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Policy Uncertainty and Macroeconomic Dynamics: A New Index for Morocco

Oussama Houari**

Abstract. In the absence of a dedicated Economic Policy Uncertainty (EPU) index for Morocco, we construct a novel measure using natural language processing techniques applied to seven major Moroccan newspapers. The resulting index captures fluctuations in uncertainty related to the political context, economic downturns, and extreme climate events. Employing Structural Vector AutoRegression (SVAR) models, we assess the impact of both world and domestic uncertainty shocks on Morocco's macroeconomic dynamics. Our findings show that the EPU index is countercyclical and significantly influences the economy through several transmission channels. In particular, heightened uncertainty worsens business cycle indicators, amplifies household pessimism, and promotes cash hoarding over bank savings. This research enriches the existing literature by uncovering the distinctive features of policy uncertainty in a small open emerging economy and underscores its implications for economic policy decision-making and public policy evaluation.

Keywords: Uncertainty shocks; Economic policy; Transmission mechanisms; SVAR

Résumé. En l'absence d'un indice d'incertitude de politique économique (EPU) pour le Maroc, nous en construisons un à partir de sept journaux nationaux en utilisant des méthodes de traitement automatique du langage. Cet indice reflète l'incertitude liée au contexte politique, aux ralentissements économiques et aux événements climatiques. À l'aide de modèles SVAR, nous montrons que cet indice est contracyclique et affecte significativement l'économie marocaine via plusieurs canaux de transmission. Une hausse de l'incertitude détériore les indicateurs conjoncturels, accentue le pessimisme des ménages et favorise la thésaurisation au détriment de l'épargne bancaire. Nos résultats soulignent l'importance de l'incertitude pour l'analyse et la conduite des politiques économiques au Maroc.

Mots clés : Chocs d'incertitude; Politique économique; Mécanismes de transmission; SVAR

JEL classification: D80, C32; E22, E32; E66

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1 Introduction

Ever since the COVID-19 pandemic crisis, households and firms have faced an unprecedented level of uncertainty, not only regarding the health situation but also concerning the economy's ability to cope with the pandemic shock and the related economic policy decisions. This episode was preceded by two decades during which financial and economic policy uncertainties repeatedly tested the global economy (the Dotcom crisis, the Great Recession of 2007–2009, the European sovereign debt crisis of 2010–2012, the Brexit referendum in 2016, the U.S. presidential election of the same year, and trade and geopolitical tensions involving the United States, China, and Russia). It is therefore essential for investors, researchers, and policymakers to (i) quantify the different sources of uncertainty, (ii) assess their impacts on the real and financial spheres of their respective domestic economies, and (iii) analyze the phenomena of global contagion.

There is widespread consensus in the academic literature regarding the significant negative effects of uncertainty on macroeconomic aggregates. For instance, Leduc and Liu (2016) demonstrate that an increase in uncertainty raises unemployment in the United States. This view is further supported by Caldara et al. (2016), who show that uncertainty shocks have robust negative effects on economic activity. Bekaert et al. (2013), Jurado et al. (2015), Ludvigson et al. (2021), and Baker, Bloom, and Davis (2016) provide strong empirical evidence that uncertainty has a statistically significant negative impact on the business cycle.

The literature identifies three main transmission channels. First, the real-options channel, which posits that higher uncertainty prompts firms facing irreversible investments to adopt the so-called "wait and see" attitude, causing a decline in output, investment and hiring (Bernanke, 1983; Dixit and Pindyck, 1994; Baker and Bloom, 2013). Second, the precautionary saving channel, whereby heightened uncertainty induces risk-averse agents to place greater weight on future consumption, thereby increasing current savings (Leduc and Liu, 2012; Basu and Bundick, 2017; Yıldırım-Karaman, 2018). Third, uncertainty shocks may affect the economy through financial frictions: as uncertainty rises, investors demand higher compensation for bearing risk (particularly default risk), increasing the cost of finance, i.e., the risk premium. Empirically, this leads banks to charge entrepreneurs higher interest rates, reducing investment and economic growth

(Christiano et al., 2014; Gilchrist et al., 2014; Arellano et al., 2019).

However, empirical studies of uncertainty in emerging markets remain scarce, despite growing evidence of their heightened vulnerability to uncertainty shocks. Carrière-Swallow and Céspedes (2013) show that exogenous uncertainty shocks lead to deeper and more persistent contractions in investment and consumption in emerging economies, which lack the rebound observed in advanced countries. These amplified effects are attributed to tighter credit constraints and shallower financial markets. Azad and Serletis (2022) show that U.S. monetary-policy uncertainty spills over into inflation and output volatility in inflation-targeting emerging economies such as Brazil, South Africa, and Mexico. Despite these findings, the majority of research on uncertainty shocks, particularly on Economic Policy Uncertainty (hereafter EPU), focuses primarily on large economies. As a result, EPU indicators are currently available for only 31 countries, with only a few emerging economies from Latin America (e.g., Colombia and Chile) and Asia (e.g., India and Pakistan). Notably, there is an absence of indicators for countries in the MENA region and Africa.[1]

Another widely used measure is the World Uncertainty Index (WUI), developed by Ahir et al. (2022) for 143 countries including Morocco. It is based on the frequency of the term *uncertainty* in quarterly country reports published by the Economist Intelligence Unit (EIU). This work provides valuable insights into the measurement of economic uncertainty at the international level, representing the first effort to construct an index covering a large set of advanced, emerging, and developing economies. However, the WUI may not fully capture the specificities and idiosyncrasies of individual domestic economies. As a result, several Moroccan macroeconomic and financial aggregates appear to be only loosely associated with the developments of this index, both in correlational and causal terms, as we will demonstrate in the following sections.

Additionally, the index is based on only one EIU report per country per quarter, leading to potentially quite large sampling noise.[2] For example, the value of the Moroccan WUI is equal to zero over several periods, as illustrated in Figure A.1 in the appendix. This raises questions about what a zero value imply for economic uncertainty, as it might suggest a high level of procedural and cognitive abilities among Moroccan economic

[1] Except for the case of Nigeria, where an index was developed in late 2023 by Tumala et al. (2023) from the CBN (Central Bank of Nigeria). See www.policyuncertainty.com.
[2] See Ahir et al. (2022) pp. 3 and 21-22.

agents. This constitutes a strong assumption and highlight the benefits of complementing the WUI approach with a country-specific perspective tailored to the Moroccan economic and institutional contexts.[3]

This study aims to address these gaps by developing an inclusive approach to the broader debate on uncertainty, specifically in the context of the Moroccan economy. Our contributions to the related literature is twofold. First, we construct, for the first time, an Economic Policy Uncertainty index for Morocco following the methods outlined by Baker, Bloom, and Davis (2016). Our index is built using automated textual analysis methods, which analyze the frequency of press articles containing words such as "uncertainty," "economy," etc., from seven major Moroccan newspapers.[4] Second, we employ a variety of SVAR models to examine the comparative impacts of World and Policy uncertainty shocks on Moroccan macroeconomic dynamics. This analysis identifies different transmission mechanisms, utilizing variables that remain unexplored in the related literature, such as cash in circulation.

Our results show that the evolution of the EPU index in Morocco is countercyclical and closely linked to domestic conditions, reflecting the political context, economic recessions, and more recently, extreme climatic conditions (mainly droughts and heatwaves), as well as large-scale international events of a geopolitical and economic nature. This countercyclical nature is confirmed by the results of econometric modelling, in which we demonstrate that economic policy uncertainty shocks have a significant negative impact on the Moroccan economy, unlike world uncertainty shocks. These effects are transmitted to the business cycle through various mechanisms affecting both supply and demand, i.e., the real options channel and the precautionary savings channel.

These results also highlight a particularity specific to the Kingdom, namely that the savings behaviour of Moroccan agents following an uncertainty shock does not follow the traditional pathways explored in the related literature (e.g., increased bank deposits) but primarily manifests through an increase in cash circulation and hoarding. In other words, Policy Uncertainty is a determinant of cash circulation in Morocco.[5] This study

[3] We observe a similar pattern of zero-value periods in the WUI for several MENA countries, notably Egypt, Jordan, and Tunisia, among others.

[4] To construct the U.S. EPU index, Baker, Bloom, and Davis (2016) select 10 leading newspapers: USA Today, Miami Herald, Chicago Tribune, Washington Post, Los Angeles Times, Boston Globe, San Francisco Chronicle, Dallas Morning News, New York Times, and Wall Street Journal.

[5] Shimi et al. (2023) show that non-transactional cash demand, i.e., cash hoarding, fluctuated in 2021 between 60% and 80% of the total value of high-denomination banknotes (100 MAD and 200 MAD)

thus contributes to enriching the existing literature and demonstrates the importance of considering uncertainty in economic research in Morocco, particularly in policy decision-making, the communication of these decisions, and the evaluation of public policies.

The rest of the paper is structured as follows. The second section provides an overview of the data utilized and the methodology adopted for constructing the EPU index. Section 3 assesses the validity of our EPU measures for Morocco through multiple approaches and provides further evidence on the evolution of policy-related uncertainty in the country over time. Section 4 and Section 5 focus, respectively, on the methodology used to quantify the transmission channels of uncertainty shocks to the Moroccan economy, and on the presentation of the corresponding estimation results, including several extensions and sensitivity checks. Section 6 concludes.

2 Measuring economic policy uncertainty

In this section, we develop a Moroccan-specific Economic Policy Uncertainty (EPU) index. We then examine the narrative associated with the most significant increases in the index. We demonstrate that the fluctuations in our index are closely linked to the political context, economic recessions, and, more recently, to extreme weather conditions (primarily droughts and heatwaves).

To assess the impact of uncertainty shocks on financial and real cycles in Morocco, we follow the methodology proposed by Baker, Bloom, and Davis (2016) and construct the EPU index based on the frequency of press articles from seven major Moroccan newspapers, both in French (Le Matin, La Nouvelle Tribune, L'Économiste, Le Desk, and Libération) and Arabic (Al-Ahdath Al-Maghribiya and Bayane Al-Yaoume). The selection of these newspapers is driven by the bilingual nature of the press in Morocco, the popularity of the newspapers, and their availability in the FACTIVA database (Dow Jones & Company). The corpus comprises 355,248 articles spanning the period from April 2011 to March 2025.

Our objective is to capture the uncertainty related to economic policy decision-makers,[6] various types of economic policies,[7] and the effects of their implementation

in circulation, depending on the assumptions used. It is worth noting that these two denominations accounted for more than 97% of the total value of currency in circulation in Morocco in the same year.

[6] Government, parliament, central bank, etc.

[7] Monetary policies, fiscal policies, etc.

(or lack thereof).[8] Consequently, a press article addressing uncertainty must contain at least one term from each of the three categories, each consisting of a set of keywords related to Economic (E) Policy (P) Uncertainty (U). As shown in Table 1, we adjust the

Table 1 Arabic, French, and English keywords corresponding to "Economic", "Policy", and "Uncertainty" categories

Keywords in Arabic	Keywords in French	Translated keywords
Uncertainty-related keywords		
غامض ou غموض ou ريبة ou شك ou انعدام اليقين ou عدم اليقين ou انعدام الاستقرار ou عدم الاستقرار ou اضطراب ou تقلب ou اختلال ou خلل	incertitude*, incertain*	uncertain*
Policy-related keywords		
ضريب or سياس ضريبية or نقد or سياس or تقنين or قوانين or قانون or برلمان or نقد or تشريع or بنك مركزي or بنك المغرب or بام or معدل or اسعار الفائدة or سعر الفائدة or الفائدة or نسب الفائدة or سعر رئيسي or ضرائب or حكوم or اسعار رئيسي or وزير or وزار or رسوم or رسم or جباي or وزراء or إصلاح or تنظيم or مالي or إنفاق عام or ميزاني or عجز or تعديل or عبء خزين or إنفاق خزين or إنفاق حكوم or إيراد خزين or إيراد حكوم or إيراد عام or دين or دين خزين or دين حكوم or دين عام سيادي	fiscal* or "politique fiscale" or monetaire* or "politique monetaire" or parlement* or loi* or legisla* or "banque centrale" or "bank al-maghrib" or bam or "taux d'interet" or "taux directeur" or gouvern* or tax* or impot* or minist* or financ* or regul* or reglementa* or reform* or deficit* or budget* or "politique budgetaire" or "depense publique" or "depense du tresor" or "charge du tresor" or "recette publique" or "recette du tresor" or "dette publique" or "dette du tresor" or "dette souveraine"	fiscal* or "fiscal policy" or monetary* or "monetary policy" or parliament* or law* or legisla* or "central bank" or "Bank Al-Maghrib" or bam or "interest rate" or "policy rate" or govern* or tax* or ministr* or financ* or regulat* or reform* or deficit* or budget* or "public spending" or "treasury charges" or "public revenue" or "treasury revenue" or "treasury resources" or "public debt" or "treasury debt" or "sovereign debt"
Economy-related keywords		
اقتصاد	economi*	econom*

Notes: For Latin languages, FACTIVA does not automatically recognize the various declensions for each term used. As a result, asterisks are employed to enable this feature. For example, entering the term "minist*" into the FACTIVA search engine will display all articles from the selected newspapers mentioning the terms "ministre," "ministres," etc. This is not necessary for Arabic, as FACTIVA automatically recognizes all word declensions. It is sufficient to enter the term "ضريب" for FACTIVA to find all articles from the selected newspapers mentioning terms like "ضريبة", "ضريبي", etc. Moreover, we include variants like نفقات, مداخيل and ديون.

[8] In terms of taxes, deficit, interest rates, etc.

list of terms used by Baker, Bloom, and Davis (2016) for the U.S. case to better reflect the institutional and economic specificities of Morocco.[9]

The construction of the dictionary, particularly the set of policy-related (P) terms, raises important concerns. Many policy expressions may or may not convey genuine economic uncertainty, depending on the context in which they appear. As with any automated textual classification, this process is subject to two principal types of error: false positives, where non-relevant articles are incorrectly flagged, and false negatives, where genuinely relevant content is missed. Identifying an appropriate balance in the selection of P terms thus represents a non-trivial challenge,[10] particularly in a multilingual and context-specific environment such as Morocco. To mitigate these risks, we undertook a meticulous and extensive manual review of several hundred newspaper articles to identify the vocabulary most relevant to economic policy uncertainty in the Moroccan context. Particular attention was devoted to Arabic-language sources, for which this constitutes the first attempt to construct a dedicated uncertainty-related dictionary, thereby addressing a notable gap in the existing literature.

As shown in Table 2, we find that 8,751 press articles (about 2.46% of the total corpus) simultaneously contain at least one term from each of the three categories related to Economic (E) Policy (P) Uncertainty (U).

Table 2 Summary of newspapers utilized for index construction

	Newspaper	Total articles	EPU-related articles	Data span
Francophone newspapers	Le Matin	90,192	841	October 2016 - March 2025
	La Nouvelle Tribune	65,649	856	April 2011 - March 2025
	L'Économiste	50,258	596	October 2016 - March 2025
	Le Desk	15,580	100	June 2020 - March 2025
	Libération	10,281	148	April 2022 - March 2025
Arabic-language newspapers	Al Ahdath Al Maghribia	87,023	2,473	October 2012 - March 2025
	Bayane Al Yaoume	36,265	3,737	October 2012 - March 2025
	Total	355,248	8,751	April 2011 - March 2025

[9] The list of words originally used by Baker, Bloom, and Davis (2016) is as follows: "economic" or "economy"; "uncertain" or "uncertainty"; and one or more of "congress", "deficit", "Federal Reserve", "legislation", "regulation", or "White House".
[10] Thanks to Steven J. Davis for drawing our attention to this important point.

We observe a relatively low volume of archived publications on FACTIVA between April 2011 and December 2014, alongside irregular volatility patterns that are not clearly associated with identifiable economic or political events. Only 25,217 articles and 962 uncertainty-related articles were archived during this period. This lack of coverage is noteworthy, as the period includes pivotal events in Morocco's political history, notably the constitutional referendum of July 1, 2011, which introduced major reforms in response to social movements. Furthermore, no articles were archived during July and August 2011, despite significant political and social developments during these months. These inconsistencies in coverage could bias our analysis. To ensure data reliability and consistency, we therefore restrict our sample to data from January 2015 onwards.

The frequency of publications varies over time and across newspapers, so we scale the frequency of EPU-related articles by the total number of publications per month and per newspaper. This adjustment allows us to correct the EPU index for variations that are simply due to (i) the absolute increase in the total number of publications and (ii) relative political or editorial biases across outlets, meaning that fluctuations in our index more accurately reflect shifts in media coverage related to economic uncertainty. The series are then standardized to unity for each newspaper and normalized to a mean of 100 over the 2015–2025 period. The robustness of this methodology is demonstrated in Baker, Bloom, and Davis (2016), and it has been shown to withstand variations in political and editorial biases across different media sources.[11] For precision, let X_{it} denote the ratio of EPU-related articles to the total publications, corresponding to the third and second columns of Table 2, respectively, for each newspaper $i = 1, 2, ..., 7$ and each month t :

$$X_{it} = \frac{epu\_articles_{it}}{total\_articles_{it}} \tag{1}$$

To obtain a standardized series Y_{it} for each newspaper, we consider the ratio of the articles related to EPU to its standard deviation, as follows:

$$Y_{it} = \frac{X_{it}}{\sigma_i} \tag{2}$$

The series Y_{it} now has a unit standard deviation for each newspaper. We then combine the standardized series Y_{it} by calculating the arithmetic mean of the seven newspapers

[11] See Section 3 for a detailed discussion of our assessment strategies, which are designed to address concerns related to our media-based measure of policy uncertainty.

for each month. This yields a new series Z_{it} such that:

$$Z_t = \frac{\sum_{i=1}^{n} Y_{it}}{n} \tag{3}$$

To obtain the Economic Policy Uncertainty (EPU) index, we normalize the series Z_{it} by multiplying each of its observations by $100/\mu$, where μ is the mean of Z_{it} over the period from January 2015 to March 2025. This ensures that the index is scaled to a baseline value of 100 for the period 2015-2025. The formula becomes:

$$EPU_t = \frac{Z_t}{\mu} * 100 \tag{4}$$

The resulting EPU_t index is presented in Figure 1 below. We observe that the index has exhibited significant fluctuations over the past decade, with notable spikes driven by domestic factors. These include structural reforms to the compensation fund (i.e., the definitive liberalization of fuel prices in December 2015), pension system reforms,[12] the political deadlock from October 2016 to March 2017,[13] and the pandemic crisis and its economic consequences starting in March 2020. More recently, extreme climatic phenomena, such as consecutive years of drought, have raised substantial uncertainties regarding the ability of the Moroccan economy, particularly the agricultural sector, to adapt to these new challenges.

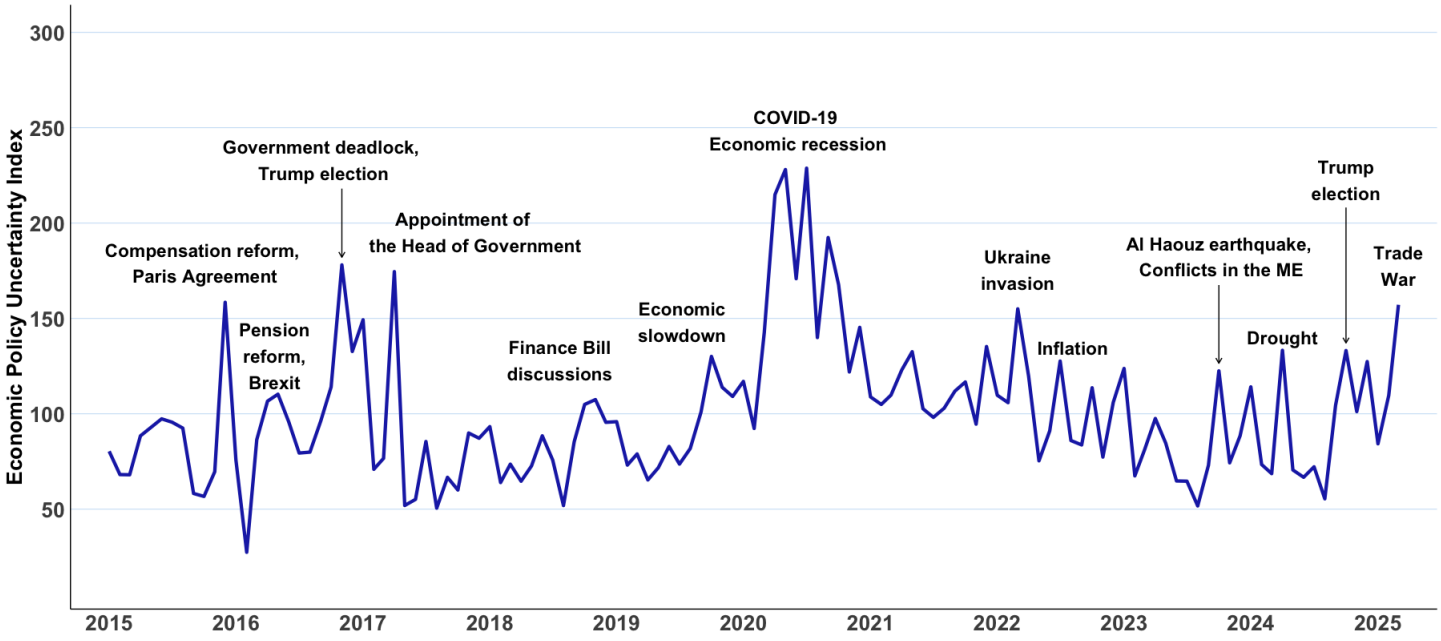
Major international events, primarily geopolitical and economic in nature, also exert a significant influence on the dynamics of economic policy uncertainty in Morocco. The results of the Brexit referendum in June 2016 and the U.S. presidential election in November of the same year are pertinent examples in this regard. The Russo-Ukrainian war and the conflicts in the Middle East have further exacerbated economic uncertainties in the country. This is due, on the one hand, to the profound repercussions of these crises, including geopolitical fragmentation and heightened international tensions among major global powers. On the other hand, it is specifically related to the critical role played by

[12] On June 28, 2016, the parliamentary majority adopted legislative texts regarding the gradual increase in the retirement age for pensioners of the Moroccan Pension Fund (Caisse Marocaine des Retraites, CMR) from 60 to 63 years.

[13] After leading the legislative elections in October 2016, the Justice and Development Party (Parti de la Justice et du développement, PJD) led by Abdelilah Benkirane faced difficulties in forming a government coalition due to disagreements with other political parties. In March 2017, Saad-Eddine El Othmani, also a member of the PJD, was appointed as the head of the government. The EPU index saw a significant decline during the subsequent period.

these regions in global cereal and energy markets, combined with Morocco's dependence on imports in these two strategic sectors. The recent escalation of trade tensions initiated by the new U.S. administration has added another layer of uncertainty, particularly in relation to global value chains and Morocco's trade-exposed sectors.

Figure 1 Monthly Economic Policy Uncertainty Index for Morocco



Notes: This index reflects the monthly frequency of newspaper articles containing the three categories of terms detailed in Table 1. The newspapers considered are listed in Table 2. The series presented here is the result of numerous transformations described in equations 1-4.

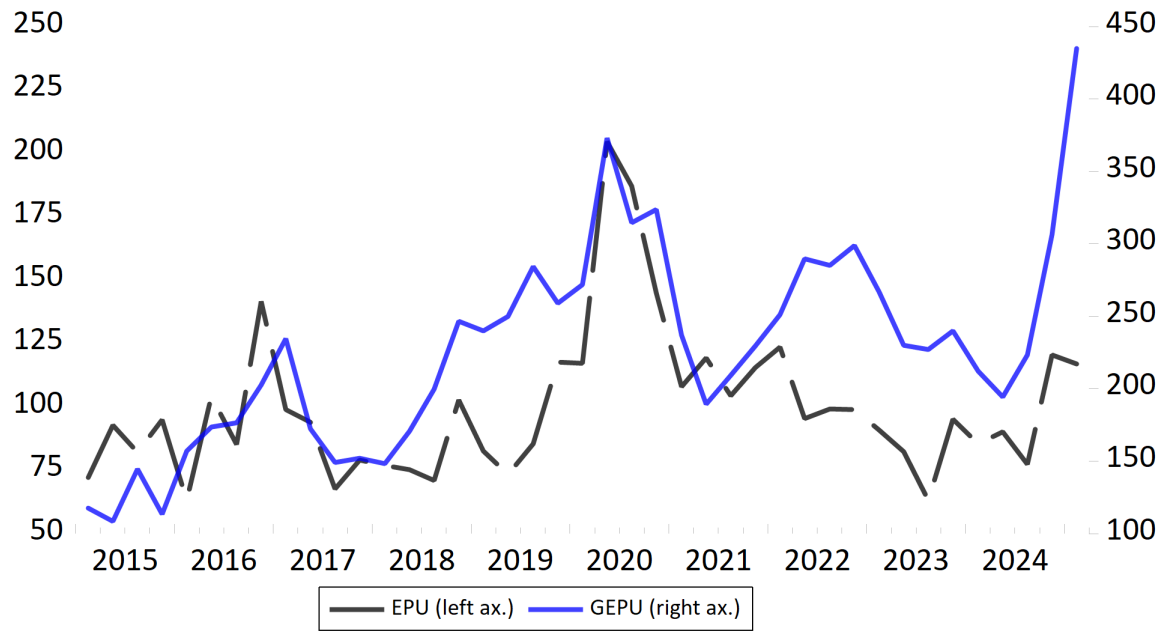
3 Assessment of our policy uncertainty measure

As outlined in Section 2, leveraging newspaper coverage to proxy economic policy uncertainty raises concerns regarding potential political or editorial biases, as well as the accuracy and consistency of media narratives. This section seeks to address these issues through four complementary approaches: (i) a discussion of the relationship between EPU metrics and the political orientation of media outlets; (ii) a comparison of our Moroccan EPU index with existing indices for other countries and global uncertainty benchmarks; (iii) a preliminary investigation of the correlation between EPU and key macroeconomic indicators in Morocco; and (iv) a comparison with alternative measures of uncertainty and/or risk, specifically the Realized Volatility of the Moroccan All Share Index (MASI) and the World Uncertainty Index constructed by Ahir et al. (2022). These endeavors

to assess the reliability and relevance of our policy uncertainty measure are further extended in Section 4 and Section 5, where we examine the macroeconomic effects of policy uncertainty shocks in Morocco using a Structural Vector AutoRegression framework.

By relying on a diverse set of media sources, seven in this study, and incorporating the methodological refinements introduced in the previous section, our approach inherently mitigates potential political bias, in line with the rationale provided by Baker, Bloom, and Davis (2016). In their study, the authors split their ten selected newspapers into the five most "Republican" and five most "Democratic" based on the media slant index developed by Gentzkow and Shapiro (2010),[14] and find that the resulting left-leaning and right-leaning EPU subindices are highly correlated at the 0.92 level over the 1985–2015 period. This strong comovement suggests that political orientation does not significantly distort the dynamics of newspaper-based measures of economic policy uncertainty.

Figure 2 Moroccan and Global Economic Policy Uncertainty Indices



We do not replicate this partisan classification for three main reasons. First, there is no equivalent media slant index in the Moroccan context.[15] Second, and more fundamentally, the left–right dichotomy employed in the U.S. case does not easily map onto the political landscape of many emerging economies, including Morocco, where party systems may

[14] Gentzkow and Shapiro (2010) derive slant scores from the relative frequency with which newspapers adopt terms characteristically used by either Republican or Democratic members of the U.S. Congress.
[15] Developing such an index could constitute a valuable direction for future research.

be either fragmented or concentrated. Third, the evidence in Baker, Bloom, and Davis (2016) indicates that political orientation introduces only minimal variation in newspaper coverage of EPU indices.[16] Together, these considerations reinforce the view that political slant is unlikely to significantly compromise the empirical validity of newspaper-based uncertainty indices.

Figure 2 compares our policy uncertainty index with its global counterpart in Davis (2016).[17] The two indices exhibit a correlation of approximately 0.6, as shown in Table 3, suggesting that international uncertainty shocks are partially transmitted to Morocco. This reinforces the idea that being a small open emerging economy, Morocco is relatively exposed to global uncertainty dynamics.

Table 3 Correlation of the Moroccan EPU Index with other Uncertainty Measures

Variable	EPU	EPU_G	EPU_US	EPU_SP	EPU_FR
EPU	1.0000				
	-				
EPU_G	0.5838***	1.0000			
	(4.4910)	-			
EPU_US	0.4202***	0.9361***	1.0000		
	(2.8922)	(16.6248)	-		
EPU_SP	0.4440***	0.4878***	0.3802**	1.0000	
	(3.0945)	(3.4900)	(2.5673)	-	
EPU_FR	0.3238**	0.5704***	0.4712***	0.3730**	1.0000
	(2.1377)	(4.3372)	(3.3362)	(2.5106)	-

Notes: The Global EPU Index is sourced from Davis (2016), while the EPU indices for the U.S., Spain, and France are obtained from Baker, Bloom, and Davis (2016). ** and *** denotes statistical significance at the 5% and 1% levels, respectively. t-statistics are reported in parentheses.

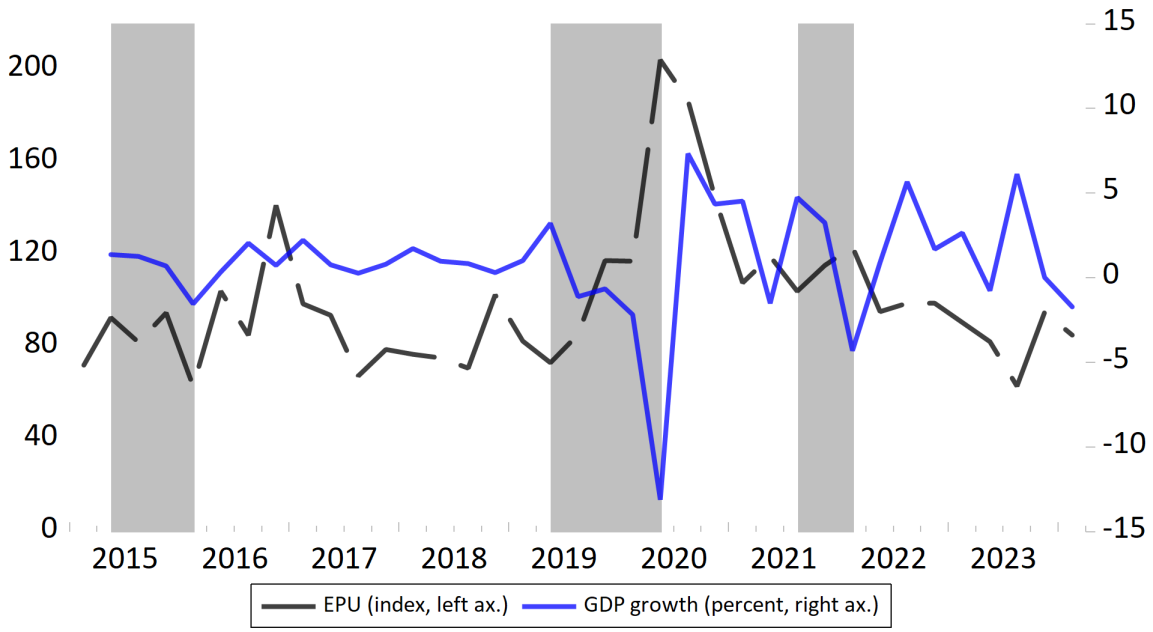
To provide an initial insight into the potential relationships between uncertainty and macroeconomic dynamics in Morocco, Figure 3 displays the EPU index on a quarterly frequency alongside Morocco's GDP growth.

We highlight that periods of economic recession generally correspond to a substantial increase in our uncertainty index. This is particularly evident during the COVID-19 pandemic crisis, when the EPU index (GDP growth) reached a record high (low) of 205

[16] This conclusion is further reinforced by Houari et al. (2025), who, in a different context, find a strong correlation (0.85) between climate risk indices derived from newspapers with differing political leanings in France, Le Figaro (center-right) and Le Monde (center-left), over the period 2000–2023.
[17] The Global EPU index from Davis (2016) is the GDP-weighted average of newspaper-based EPU indices for 21 countries.

(-13.1%) in the second quarter of 2020. This countercyclical nature of our uncertainty measure indicates, even before the econometric modelling of cause-and-effect relationships developed in Section 4, its significance in understanding the complex dynamics of real cycles in Morocco (GDP growth and its sub-components: investment, consumption, etc.).

Figure 3 Quarterly Economic Policy Uncertainty Index and GDP Growth in Morocco



Furthermore, Table 4 presents the correlation matrix between the EPU index and the only preexisting measures of uncertainty/risk for Morocco, i.e., the World Uncertainty Index (WUI) and the Realized Volatility (RV) of the MASI index. We use RV as a proxy for financial risk or uncertainty, acknowledging that it is a backward-looking measure based on historical price movements. This is particularly relevant in the absence of forward-looking indicators such as implied volatility indices (e.g., the VIX for the U.S. or the VSTOXX for Europe).

We observe that the EPU measure we developed is positively and significantly correlated with Realized Volatility, whereas the WUI is weakly and insignificantly correlated with our proxy for financial dynamics in Morocco. These findings are consistent with our previous observations regarding the potential limitations of the WUI in capturing fluctuations of key Moroccan macroeconomic and financial aggregates.[18]

[18] We do not attempt here to construct a dedicated news-based index of equity market uncertainty, as done by Baker, Bloom, and Davis (2016), who show that the correlation between their baseline EPU index

Table 4 Correlation Matrix of Uncertainty/Risk Measures in Morocco

Variable	EPU	WUI	RV
EPU	1.0000		
	-		
WUI	0.5172***	1.0000	
	(3.5759)	-	
RV	0.2676*	0.0648	1.0000
	(1.6532)	(0.3846)	-

Notes: * and *** indicate statistical significance at the 10% and 1% levels, respectively. t-statistics are reported in parentheses.

4 Econometric framework and data

This section outlines the methodology and data used to analyze the impact of uncertainty shocks on macroeconomic dynamics in Morocco. Considering our research question and the statistical properties of the data, we have selected the SVAR modelling framework as the methodological approach. We estimate the following SVAR model:

$$Az_t = c + \sum_{i=1}^{p} z_{t-i} A_i + \epsilon_t \tag{5}$$

where z_t is an n-vector of endogenous variables, A is an $(n \times n)$ non-singular matrix capturing the contemporaneous relationships among the endogenous variables, A_i is a matrix of structural parameters, c is an n-vector of intercepts, and ϵ_t is an n-vector of structural innovations with zero mean and a diagonal covariance matrix Σ_ϵ. Furthermore, $\epsilon_t = Ae_t$, where e_t represents the reduced-form error terms of the model.

To identify our SVAR model, $\frac{n^2-n}{n}$ restrictions are required. We use a recursive identification scheme by imposing zero exclusion restrictions above the diagonal of A, i.e., A is a lower triangular matrix. Consequently, the structural shocks and the resulting impulse response functions are just-identified.

To conduct our analysis, we use quarterly Moroccan data covering the period from 2015Q1 to 2024Q1. Table A.1 in the appendix presents the set of variables included in the different estimated models. The choice of variables is guided by the need to quantify

and the VIX improves significantly from 0.58 to 0.73 when employing an optimized term set specifically tailored to equity market uncertainty. Developing such a refined index for the Moroccan context remains a promising avenue for future research. Instead, Table 4 should be viewed as a preliminary effort, which, while informative, can undoubtedly be refined and improved in subsequent work.

the transmission channels of uncertainty shocks to the economy. We identify three main channels by estimating three distinct trivariate SVAR models: SVAR-BC, SVAR-RO, and SVAR-PS, corresponding to Business Cycle, Real Options, and Precautionary Savings, respectively.[19] The first channel, reflecting the aggregate response of main business cycle's indicators to uncertainty shocks, is represented by GDP growth rate and unemployment rate (UN). The second channel through which uncertainty shocks can be transmitted to the economy is the real options channel. Indeed, increasing economic uncertainty leads firms to halt or delay their investment and employment decisions. We thus introduce the variables for investment (INV) and unemployment rate (UN) to account for these effects.

The third mechanism through which uncertainty shocks impact the economy is the precautionary savings channel. To cope with uncertainty shocks and smooth consumption over time, risk-averse agents reduce their current consumption, prioritize future consumption, and consequently increase their savings. Here, we consider the variables for consumption (C) and savings (S).

Before estimating the model described in Equation (5), we determine the order of integration for all the variables considered using the Augmented Dickey-Fuller (ADF) test. The test results indicate that three variables (GDP, C, and INV) exhibit a unit root at levels, as their reported t-statistics are lower than the corresponding critical values. These variables are stationary in their first differences, i.e., $I(1)$ variables. The other variables (EPU, UN, and S) are stationary at levels, i.e., $I(0)$ variables.

Our strategy for identifying structural uncertainty shocks places the considered uncertainty measures first in the causal order governing the contemporaneous relationships between the endogenous variables in the SVAR systems we estimate. This approach aligns with the associated literature (see, among others, Baker, Bloom, and Davis, 2016; Leduc and Liu, 2016; Arellano et al., 2019) and reflects the nature of economic uncertainty as a source of business cycle fluctuations.[20]

[19] Our strategy of estimating three distinct SVAR models to account for the three transmission channels is motivated by the size of our sample. See Houari (2022), where multiple channels are considered within a single monthly SVAR framework for the U.S. economy.

[20] While the direction of causality between uncertainty and economic activity remains an open debate in the literature, recent empirical evidence increasingly supports the view that uncertainty acts as a causal driver of business cycle fluctuations rather than merely reflecting them. On the one hand, heightened uncertainty is the result of a bearish economic activity (see Decker et al., 2016 for a comprehensive review of this literature). On the other hand, the increase in uncertainty is rather causal of the contracting of investment and output. Mainly, a decline in the GDP and its subcomponents occurs when an unusual uncertainty shock or an institutional aberration occurs. But also, because of the intrinsic volatility in the financial markets where speculative and conjectural elements play an essential role (Yıldırım-Karaman,

The causal ordering of the remaining variables follows both economic theory and prior empirical literature. In the SVAR-BC specification, we adopt the following causal ordering: uncertainty measure, GDP and unemployment rate. For the SVAR-RO model, we order the variables as: uncertainty measure, investment and unemployment rate. This reflects the notion that demand aggregates (output and its components) absorb shocks contemporaneously, whereas labor-market variables adjust more sluggishly, due to hiring frictions and reporting lags (see, e.g., Stock and Watson, 2001; Blanchard and Perotti, 2002; Galí, 2015). On analogous grounds, the SVAR-PS framework adopts the following causal ordering: uncertainty measure, consumption, and savings. The number of lags is determined using the Bayesian Information Criterion (BIC), resulting in two lags for the SVAR-BC and SVAR-PS models, and one lag for the SVAR-RO model.

5 Results

In this section, we first report the baseline SVAR estimates in Section 5.1. Section 5.2 examines the transmission of uncertainty through confidence indicators, while Section 5.3 introduces global uncertainty controls to isolate the EPU's domestic component. Finally, Section 5.4 offers a comparative analysis using a range of national and global uncertainty/risk indices.

5.1 Baseline results

We report the estimation results of the three models, where the first equation represents structural uncertainty. The residuals serve as a measure of the uncertainty shock. The recursive identification of the SVAR-BC, SVAR-RO, and SVAR-PS models allows us to estimate the impulse response functions, which are shown in Figure 4 below. The scale of the one-standard deviation shock to the quarterly EPU corresponds to a 25-point increase in the Moroccan EPU index, representing approximately one-fourth of the surge observed in the aftermath of the COVID-19 pandemic.

We find that economic policy uncertainty shocks are transmitted to the economy through the aforementioned channels, with some specificities related to the Moroccan

2018). See also Baker and Bloom (2013) who identify the causal link between uncertainty and economic activity using Proxy-SVAR approach, i.e. an SVAR with external instrumental variables.

economy. Firstly, following a one-standard deviation shock to economic policy uncertainty, both GDP and investment experience significant declines in the first period, while the unemployment rate increases over several quarters. Together, these responses reflect the presence of the real-options channel during periods of high uncertainty, where firms, typically faced with irreversible investments, adopt a wait-and-see approach to investment

Figure 4 Impulse responses to one-standard deviation EPU shocks

Notes: Impulse response functions to structural EPU shocks are expressed in percentages (except for the unemployment rate response, which is in percentage points as described in Table A.1). The responses of GDP and the unemployment rate are derived from the estimation of the SVAR-BC(2) model with the following causal ordering: uncertainty measure, GDP and unemployment rate. The investment response is derived from the estimation of the SVAR-RO(1) model with the causal ordering: uncertainty measure, investment and unemployment rate. The responses of consumption and savings are derived from the estimation of the SVAR-PS(2) model with the causal ordering: uncertainty measure, consumption and savings. Shaded areas indicate 95% standard error bands.

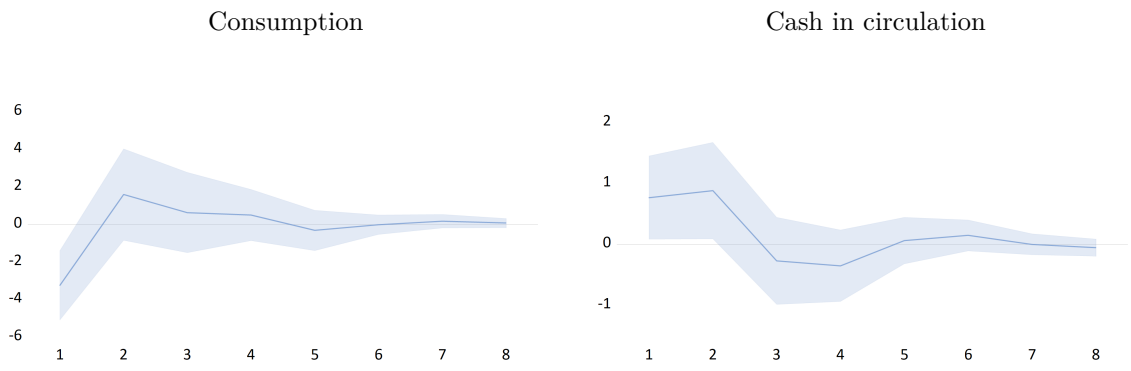
and employment, thereby leading to a decline in production.

The magnitude of the impulse response functions obtained in Figure 4 lies within a plausible and expected range, consistent with the findings of previous studies applying SVAR approaches in the uncertainty literature across different countries. For instance, in response to their respective country-specific EPU shocks, investment declines by approximately –3.6% in Ireland (Rice, 2023) and –3.1% in Japan (Arbatli et al., 2017), while employment contracts by –0.3% in the United States (Baker, Bloom, and Davis, 2016). Similarly, industrial production falls by approximately 2% in Japan and up to 4% in Turkey (Kilic and Balli, 2024). These results suggest that the responses observed in our analysis are in line with established empirical evidence.

We then examine the precautionary saving channel and find that consumption decreases significantly by -2.42%, while savings respond in the opposite direction to economic theory in the first period, with a non-significant decrease of approximately -3.14%. This unconventional response of savings does not align with the underlying economic intuition of the rational behaviour of a risk-averse agent. Typically, such an agent would aim to smooth consumption over time in the face of an uncertainty shock by reducing current consumption and increasing savings in anticipation of future consumption.

This response also contradicts the findings of both theoretical and empirical studies on the topic (see, e.g., Leduc and Liu, 2012; Basu and Bundick, 2017; Yıldırım-Karaman, 2018; and Houari, 2022), raising several questions about the relevance of this variable in identifying the presence of the precautionary saving channel in Morocco.

Figure 5 Impulse responses to one-standard deviation EPU shocks



Notes: Impulse response functions of consumption and cash circulation (in percentage) to a structural EPU shock. The responses are derived from the estimation of a second-order SVAR-Cash model with the following causal ordering: uncertainty measure, consumption and cash circulation. We use the log-difference of cash in circulation, given that the series exhibits a unit root and is integrated of order one. Shaded areas indicate 95% standard error bands.

In light of this perplexing result, we substitute the savings variable with the difference between the M2 and M1 monetary aggregates to more accurately capture savings deposits. Nonetheless, we obtain a similarly negative and statistically insignificant response. Consequently, being aware of the pervasive issue of cash hoarding in Morocco, we introduce the variable of fiduciary currency in circulation into the SVAR-PS model as an alternative proxy for savings. The corresponding results are shown in Figure 5.

This choice is motivated by the findings of Shimi et al. (2023), who document that non-transactional cash demand, i.e., hoarded cash, accounted for between 60% and 80% of the total value of high-denomination banknotes in circulation in 2021. We observe a notable and highly significant increase of 0.76% at the 95% confidence level in fiduciary circulation in the first period following an uncertainty shock. The incorporation of this variable into the SVAR-PS model proves crucial, as it sheds new light on the saving behaviour of Moroccan economic agents, for whom cash holds paramount importance as a store of value, particularly in times of heightened economic uncertainty. These findings align with Rösl and Seitz (2022), who show that cash continues to play a vital role in crisis management, highlighting its stabilizing macroeconomic properties across five case studies from developing countries, namely Venezuela, Zimbabwe, Afghanistan, Iraq, and Libya.

The quantified impact of uncertainty shocks on cash dynamics remains largely unexplored in the existing uncertainty literature. This may be partly attributed to the fact that most EPU indices have been developed for advanced economies, whereas the issue of cash hoarding is particularly salient in emerging market contexts. Consequently, our findings offer a novel contribution by highlighting the relevance of our uncertainty measure in an emerging economy such as Morocco.

5.2 Uncertainty and confidence

Next, to deepen our understanding of the demand-side dynamics of Moroccan agents under heightened uncertainty, we examine the relationship between household confidence and economic policy uncertainty. This extension contributes to a relatively narrow but growing strand of literature at the intersection of economic policy uncertainty and consumer confidence. For instance, Shapiro et al. (2022) show that their news sentiment index, constructed from economic and financial news articles published in 16 U.S. news-

papers since 1980, helps predict the Michigan Consumer Sentiment Index. Moreover, they find that news sentiment significantly affects key macroeconomic aggregates, reinforcing the transmission mechanisms suggested by the baseline results in Section 5.1. Similarly, Bergman and Worm (2021) find that news-based uncertainty significantly influences household expectations regarding both their own financial situation and the broader Danish economy over a 12-month horizon. These effects are identified using both reduced-form and structural VAR frameworks. The authors also emphasize considerable heterogeneity in responses across socioeconomic and demographic dimensions.[21]

To investigate these dynamics in the Moroccan context, we use the Household Confidence Index derived from the Permanent Household Survey on Economic Conditions conducted by the High Commission for Planning (HCP), Morocco's national statistical and planning authority.[22] The index reflects households' perceptions and expectations concerning their own financial situation and the Moroccan economy over a 12-month horizon. Specifically, its components capture views on the evolution of the standard of living, unemployment, the perceived appropriateness of purchasing durable goods, and the household's current and expected financial situation.[23]

We then estimate an alternative version of the SVAR-PS model, replacing the consumption variable with the Household Confidence Index. The results reveal a statistically significant decline of -2.17% in response to an EPU shock, as shown in Figure 4. In other words, hightened uncertainty is associated with increased household pessimism. These findings suggest that uncertainty, as conveyed through media content and news coverage, not only influence households' perception of the current economic environment but also shape their expectations regarding future financial conditions.

5.3 Controlling for global uncertainty

Global policy decisions by major economic powers such as the United States, the European Union, or China can generate widespread spillover effects, influencing both the first and second moments of economic uncertainty in other countries, particularly in small open economies such as Morocco. A growing body of research highlights the international

[21] See Bergman and Worm (2021) for a comprehensive literature review on the role of news in shaping consumer confidence, with particular attention to the impact of policy uncertainty.
[22] In French: Enquête permanente de conjoncture auprès des ménages du Haut-Commissariat au Plan (HCP).
[23] See Table A.1 in the appendix for further detail.

transmission/spillovers of policy uncertainty. For example, Klößner and Sekkel (2014), Zhang et al. (2019) and Thiem (2020) investigate the global transmission of policy uncertainty and document the existence of substantial spillovers across major economies. Given the increasingly globalized nature of economic and financial linkages, accounting for these external influences is essential when analyzing the domestic effects of uncertainty in emerging markets.

To control for potential spillover effects from global economic policy uncertainty to the Moroccan context, we follow a strategy inspired by Athira and Ramesh (2024). While their approach consists of regressing the domestic EPU of each of the 22 countries in their sample on the U.S. EPU to isolate idiosyncratic uncertainty, we think this method presents an econometric limitation. In particular, both the U.S. and domestic EPU series may be jointly driven by a common global uncertainty factor.[24] This raises concerns about endogeneity and omitted variable bias in their specification. A more appropriate strategy would be to either instrument the U.S. EPU or to directly use a global EPU index that better captures this common uncertainty component. We adopt the latter approach.

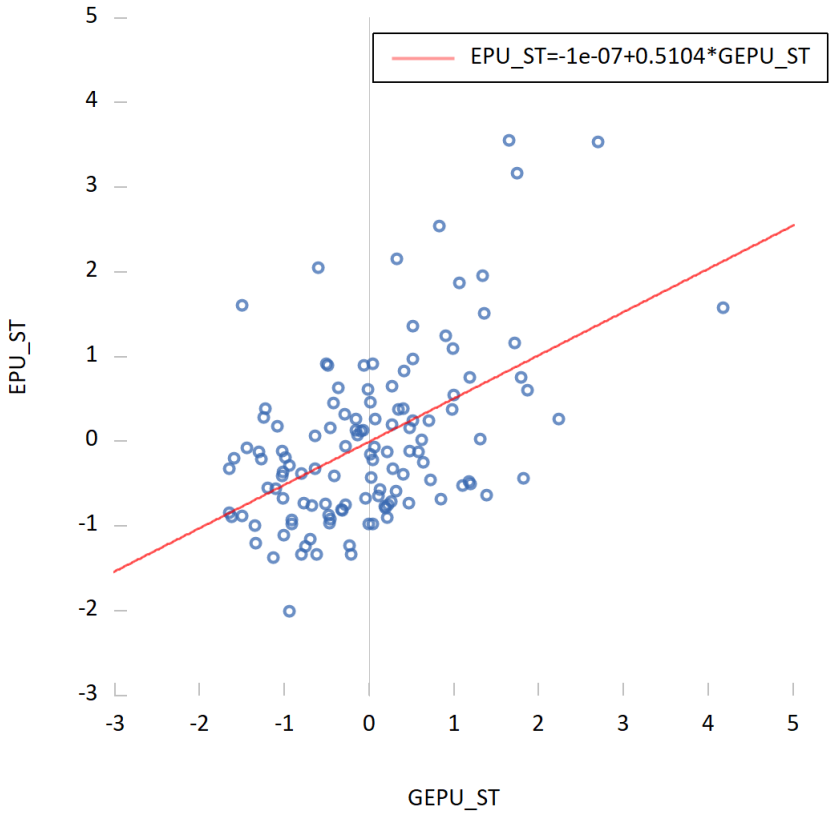
Specifically, we estimate a simple linear regression of the Moroccan EPU index on the composite Global EPU index of Davis (2016), and retrieve the residuals of this regression (hereafter, EPU_RES). These residuals isolate the component of Moroccan uncertainty that is orthogonal to global uncertainty and can thus be interpreted as capturing the purely domestic dimension of policy-related uncertainty. As a preliminary step, we illustrate the positive relationship between the Moroccan and global EPU indices via a scatter plot (see Figure 6). The estimated slope is positive and statistically significant at the 1% level, which justifies the importance of controlling for global effects in our empirical framework.

We then re-estimate our previously described SVAR models using EPU_RES as the structural uncertainty shock. While the impulse responses are slightly attenuated and marginally less significant, they remain robust to this alternative specification. This indicates that our results are not merely driven by global uncertainty spillovers, and that the Moroccan EPU retains independent explanatory power for the country's macroeconomic dynamics. In sum, this sensitivity check reinforces the validity of our uncertainty measure

[24] For example, Table 3 provides evidence that both the U.S. and Morocco EPU indices exhibit stronger correlations with the global EPU index than with other national indicators.

as a distinct and meaningful indicator of domestic macroeconomic uncertainty.[25]

Figure 6 Standardized Global and Moroccan Economic Policy Uncertainties



Notes: The scatter plot illustrates the nexus between monthly standardized Global (GEPU_ST) and Moroccan Economic Policy Uncertainty (EPU_ST) indices. A simple linear regression is estimated, with the Moroccan EPU as the dependent variable and the Global EPU as the predictor. We find that the slope is positive and statistically significant at the 1% level.

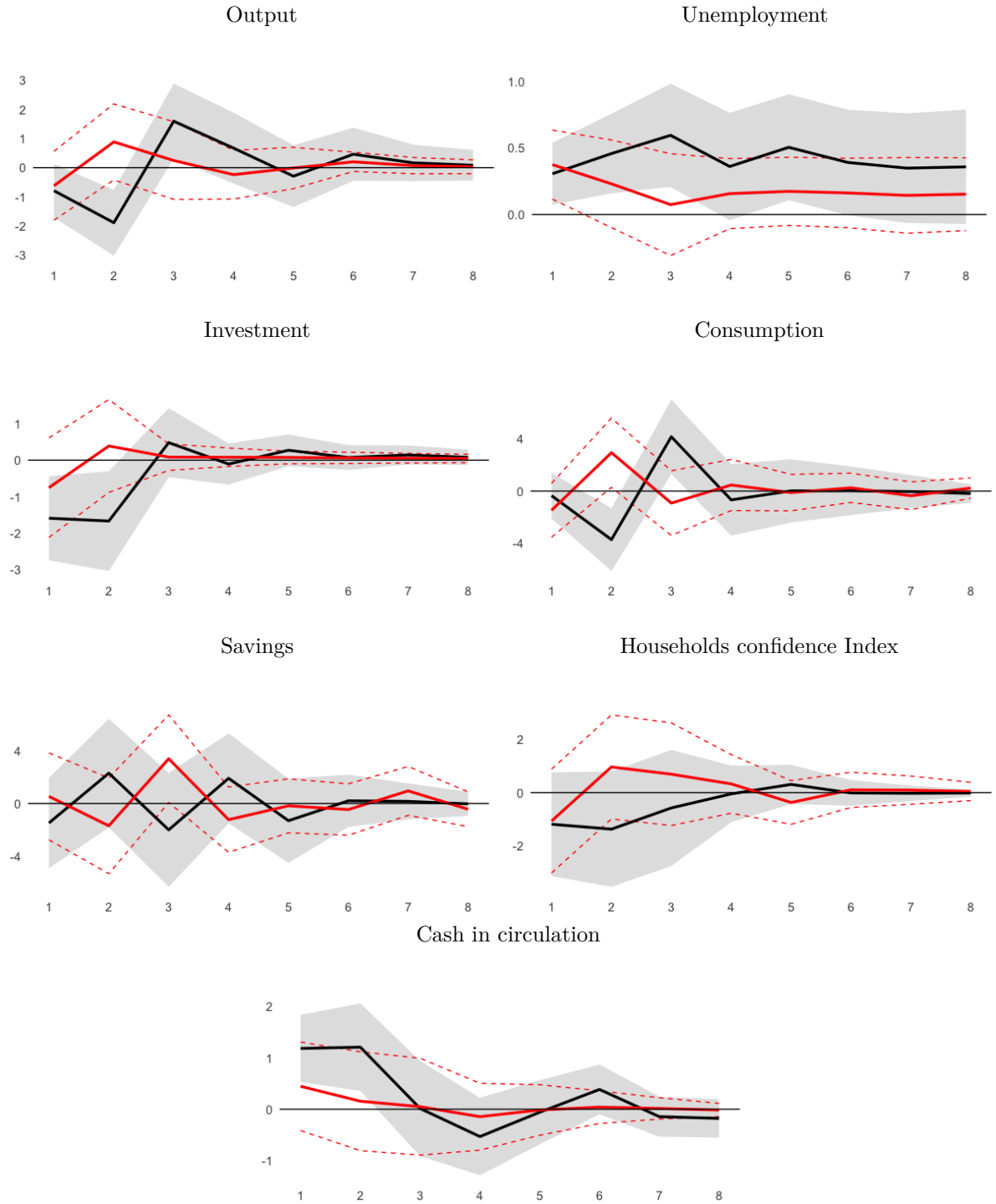
5.4 Comparative analysis

Finally, we undertake a comparative analysis of the impact of the MASI Realised Volatility and the World Uncertainty Index on the different transmission channels, as illustrated in Figure 7.

The results suggest that the World Uncertainty Index has limited explanatory power for the macroeconomic aggregates considered. These findings are consistent with those of Kilic and Balli (2024), who show that local-language materials (in Turkish) are more effective in capturing macroeconomic uncertainty and its real effects,[26] whereas English-

[25] These results are available upon request.
[26] Kilic and Balli (2024) find that an unexpected increase in uncertainty leads to permanent declines in industrial production, employment, and trade, as well as lasting increases in stock and oil prices in Türkiye.

Figure 7 Comparative IRFs for shocks in RV and WUI



Notes: Impulse response functions are expressed in percentages, except for the unemployment rate, which is measured in percentage points as detailed in Table A.1. Solid black lines represent responses to a structural Realised Volatility shock (RV), while solid red lines correspond to responses to a structural World Uncertainty shock (WUI). The results are obtained from the estimation of the SVAR-BC(2), SVAR-RO(1), and SVAR-PS(2) models. Gray-shaded areas and red dashed lines denote 95% confidence bands based on standard errors.

language sources tend to yield less consistent results. This emphasizes that our EPU measure, based on Arabic- and French-language materials, provides additional explanatory power for business cycle fluctuations in the Moroccan context.

While RV exhibits a statistically significant impact on several macroeconomic variables, its influence remains less pronounced and less pervasive than that of the EPU. This finding is consistent with the fact that realized volatility primarily captures financial market risk and uncertainty, whereas economic policy uncertainty reflects a broader spectrum of macroeconomic uncertainty, encompassing both economic and policy-related dimensions.

6 Conclusion

This paper contributes to the growing literature on economic uncertainty in emerging markets by introducing the concept of policy uncertainty into the Moroccan economic debate and highlighting its pivotal role in explaining macroeconomic dynamics, especially in the aftermath of the 2008 Great Recession. Since then, the theory of uncertainty has attracted unprecedented interest from academics, policymakers, and market participants. Nevertheless, despite this growing global attention, the literature focusing on Morocco remains remarkably limited, with no tailored measure of economic policy uncertainty developed to reflect the country's specific idiosyncrasies.

Our research addresses this gap by constructing an Economic Policy Uncertainty index following the methodology of Baker, Bloom, and Davis (2016). This index is developed using automated textual analysis methods based on the frequency of newspaper articles from seven major Moroccan publications. We demonstrate that fluctuations in this index are closely linked to the political context, economic recessions, and, more recently, extreme climatic conditions such as droughts and heatwaves.

This study presents several original contributions. First, we offer a comprehensive conceptual framework that situates the uncertainty debate within the specific context of the Moroccan economy. Second, we construct, for the first time, a locally grounded EPU index based on Arabic- and French-language media sources in Morocco. Third, we quantify the transmission channels of uncertainty shocks to the Moroccan economy, considering variables that are rarely investigated in the associated literature such as cash

hoarding. Therefore, our study fills a critical gap and fosters a deeper understanding of uncertainty transmission mechanisms in middle-income economies.

The results from our SVAR estimations reveal statistically significant impacts of EPU shocks on a set of key macroeconomic indicators, including GDP, investment, consumption, savings, unemployment, and currency in circulation. By comparison, WUI shocks appear to have only a modest influence on most of these variables. This underscores the value of a country-specific measure in complementing global indices, and shows that constructing uncertainty indices using local sources (beyond English-language materials), such as the EPU developed in this study, yields a more reliable and context-sensitive measure of uncertainty in Morocco. This research contributes to the existing literature by highlighting the importance for policymakers, investors, and researchers to rely on local media-based indicators for a more accurate assessment of economic policy uncertainty in Morocco.

From a forward-looking perspective, several promising avenues for future research could further enrich this work. First, incorporating additional variables, such as inflation expectations, investor sentiment and sovereign risk premia, would provide a more comprehensive understanding of how uncertainty shapes economic dynamics in Morocco. Second, extending the historical coverage of the dataset would strengthen the robustness of our findings and allow for better contextualization over time. Third, integrating a wider range of media sources, including digital platforms such as Hespress, could enhance the representativeness of the index. Finally, disaggregating the overall index into subcomponents, focusing, e.g., on fiscal, monetary, and climate-related uncertainty would enable more granular analyses of the differentiated effects of each dimension of policy uncertainty.

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A Appendix

Figure A.1 Plots of the main variables

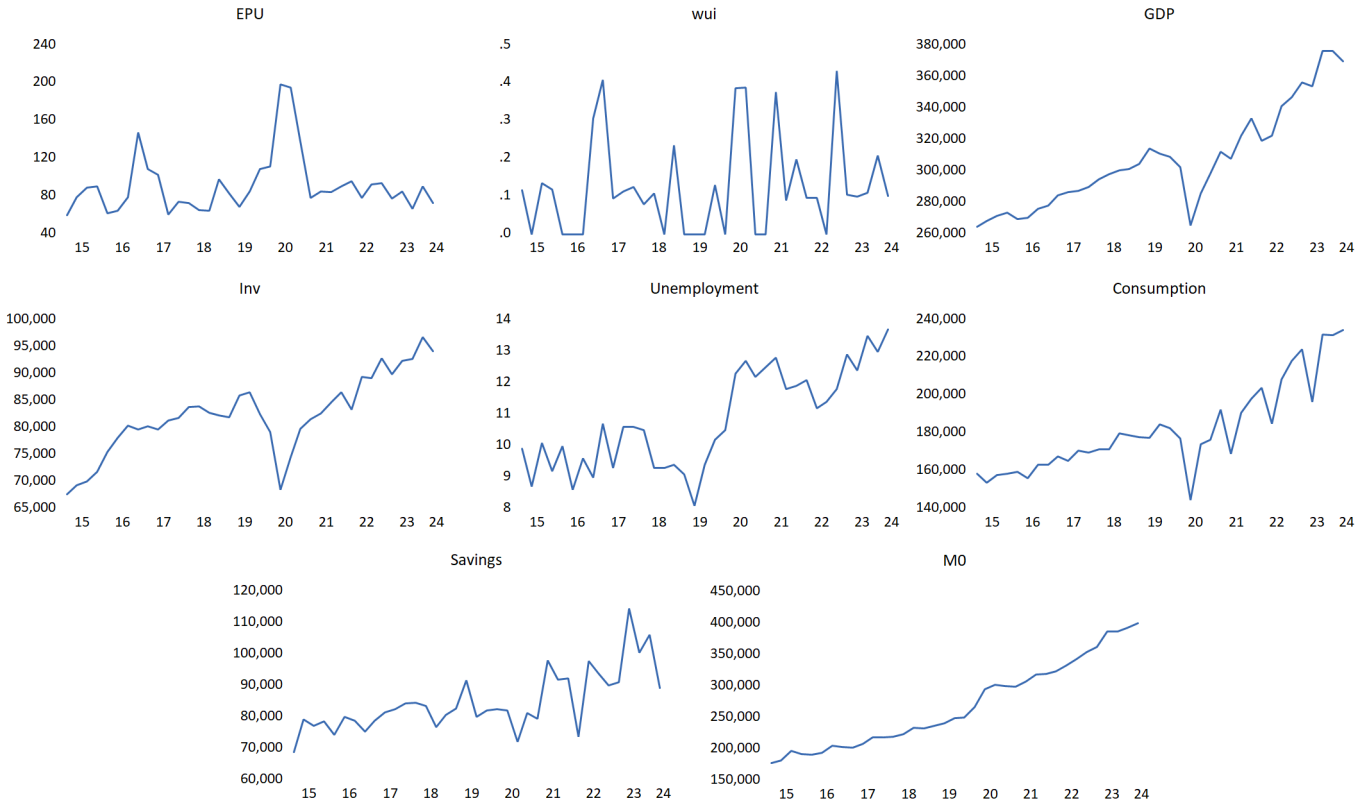

Table A.1 Description of variables

Variable	Label	Description
Uncertainty/risk measures		
Economic Policy Uncertainty index	EPU	Author's calculations
World Uncertainty Index	WUI	World uncertainty index constructed by Ahir et al. (2022)
Realised volatility	RV	Standard deviation of MASI Index returns
Business cycle indicators		
(Growth of) Gross domestic product	GDP	Log (difference of) gross domestic product
Unemployment	UN	Unemployment rate in level
Real-options channel		
(Growth of) Investment	INV	Log (difference of) investment
Unemployment	UN	Unemployment rate in level
Precautionary savings channel		
(Growth of) Consumption	C	Log (difference of) consumption
(Growth of) Savings	S	Growth rate of savings
(Growth of) Cash in circulation	CF	Log (difference of) cash in circulation
(Growth of) Households Confidence Index	HCI	Log (difference of) Households Confidence Index. The HCI is calculated based on seven indicators, four of which relate to the general economic environment and three to the household's own situation. The general indicators cover the past and expected evolution of the standard of living, the expected change in unemployment, and the perceived opportunity to purchase durable goods. The household-specific indicators reflect the household's past, current, and expected financial situation. The HCI is calculated as the simple arithmetic average of the balances of these seven indicators.

Notes: The variables are categorized according to the channel they highlight. All variables are of quarterly frequency. The data are sourced from BESMEF, except for EPU, WUI, RV, and CF. Specifically, the EPU index is constructed by the author; the WUI is downloaded from www.policyuncertainty.com; the RV is calculated by the author using MASI index values downloaded from Refinitiv-Eikon; and the CF series is downloaded from www.bkam.ma.

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