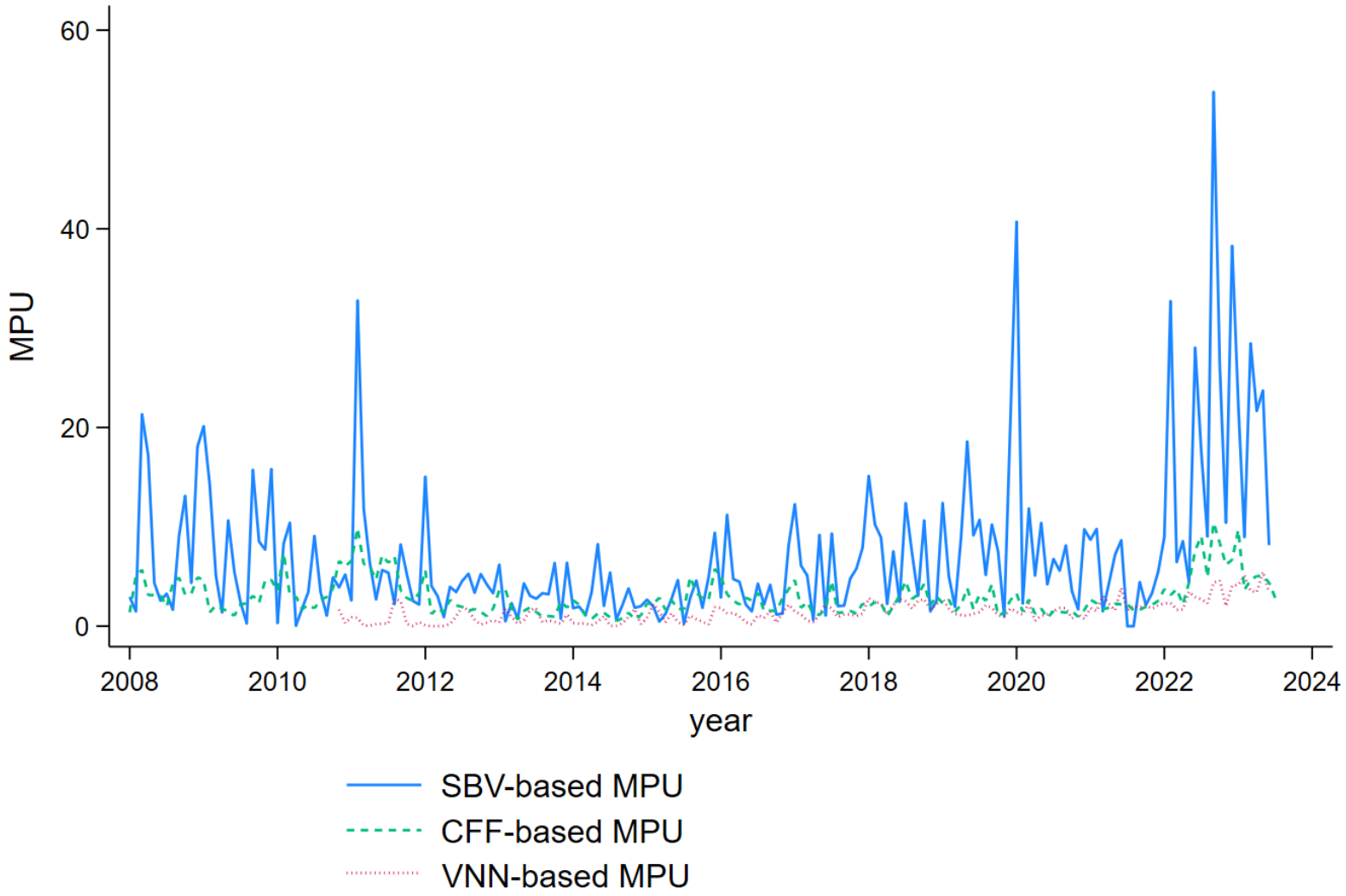


Figure 4. SBV-based MPU index versus news-based MPU indices.

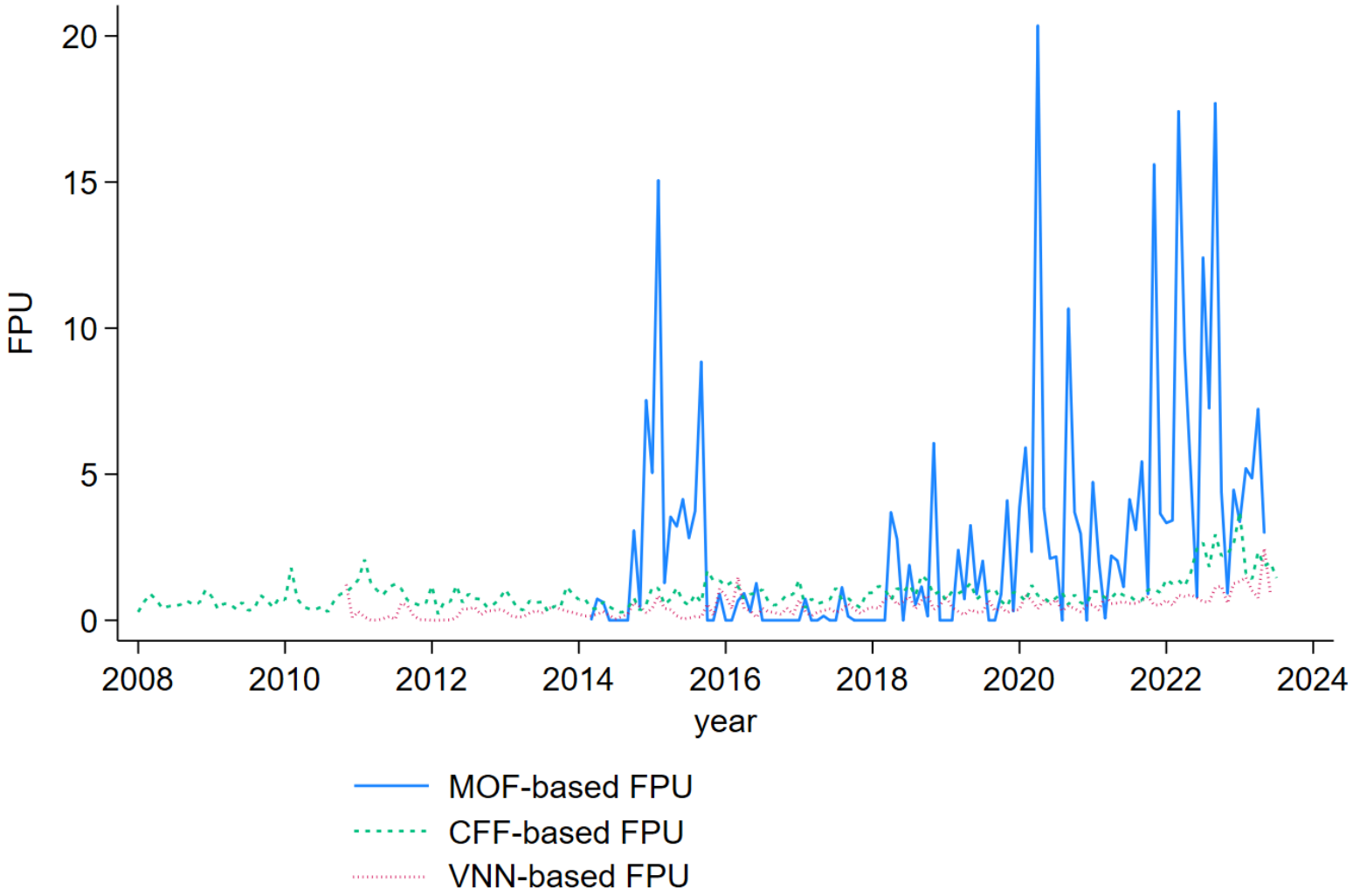


Figure 5. MOF-based FPU index versus news-based FPU indices.

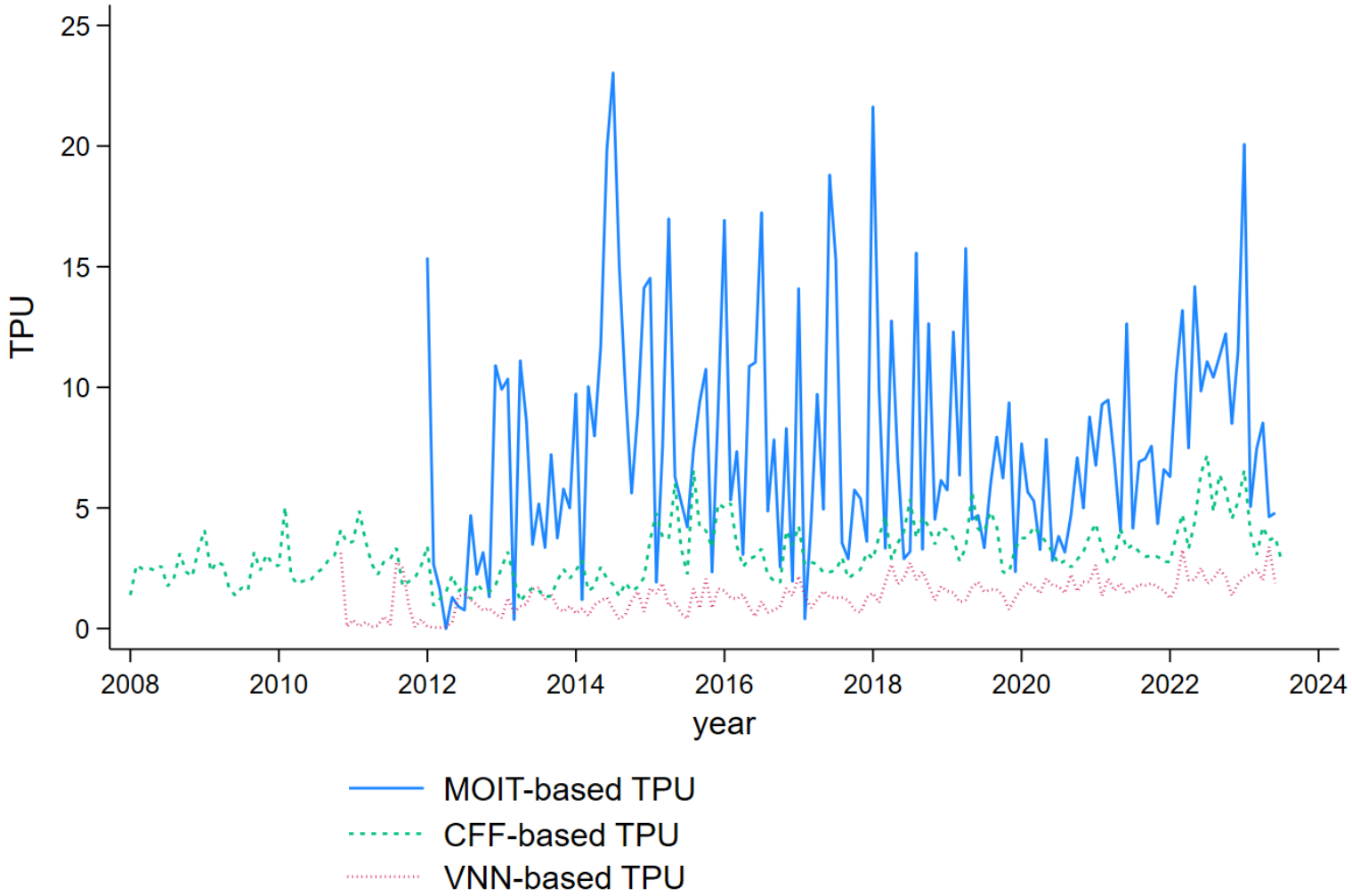


Figure 6. MOIT-based TPU index versus news-based TPU indices.

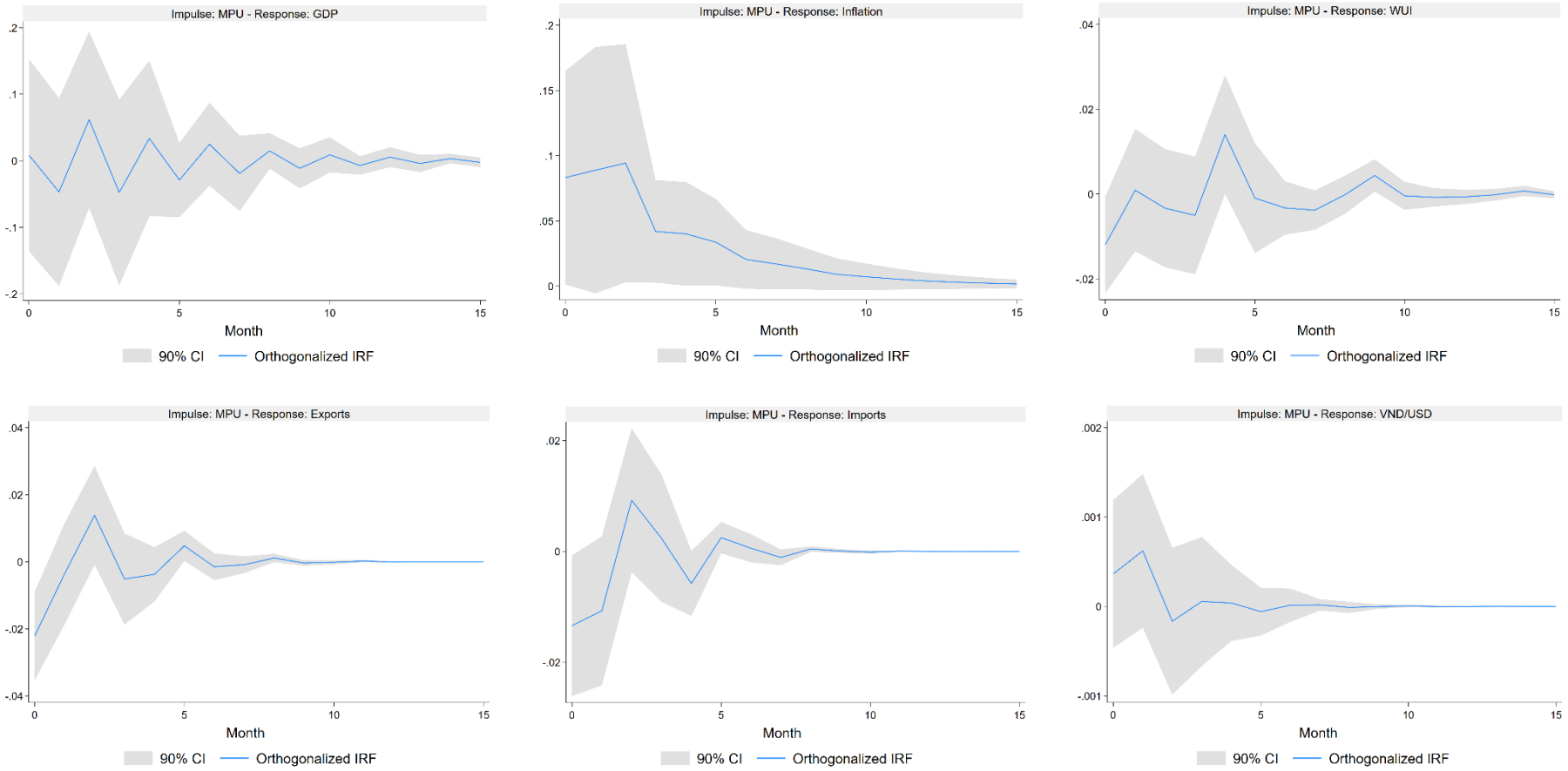


Figure 7. Impulse responses of MPU index to macroeconomic factors.

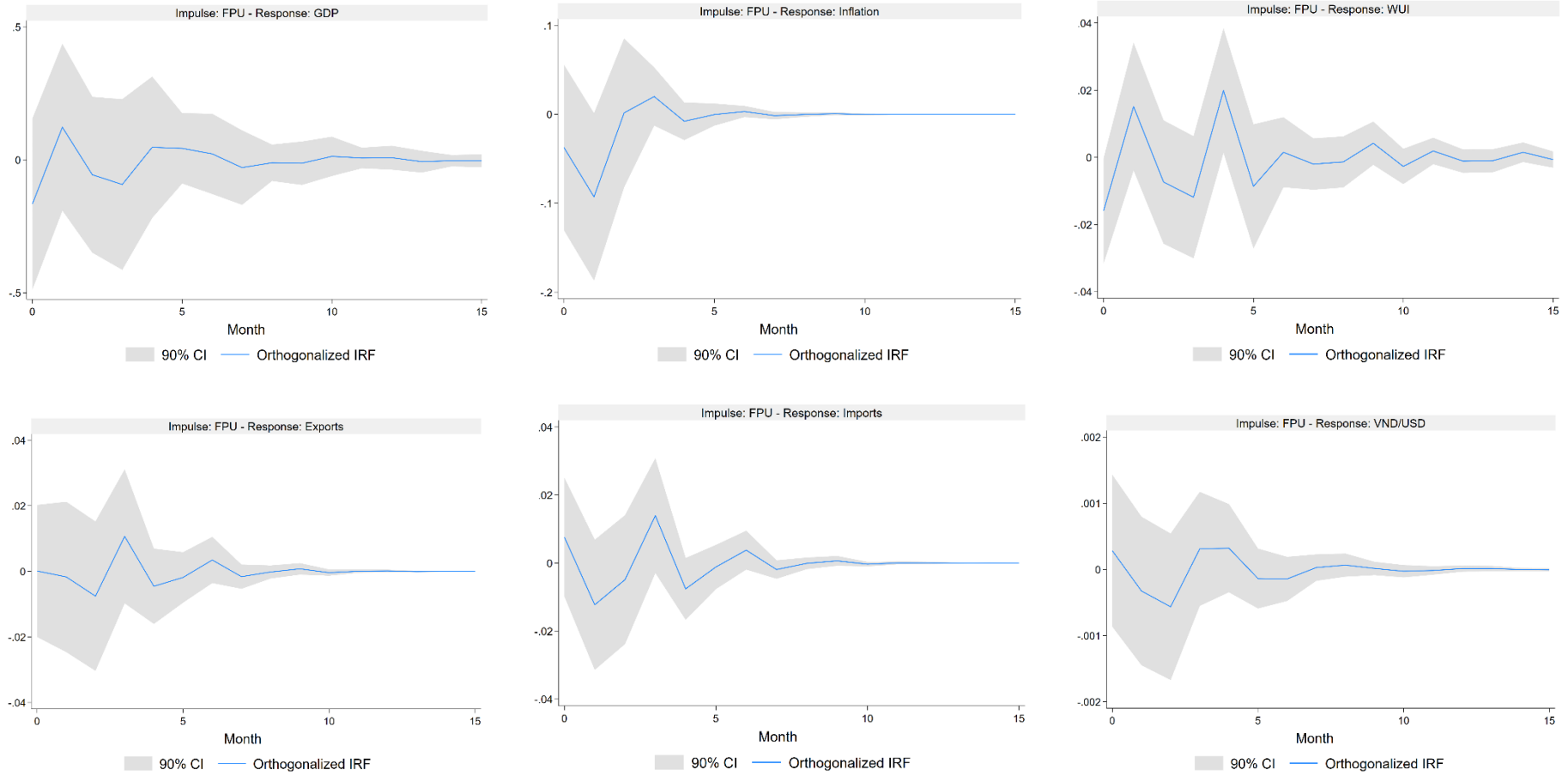


Figure 8. Impulse responses of FPU index to macroeconomic factors.

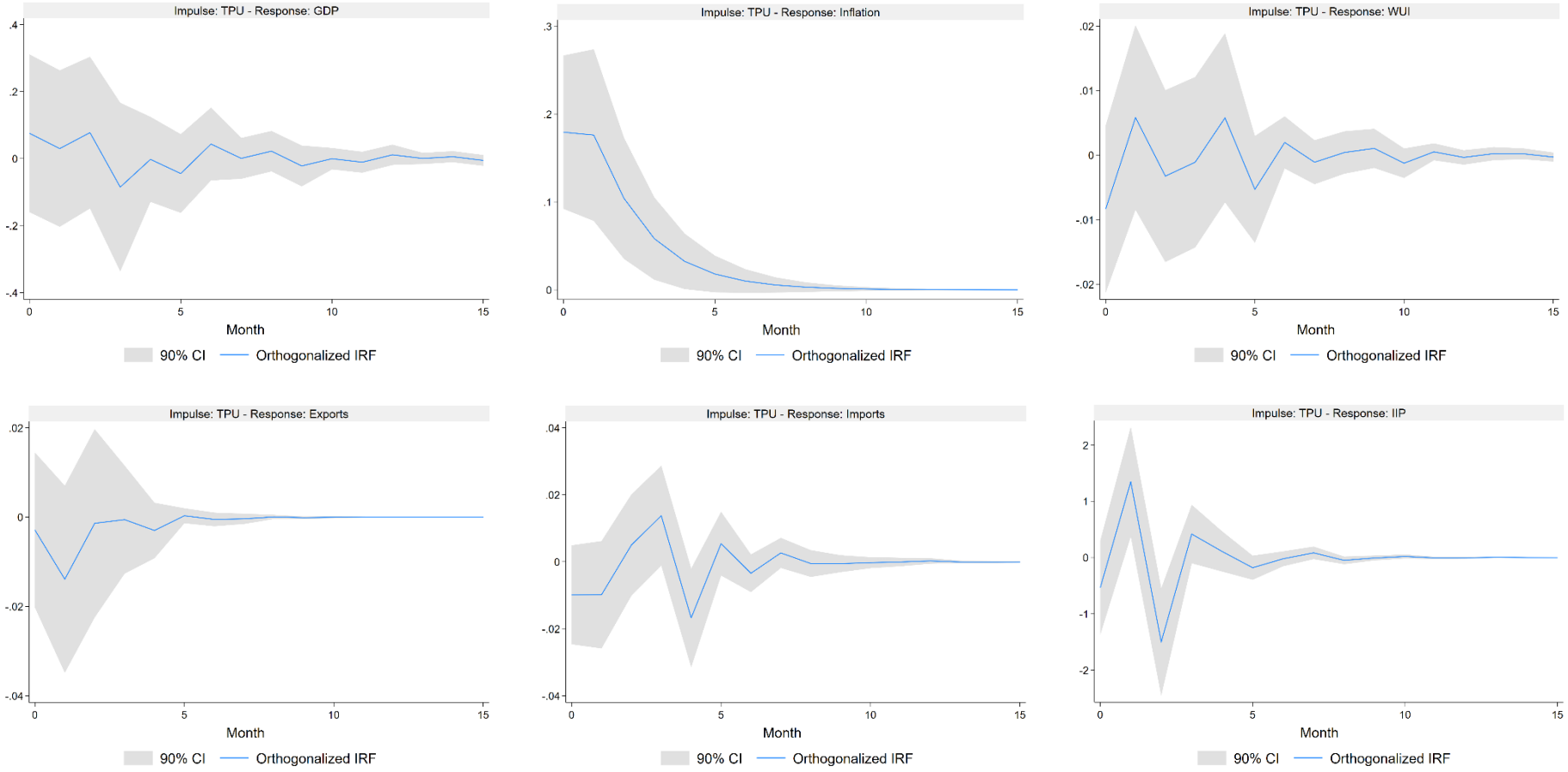
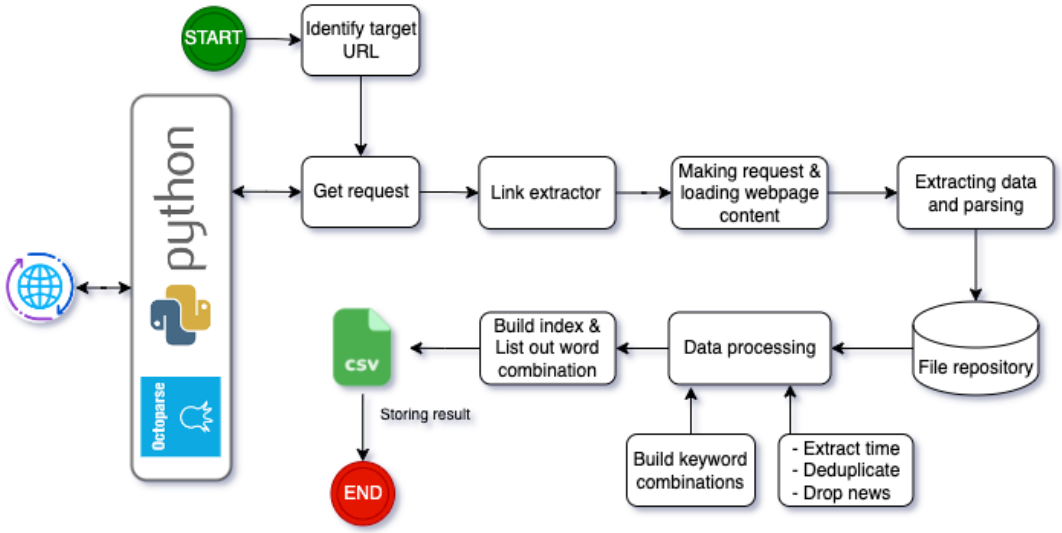


Figure 9. Impulse responses of TPU index to macroeconomic factors.

APPENDIX

Appendix A1. Data processing workflow



1. Identifying target URL:
    - Define Data Requirements: Begin by clearly defining the data to scrape using the word combinations representing monetary policy, trade policy, and fiscal policy.
    - Identify the Website or Webpage: Determine the websites where the desired data is located, including the websites of MOF, MOIT, SBV, and the online newspapers CafeF and Vietnamnet.
    - Analyse Website Structure: Explore the structure of the website to understand how the data is organised and then identify the specific page or pages containing the information.
2. Getting request:

Use Python and Octoparse as technical platforms to extract URLs of news on the websites.

- Create a GET Request: Using the Beautiful Soup library and Octoparse to create a GET request to the target URL.
- Send the GET Request: Send the constructed GET request to the target URL to get the links of news received from the server response.

3. Making requests and loading webpage content:
    - Continue to get requests to target the URL of each piece of news.

- Retrieve and process the response received from the server and load website content.

4. Extracting data and parsing:
    - Extract and parse the content of the response to extract the specific data of the news: time, content of the news.
    - Store the extracted data in CSV files.
5. Data processing:
    - Build word combinations from defined keywords. The lists of keyword combinations are from Tables 1-3.
    - Deduplicating news.
    - Remove error news or no-content news like videos, and magazines.
6. Building index:
    - Use Python libraries to count the frequencies of the word combinations in each newspaper.
    - List out all word combinations that appear in each article.

Appendix A2. Examples of text from government-sourced articles reflecting CEPU

EPU category	Data outlet (website)	Date	Article title (in Vietnamese)	Example text (in Vietnamese)
MPU	SBV	05/05/2023	Chính sách giảm lãi suất được triển khai quyết liệt	"…Theo Phó Thống đốc, giảm lãi suất là một trong tám giải pháp mà Ngân hàng nhà nước đã triển khai trong 4 tháng đầu năm nhằm hỗ trợ doanh nghiệp và nền kinh tế. Cụ thể, Ngân hàng nhà nước đã điều hành chính sách tiền tệ nhằm tạo ổn định giá trị đồng tiền, đảm bảo ổn định tỷ giá - đây là điều kiện tiên quyết; quan trọng nhất."
	VNN	28/07/2022	Một loại lãi suất điều hành của NHNN tăng vọt, giai đoạn tiền rẻ đã chính thức đi qua?	"…Trước đó, mức lãi suất 2,5%/năm được Ngân hàng Nhà nước (NHNN) trực tiếp giảm từ tháng 9/2020, trong đợt giảm đồng loạt các lãi suất điều hành nhằm hỗ trợ nền kinh tế trước tác động sâu sắc của đại dịch COVID-19. Dù tiến hành theo phương thức đấu thầu lãi suất, không trực tiếp ấn định lãi suất nhưng việc NHNN chỉ chấp nhận cho 8/20 thành viên tham gia thị trường vay gần 15.000 tỷ với lãi suất 3,8% thay vì 2,5% cho thấy nhà điều hành đã không còn sẵn sàng cho hệ thống ngân hàng vay vốn với chi phí rẻ như trước nữa…."
	CFF	03/10/2018	Điều hành chính sách tiền tệ: Điểm tựa vững chắc cho nền kinh tế	"…Là cơ quan quản lý nhà nước về tiền tệ, NHNN Việt Nam đã chủ động triển khai nhiều giải pháp để góp phần kiểm soát lạm phát. Việc tín dụng tăng trưởng thấp hơn so với cùng kỳ cũng không nằm ngoài mục tiêu này. Nhờ đó, lạm phát cơ bản tháng 9/2018 tăng 0,14% so với tháng trước và tăng 1,61% so với cùng kỳ năm trước. Lạm phát cơ bản bình quân 9 tháng năm 2018 tăng 1,41% so với bình quân cùng kỳ năm 2017. Một thành công rất đáng ghi nhận nữa là mặc dù áp lực lạm phát tăng cao, song NHNN vẫn duy trì được sự ổn định của mặt bằng lãi suất, thậm chí mặt bằng lãi suất cho vay còn giảm nhẹ so với cuối năm trước…"
FPU	MOF	04/05/2023	Chính sách tài khóa giúp phục hồi và phát triển kinh tế	"…Bước sang năm 2023, tình hình thế giới và trong nước diễn biến ngày càng phức tạp đã tác động tới nền kinh tế, đời sống của người dân và tình hình sản xuất - kinh doanh của doanh nghiệp. Nhằm tháo gỡ khó khăn cho doanh nghiệp, một loạt giải pháp đã được Bộ Tài chính chủ động nghiên cứu và xây dựng. Theo đó, Bộ Tài chính đã đề xuất với cấp có thẩm quyền các giải pháp giảm, gia hạn thuế, phí và tiền thuê đất áp dụng cho năm 2023 với tổng quy mô gói hỗ trợ khoảng 198,4 nghìn tỷ đồng, trong đó, số tiền miễn, giảm là 77,2 nghìn tỷ đồng và số tiền gia hạn là 121,2 nghìn tỷ đồng…"
	VNN	03/01/2019	Lãi suất, tỷ giá biến động ra sao trong năm 2019?	"…Bức tranh tài khóa của Việt Nam đã bớt căng thẳng trong năm 2017 và 2018 khi thâm hụt ngân sách/GDP giảm mạnh nhờ nguồn thu từ thoái vốn nhà nước tại các doanh nghiệp và mức tăng trưởng GDP khả quan. Tuy nhiên các nguồn thu từ thoái vốn doanh nghiệp nhà nước không phải là nguồn thu ổn định do đó về dài hạn tình trạng căng thẳng tài khoá

				của Việt Nam vẫn còn. MBS dự báo, áp lực ngân sách sẽ trở lại vào năm 2020 và 2021. Thu ngân sách Nhà nước 2018 ước đạt trên 1,35 triệu tỷ đồng; chi ngân sách hơn 1,56 triệu tỷ đồng. Như vậy, bội chi ngân sách 204.000 tỷ đồng (khoảng 8,8 tỷ USD), bằng 3,67% GDP, tương ứng với tỷ lệ bội chi kế hoạch Quốc hội giao. Tuy nhiên, thâm hụt ngân sách tính theo phương pháp mới (không tính chi trả nợ gốc) sẽ khó phản ánh được thực trạng căng thẳng ngân sách. Chi trả nợ gốc trong năm 2018 dự kiến khoảng 147 nghìn tỷ VNĐ vẫn sẽ gây áp lực lên chính sách tài khoá của Việt Nam….”
	CFF	28/07/2012	Nhìn lại chính sách tài khóa nửa chặng đường 2012	“…Về thu ngân sách, biểu hiện trước hết là tổng thu so với GDP trong 6 tháng đầu năm đặt 27,6%. Đó là một tỷ lệ cao so với định hướng (25%), một mặt do công tác hành thu đã bám sát dự toán được duyệt, bám sát yêu cầu chi ngân sách; mặt khác có một phần do quy mô GDP tính theo giá thực tế trong 6 tháng đầu năm nay không tăng cao như cùng kỳ năm trước cũng như khi lập dự toán của năm nay. GDP tính theo giá thực tế tăng thấp, do hai yếu tố…”
TPU	MOIT	22/12/2017	Cải cách hành chính năm 2017 tại Bộ Công Thương: Chuyển biến từ nhận thức đến hành động	“…Năm 2017, Bộ Công Thương đã ban hành hai quyết định quan trong về cải cách hành chính là Quyết định 4846 (ngày 9/12/2016) và Quyết định 3610a (ngày 20/9/2017) về phê duyệt phương án tổng thể đơn giản hóa thủ tục hành chính và phương án cắt giảm, đơn giản hóa điều kiện đầu tư, kinh doanh thuộc lĩnh vực quản lý nhà nước của Bộ Công Thương giai đoạn 2017–2018 được cộng đồng doanh nghiệp đánh giá rất cao. Số điều kiện hiện còn là 541 so với dự kiến là 752. Đã phân cấp 141 thủ tục hành chính cấp tỉnh, 10 thủ tục cấp huyện và 2 cấp xã. Công tác xây dựng văn bản đạt tỷ lệ cao theo đó trong năm 2017, Bộ Công Thương phải xây dựng và trình Chính phủ ban hành 53 văn bản trong đó có 11 nghị định, 3 quyết định và 39 thông tư...”
	VNN	05/11/2015	Việt Nam công bố toàn văn Hiệp định TPP	“Toàn văn Hiệp định Đối tác Thương mại Xuyên Thái Bình Dương (TPP) bằng tiếng Anh vừa được Bộ Công Thương Việt Nam công bố chiều 5/11. Các thành viên dự kiến sẽ ký kết hiệp định vào quý I/2016. Chiều 5/11, Vụ Chính sách thương mại đa biên, Bộ Công Thương vừa công bố bản dự thảo toàn văn tiếng Anh của Hiệp định TPP. Theo đó, bên cạnh các quy định chung mà 12 nước thành viên đều tuân thủ ở 30 chương của hiệp định, Việt Nam đã đạt được thoả thuận song phương với 9 trên tổng số 11 thành viên còn lại về các lĩnh vực quan trọng…”
	CFF	13/07/2012	Bộ Công Thương đẩy mạnh triển khai Nghị quyết 13/NQ-CP	“Triển khai Nghị quyết số 13/NQ-CP, Bộ Công Thương đã tổ chức nhiều buổi làm việc với các Tập đoàn, Tổng công ty, doanh nghiệp thuộc Bộ, các Sở Công Thương để xây dựng kế hoạch thực hiện. Trên cơ sở đó, đến nay, Bộ đã có kiến nghị với các cơ quan chức năng liên quan nhằm tạo điều kiện tháo gỡ khó khăn về sản xuất kinh doanh, về tài chính cho các doanh nghiệp như kiến nghị về giá bán than, thuế suất nhập khẩu than, thuế suất nhập khẩu alumin, việc bảo lãnh vay vốn cũng như cơ chế xử lý lỗ của các đơn vị…”

Appendix A3. Variable description

Variable	Description	Obs	Mean	P50	SD	Min	Max
Macro-level variables							
MPU	The monthly monetary policy uncertainty index constructed using textual analysis of data from the website of State Bank of Vietnam (SBV-based MPU). For bank-level analysis, monthly MPU is annualized into annual MPU by taking the mean of the 12-months in a year.	228	6.957	4.315	8.537	0.000	60.417
MPU_VNN	The monthly monetary policy uncertainty index constructed using textual analysis of data from the website of Vietnamnet newspaper (VNN-based MPU). For bank-level analysis, monthly MPU_VNN is annualized into annual MPU_VNN by taking the mean of the 12-months in a year.	152	1.433	1.243	1.104	0.000	5.453
MPU_CFF	The monthly monetary policy uncertainty index constructed using textual analysis of data from the website of CafeF newspaper (CFF-based MPU). For bank-level analysis, monthly MPU_CFF is annualized into annual MPU_CFF by taking the mean of the 12-months in a year.	190	2.925	2.338	1.892	0.517	10.399
FPU	The monthly fiscal policy uncertainty index constructed using textual analysis of data from the website of Ministry of Finance (MOF-based FPU). For bank-level analysis, monthly FPU is annualized into annual FPU by taking the mean of the 12-months in a year.	111	2.793	1.146	4.049	0.000	20.351
FPU_VNN	The monthly fiscal policy uncertainty index constructed using textual analysis of data from the website of Vietnamnet newspaper (VNN-based FPU). For bank-level analysis, monthly FPU_VNN is annualized into annual FPU_VNN by taking the mean of the 12-months in a year.	152	0.456	0.385	0.350	0.000	2.463
FPU_CFF	The monthly fiscal policy uncertainty index constructed using textual analysis of data from the website of CafeF newspaper (CFF-based FPU). For bank-level analysis, monthly FPU_CFF is annualized into annual FPU_CFF by taking the mean of the 12-months in a year.	190	0.901	0.761	0.522	0.183	3.711
TPU	The monthly trade policy uncertainty index constructed using textual analysis of data from the website of the Ministry of Industrial and Trade (SBV-based TPU). For firm-level analysis, monthly TPU is annualized into annual TPU by taking the mean of the 12-months in a year.	138	7.634	6.962	4.753	0.000	23.028
TPU_VNN	The monthly trade policy uncertainty index constructed using textual analysis of data from the website of Vietnamnet newspaper (VNN-based TPU). For firm-level analysis, monthly TPU_VNN is annualized into annual TPU_VNN by taking the mean of the 12-months in a year.	152	1.366	1.374	0.700	0.037	3.394
TPU_CFF	The monthly trade policy uncertainty index constructed using textual analysis of data from the website of CafeF newspaper (CFF-based TPU). For firm-level analysis, monthly TPU_CFF is annualized into annual TPU_CFF by taking the mean of the 12-months in a year.	190	3.048	2.844	1.220	0.930	7.184
WUI_VN	The monthly World Uncertainty Index for Vietnam (Ahir et al., 2022)	186	0.105	0.095	0.103	0.000	0.441
WUI_WORLD	The monthly World Uncertainty Index (global) (Ahir et al., 2022)	186	22,740.990	20,596.000	9,079.864	9,050.000	57,518.000

VNINDEX_VOL	The standard deviation of daily VN-Index during the month. VN-Index is the main stock market index of stocks in Ho Chi Minh Stock Exchanges, Vietnam.	89	19.767	15.281	15.357	3.106	84.884
EPU_GLOBAL	The monthly Global economic policy uncertainty index (Baker et al., 2016)	234	155.615	134.315	78.644	49.225	431.542
GPR	The monthly Geopolitical risk index of Vietnam (Caldara and Iacoviello, 2022)	234	0.076	0.060	0.057	0.000	0.380
Firm-level variables							
LLP	The ratio of loan loss provision in percentage of total loans	606	1.242	1.120	0.765	-0.490	5.260
ZSCORE	The bank risk-taking measure of the bank	619	18.362	14.955	13.651	2.198	86.549
BANKSIZE	The natural logarithm of the total assets of the bank	621	17.940	18.090	1.625	12.334	21.150
CIR	The Cost-to-income ratio of the bank (in percentage)	622	79.439	82.475	15.975	14.420	102.14
PROFIT	Net income to total assets ratio of the bank (in percentage)	619	1.312	1.060	1.071	-0.420	5.380
NPL	Non-performing loan ratio of the bank	578	1.847	1.620	1.517	0.000	10.83
SIZE	The natural logarithm of total assets of the non-financial firms	7,278	13.548	13.466	1.648	9.634	19.581
LEVERAGE	Long-term debt to total assets ratio	6,812	0.085	0.023	0.131	0.000	0.931
CASHFLOW	Net operating cash flow on total assets ratio	5,706	0.068	0.058	0.169	-0.482	0.698
ROA	The return-on-assets ratio of the non-financial firm	6,019	0.058	0.049	0.081	-0.246	0.323
CAPEX	Capital expenditure scaled by the beginning balance of total assets	5,265	0.070	0.031	0.107	0.000	0.639

Appendix A4. The impact of TPU on firm performance across sectors

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA	(10) ROA
TPU	-0.009***	-0.009***	-0.009***	-0.009***	-0.008***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Energy×TPU	0.000									
	(0.001)									
Material×TPU		-0.002***								
		(0.001)								
Industrial×TPU			0.001**							
			(0.000)							
Consumer Discretionary×TPU				-0.000						
				(0.001)						
Consumer Staples×TPU					-0.000					
					(0.001)					
Health care×TPU						0.001*				
						(0.001)				
Information Technology×TPU							-0.001			
							(0.002)			
Communication Services×TPU								0.000		
								(0.001)		
Utilities×TPU									0.002**	
									(0.001)	
Real Estate×TPU										0.003**
										(0.001)
Constant	-0.013	-0.012	-0.012	-0.012	-0.014	-0.011	-0.013	-0.013	-0.015	-0.013
	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.040)	(0.039)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Observations	4,722	4,722	4,722	4,722	4,722	4,722	4,722	4,722	4,722	4,722
Adjusted R-squared	0.618	0.619	0.619	0.618	0.618	0.618	0.618	0.618	0.619	0.618

This table presents the regression results of firm performance on TPU and TPU's interaction with sector dummies. The dependent variables are return-on-assets (ROA). Sector classification follows the Global Industry Classification Standard (GICS). TPU is lagged by one year. Variable descriptions are in Appendix A2. Numbers in parentheses are standard errors. Standard errors are clustered by year following Nguyen and Phan (2017). ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.