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MACROFINANCIAL UNCERTAINTY IN ITALY: MEASUREMENT AND IMPLICATIONS FOR FINANCIAL STABILITY

by Luca Moller*

Abstract

Over the past two decades, repeated economic, financial and geoeconomic shocks have significantly increased economic uncertainty, renewing academic and policy interest in its measurement and macrofinancial implications. Yet uncertainty is an unobservable and intrinsically multidimensional phenomenon that cannot be fully represented by any single metric. This paper investigates macrofinancial uncertainty in Italy using a broad set of indicators designed to capture its multiple dimensions. Fifteen monthly measures are constructed and compared, drawing on surveys, forecast errors, text analysis and financial market data. The evidence shows that uncertainty tends to rise during recessions and adverse shocks, while substantial heterogeneity across measures confirms the limitations of relying on any single indicator. The informational content of the different metrics for adverse macroeconomic and financial tail risks is then assessed using quantile regressions. In-sample predictive performance varies considerably across measures, target variables and horizons, with several indicators providing useful signals, especially for risks to bank lending dynamics and economic activity. On this basis, a composite indicator of macrofinancial uncertainty for Italy is constructed by selecting and weighting components according to the strength and consistency of their historical association with tail risks. Estimates from a structural quantile VAR indicate that innovations in the composite indicator are followed by lower industrial production, employment and bank loans and by higher financial market stress, with more pronounced effects under adverse macrofinancial conditions.

JEL Classification: C32, E32, E44, G01.

Keywords: macrofinancial uncertainty, composite indicator, economic activity, early warning, growth-at-risk, financial stability.

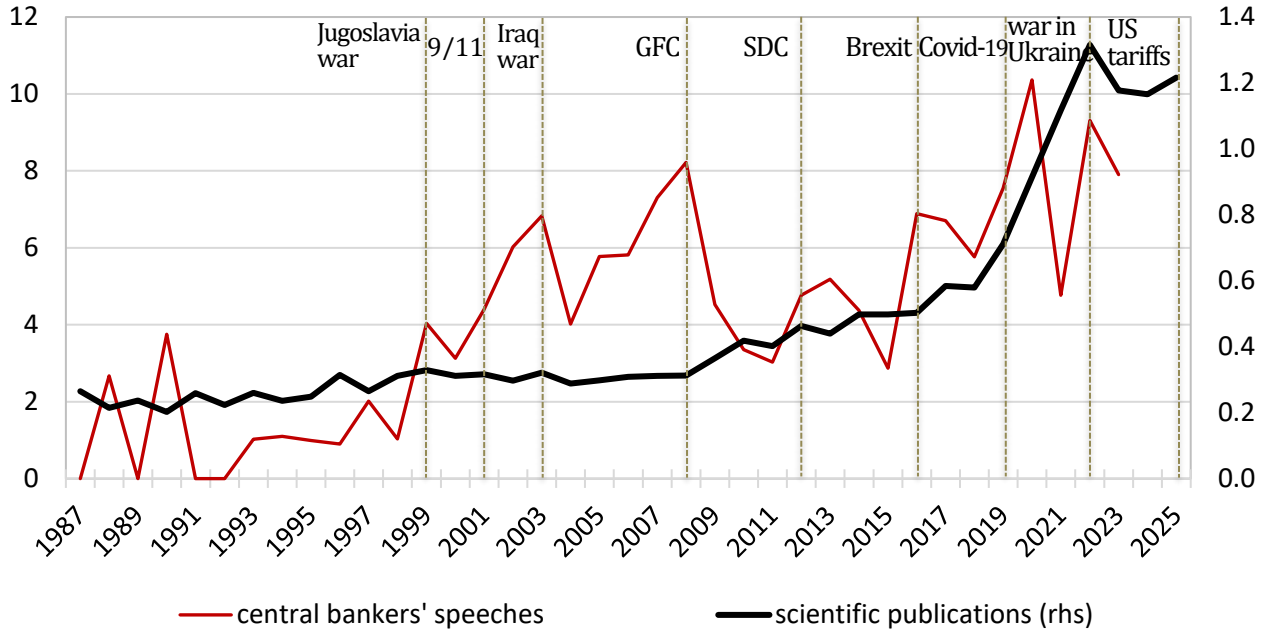
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1. Introduction

Over the past two decades, economic uncertainty has become an increasingly prominent theme both in the academic debate and in central bank policy discussions (Figure 1). This growing interest reflects the succession of shocks that have affected the global economy in recent years: the 2008 financial crisis, the European sovereign debt crisis, Brexit, the Covid-19 pandemic, Russia's invasion of Ukraine and the ensuing energy crisis and monetary policy tightening in 2022. In this context, economic uncertainty has become not only a relevant topic for research, but also an increasingly central dimension in the monitoring of macroeconomic and financial conditions.

Figure 1: Relevance of economic uncertainty in research and policy discourse

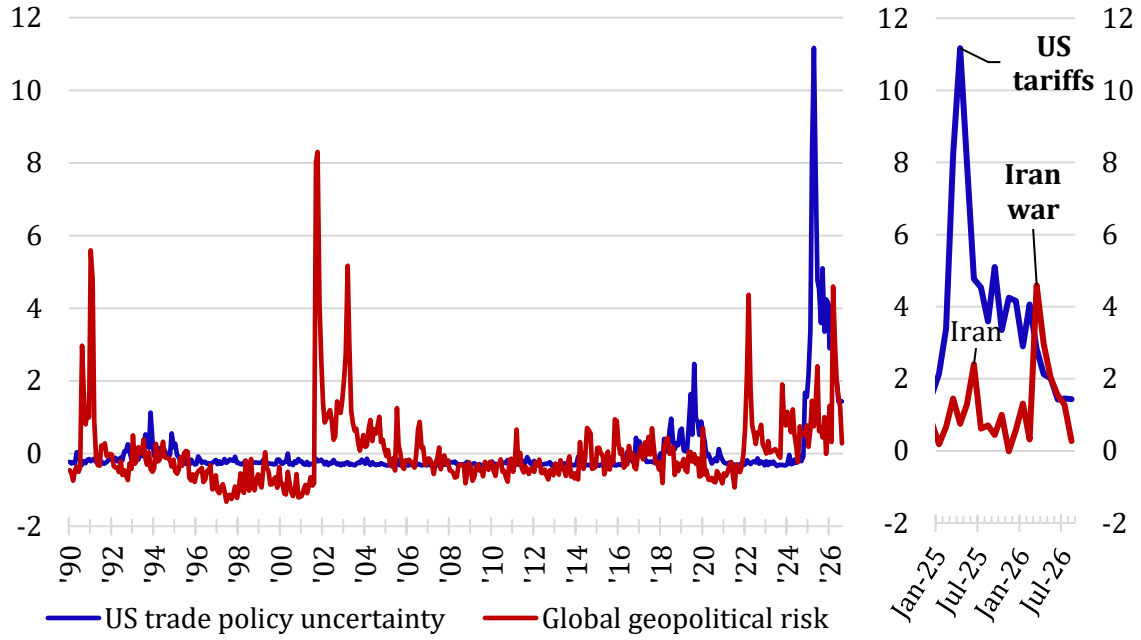


Sources: OpenAlex data, Campiglio et al. (2025) data available at cbspeeches.com, and author's calculations.
Notes: *central bankers' speeches*: percentage of public speeches by central bank officials mentioning the word "uncertainty" at least five times; the sample includes the central banks of Italy, Germany, France, Spain, the Netherlands, the United Kingdom, the United States, Japan, China, India and Russia. *Scientific publications*: percentage of scientific journal publications in the field of economics and finance mentioning the expression "economic uncertainty" in the title or abstract.

Since the beginning of 2025, uncertainty surrounding international trade, as well as geopolitical risks, have risen sharply, mostly owing to the seismic shifts in US foreign policy (Figure 2). For an economy such as Italy's, which is deeply integrated into global value chains and dependent on foreign energy supplies, these developments may affect the domestic outlook not only through their direct impact on trade and production, but also through a deterioration in expectations, greater caution in consumption and investment decisions, and tighter financial conditions. This motivates an assessment of whether, and to what extent, the recent increase in geoeconomic uncertainty[1] has actually been transmitted to the domestic macrofinancial environment.

[1] The term "geoeconomic uncertainty" is used throughout the paper as an umbrella concept encompassing the various forms of uncertainty generated by international political and economic tensions.

Figure 2: Indicators of geoeconomic uncertainty



Sources: www.policyuncertainty.com and author calculations.
Notes: the US trade policy uncertainty indicator is the one proposed by S.R. Baker, N. Bloom and S.J. Davis, "Measuring Economic Policy Uncertainty", QJE, 131(4), 2016; the geopolitical risk index is based on D. Caldara and M. Iacoviello, "Measuring Geopolitical Risk", AER, 112(4), 2022. The indicators have been standardised for comparison purposes.

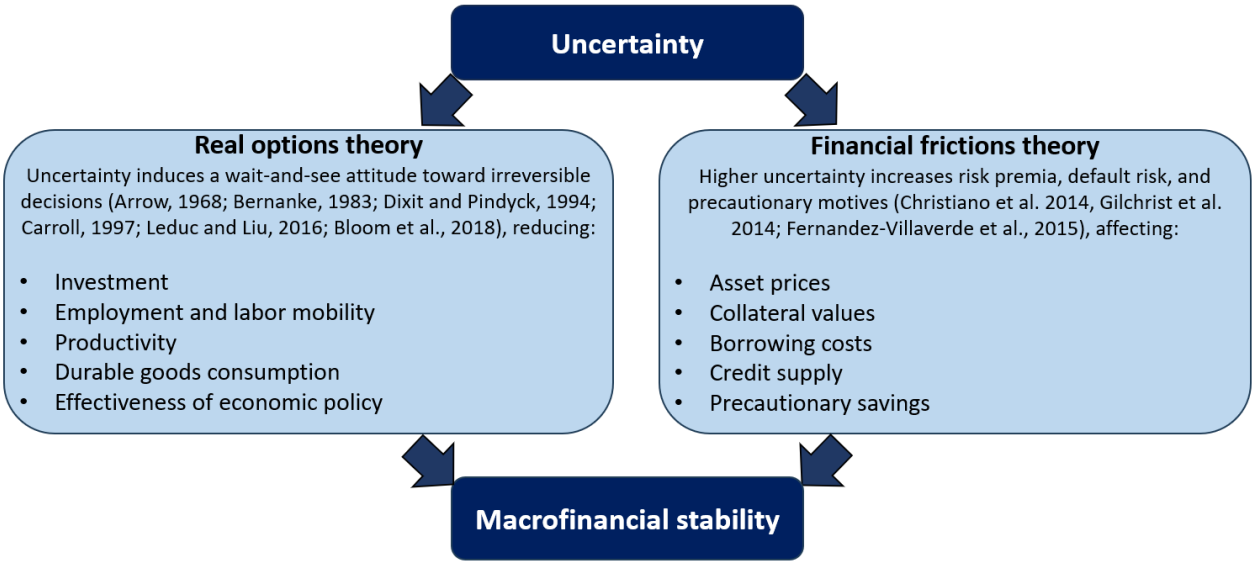
The theoretical literature has identified several ways in which economic uncertainty may affect macrofinancial stability. These may be grouped into two broad channels (Figure 3).[2] First, the real channel, traditionally associated with real-options theory: when decisions are partly irreversible, an increase in uncertainty raises the value of waiting and leads firms to postpone investment and hiring (Arrow 1968, Bernanke 1983, Dixit and Pindyck 1994, Leduc and Liu 2016). Through the same mechanism, uncertainty may depress household consumption, especially of durable goods, and increase precautionary saving (Carroll 1997); it may weaken the effectiveness of economic policy by inducing households and firms to respond less to monetary or fiscal impulses (Bloom 2009, Vavra 2014, Aastveit et al. 2017, Bloom et al. 2018); and it may hinder the efficient reallocation of capital and labour, with adverse effects on aggregate productivity and medium-term growth (Lazear and Spletzer 2012, Bloom et al. 2018).

The second is the financial channel. In the presence of financial frictions, uncertainty erodes investor confidence, raises risk premia and amplifies tail risks in financial markets, with possible feedback effects on the real economy through balance-sheet mechanisms and financial-accelerator dynamics (Gilchrist et al. 2014, Christiano et al. 2014). The financial channel also operates through credit supply, both in terms of quantities and prices: in a more uncertain environment, intermediaries face greater difficulties in assessing borrowers' creditworthiness and may restrict the supply of funding or make access to credit more costly (Fernández-Villaverde et al. 2015). These channels can interact and reinforce one another, particularly

[2] The text discusses only the possible negative effects of uncertainty on the economy and the financial system. It should be stressed, however, that the theoretical framework is not unambiguous: in some contexts, uncertainty may also activate channels operating in the opposite direction, for example through growth options or Oi–Hartman–Abel-type effects (Bloom, 2014). For this reason, assessing its effects remains largely an empirical matter.

under preexisting financial distress, thereby propagating and amplifying shocks (Alessandri and Mumtaz 2019).

Figure 3: Transmission of economic uncertainty to macrofinancial stability



Notes: the diagram summarises the main transmission channels discussed in the theoretical literature through which economic uncertainty may affect macrofinancial stability.

The empirical literature has largely confirmed the relevance of these transmission channels (Bloom 2014, Londono et al. 2025).[3] To study these effects, researchers have developed a plurality of economic uncertainty indicators, often grounded in different notions of uncertainty and not always closely correlated with one another (Forbes 2016, Kozeniauskas et al. 2018, Ahir et al. 2025). Some indicators measure agents' subjective uncertainty, others measure the objective unpredictability of macroeconomic variables, the dispersion of expectations, the narrative salience of specific risks in the press, or volatility in financial markets. This heterogeneity suggests that, especially from a monitoring perspective, it is preferable not to rely on a single measure, but rather to consider the signals provided by different indicators and, where appropriate, summarise them in a composite measure.

Against this background, this paper, first, provides a concise review of the main families of economic uncertainty measures and discusses their respective advantages and limitations (section 2). Second, it constructs and analyses a broad set of monthly uncertainty indicators for Italy, assessing whether the evidence confirms the main stylised facts documented in the empirical literature (section 3). Third, it evaluates whether, and to what extent, the different metrics are associated with adverse tail risks for real and financial outcomes (section 4). This evidence is then used to build a composite indicator of macrofinancial uncertainty for Italy, optimised for early-warning purposes (section 5). Finally, the dynamic responses to innovations in the composite uncertainty indicator are investigated through a structural quantile vector autoregressive model (section 6). Section 7 concludes.

[3] For the specific case of Italy there is substantial empirical evidence in this regard. For example, researchers at the Bank of Italy have published more than 40 empirical studies on the topic – mostly concentrated in the last decade – confirming the relevance of the adverse effects of uncertainty on investment, consumption, risk aversion, employment, the allocative efficiency of capital and labour, credit supply, downside risks to output growth, and the sensitivity of interest rates to macroeconomic news.

2. Measuring macrofinancial uncertainty

Macrofinancial uncertainty is an unobservable phenomenon that may take very different forms depending on the agent, the time horizon and the institutional context. Over time, this has led to the proliferation of a large number of proxy indicators, often based on heterogeneous methodological approaches and on notions of uncertainty that only partially overlap.

In this paper, macrofinancial uncertainty is defined operationally as the degree of unpredictability surrounding the future evolution of the macroeconomic and financial environment. In this sense, uncertainty is an intrinsically pervasive phenomenon: it affects multiple agents and concerns several economic variables, reflecting both the volatility of economic shocks and the informational limitations faced by market participants (Jurado et al. 2015).

A useful classification distinguishes four broad families of measures (Cascaldi-Garcia et al. 2023): survey-based indicators, indicators based on econometric models and official statistics (more generally on forecast errors), text-based and market-based indicators. This classification, which focuses on the nature of the input data, can be complemented by a more conceptual taxonomy distinguishing measures that capture disagreement among agents about future macrofinancial developments, the subjective difficulty of forming precise expectations, the instability in consumer and business confidence, the objective unpredictability of macroeconomic and financial aggregates, perceived uncertainty as reflected in media narratives, and priced financial uncertainty (Figure 4). The plurality of measures therefore reflects not only differences in construction techniques, but also slightly different conceptualisations of the phenomenon and, often, different analytical uses.

Survey-based measures extract information on uncertainty directly from the expectations or forecasts of consumers, firms, financial analysts and professional forecasters. Within this group, a first set consists of disagreement indicators, which summarise the cross-sectional dispersion of macroeconomic forecasts made by different agents. Although disagreement is not conceptually identical to uncertainty – because it also incorporates differences in views, information and interpretation of the same phenomenon (Lahiri and Sheng 2010) – the literature has shown that disagreement is a reliable proxy of subjective uncertainty (Zarnowitz and Lambros 1987; Bomberger 1996; Bachmann et al. 2013).

Another set of survey-based metrics consists of subjective uncertainty measures, which seek to capture directly the difficulty economic agents face in forming precise expectations about future macroeconomic developments. These include consumers' "don't know" response rates to forward-looking questions (Jonung 1986; Reiche and Meyler 2022), direct answers of consumers and firms on the degree of difficulty in forecasting macroeconomic variables (European Commission 2021, ECB 2024), and the average dispersion observed in the probabilistic forecasts provided by individual consumers or firms (Zarnowitz and Lambros 1987; Altig et al. 2022; Bańkowska et al. 2021). These metrics, and especially the latter, represent the state of the art, approximating direct measurements of uncertainty (Manski 2004). However, they often suffer from limited historical depth and from coverage restricted to a small number of macroeconomic variables. Consumer and business confidence, also collected through surveys, is a much cruder measure, but has been widely used in the empirical literature (Parigi and Schlitzer 1994; Desroches and Gosselin 2002; Caglayan and Xu 2016; Liu and Gupta 2022).

A second group of indicators interprets uncertainty as the objective unpredictability of macrofinancial aggregates. From this perspective, what is measured is not so much how people perceive the future, but

the extent to which macroeconomic variables prove difficult to forecast on the basis of available information. This group includes indicators based on macroeconomic surprises relative to consensus forecasts (Rossi and Sekhposyan 2015; Scotti 2016), indicators based on revisions to official statistics (Shrestha and Marini 2013; Mazzi et al. 2021; Dibiasi and Sarferaz 2023), and indicators measuring the conditional volatility of model-based forecast errors for macroeconomic variables (Jurado et al. 2015). The main strength of these measures is their anchoring in a notion of uncertainty as objective forecasting difficulty; their main limitation is that they are ex-post measures that can only be computed with some delay relative to the reference period and, in some cases, depend heavily on modelling choices.

A third group of indicators extracts perceived uncertainty from textual data by measuring the frequency of terms related to uncertainty in newspapers, institutional reports, corporate communications or other documentary sources (Baker et al. 2016; Caldara and Iacoviello 2022; Ahir et al. 2022). These indicators have become widely used in recent years because of their intuitive appeal, relative timeliness and the possibility of constructing long and internationally comparable time series. Their main advantage is that they capture dimensions of uncertainty that are difficult to measure using traditional quantitative data, for instance in relation to regulation, trade or geopolitical risks. Their limitations are equally well known: they primarily capture the narrative or media salience of uncertainty, are exposed to editorial biases and often have a relatively narrow thematic focus (Shiller 2017).

Finally, market-based measures reflect the uncertainty incorporated into financial asset prices, as captured by implied volatilities, yield spreads or other indicators of financial tension. Their main strength is timeliness: since they are often available at high frequency, they make it possible to capture in real time how markets price uncertainty. These measures, however, also have important limitations: they may conflate uncertainty with risk aversion (Bekaert et al. 2009; Bekaert et al. 2013), reflect liquidity conditions or technical factors, and be relatively uninformative during episodes of temporary disconnect between market prices and fundamentals (Duffie 2010).

It is worth noting that, since macrofinancial uncertainty is by definition a pervasive phenomenon involving multiple agents and multiple variables, many of the uncertainty measures discussed above are, in a sense, already composite indicators. For example, the indicator proposed by Scotti (2016) takes into account surprises concerning six different macroeconomic variables; the indicator proposed by Jurado et al. (2015) considers forecast errors for 132 different economic variables; similarly, the subjective uncertainty indicator proposed by the European Commission (2021) takes into account responses from consumers and firms operating in four different sectors (see appendix A for further details on the indicators calculated for Italy).

The preceding considerations lead to a general conclusion: the different measures of uncertainty should not be regarded as substitutes, but rather as complements. Each captures a particular dimension of the phenomenon and embodies a different trade-off between theoretical grounding, timeliness, interpretability and informational content. For this reason, especially from a monitoring perspective, it seems preferable to use a plurality of indicators and assess their signals jointly.

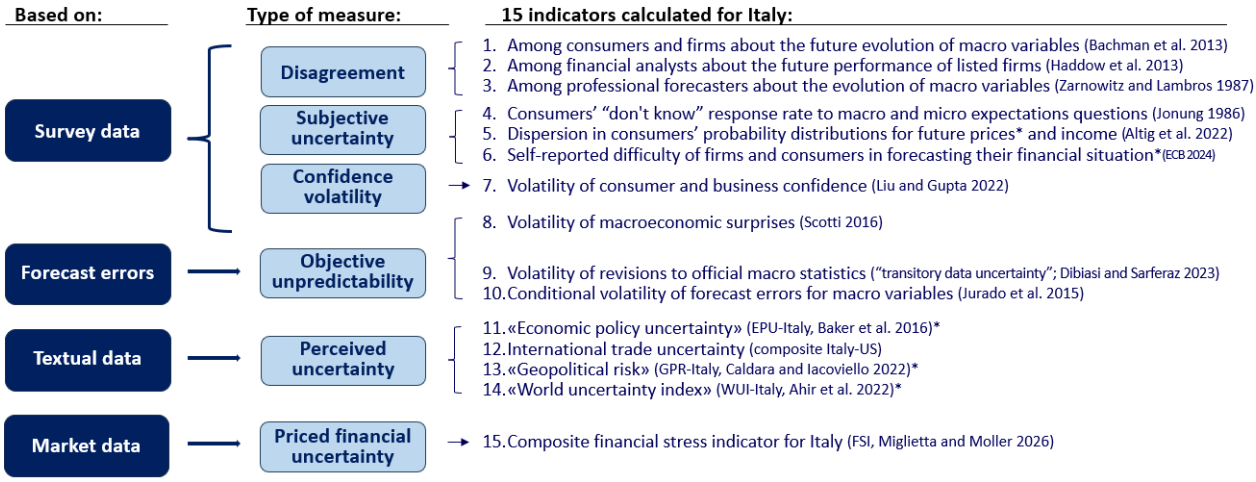
Beyond these measurement issues, the literature has identified a small number of relatively robust regularities in the behaviour and effects of uncertainty. These stylised facts provide a useful benchmark for interpreting the evidence for Italy presented in the following sections.

First, uncertainty tends to increase during recessions and in response to adverse exogenous shocks, such as wars, financial crises, energy market dislocations, political crises or changes in policy regimes. Second, the different uncertainty indicators are generally positively correlated, but not strongly, confirming that they capture distinct aspects of the same underlying reality (Kozeniauskas et al. 2018, Londono et al. 2025). Third, the available evidence suggests that uncertainty tends to have negative short-term effects on economic and financial activity, although there remains an open debate on the extent to which it is an autonomous cause of fluctuations or an endogenous response to shocks to fundamentals (Angelini et al. 2019; Ludvigson et al. 2021; Herwartz and Lange 2024; Cao et al. 2026).

3. Evidence for Italy

In light of the taxonomy discussed in the previous section, a set of fifteen monthly uncertainty indicators has been constructed for Italy, covering the main families proposed in the literature. The scheme reported in Figure 4 lists and organises them according to the kind of input data they are based on and the specific type of uncertainty they measure. The indicators have been computed so as to remain as close as possible to the versions originally proposed in the literature.[4] More details on the construction methodology and the characteristics of each measure are reported in Appendix A.

Figure 4: Uncertainty indicators calculated for Italy, by kind of input data and type of measure



Notes: The scheme lists the 15 uncertainty indicators calculated for Italy, classified according to the kind of input data they are based on and the specific type of uncertainty they measure. Indicators marked with an asterisk are freely available online and did not require any processing by the author. All the indicators have a monthly frequency.

The use of a broad set of indicators allows to assess whether the different measures convey mutually consistent signals or instead provide a more nuanced and potentially conflicting picture. This aspect is

[4] In some cases, it was necessary to adapt the indicators to the Italian context, mainly because of the more limited availability of the underlying data compared with the United States, for which many of these indicators were originally developed. Moreover, the set of 15 indicators constructed for Italy is not exhaustive, although this does not entail any material limitation for the analysis: the measures not considered are largely subsumed by indicators already included. For example, uncertainty measured through the volatility of macroeconomic aggregates, widely used in various forms in the literature, is subsumed by the indicator proposed by Jurado et al. (2015). Similarly, the numerous uncertainty measures based on market data contain largely overlapping information, summarised by the composite measure of financial stress adopted here. Finally, the dispersion in firms' probabilistic forecasts is available only at annual or semi-annual frequency in the case of Italy (INVIND, Sondtel), and its informational content is partly subsumed by the indicator number 6 (see fig. 4) used in this paper; data on the dispersion in professional forecasters probabilistic forecasts is not available for Italy.

particularly relevant in the current context, in which the public debate is strongly influenced by text-based or thematic indicators relating to specific sources of risk.

The evidence on the Italian case shows that the unconditional bivariate correlations among the fifteen measures are moderate and uneven (Table 1). This suggests that the different indicators do not merely replicate the same signal but capture different aspects of uncertainty or are affected by different levels of measurement noise, reinforcing the idea that a granular approach to measurement is preferable to relying on a single benchmark metric.

Table 1: Unconditional correlations among uncertainty indicators for Italy

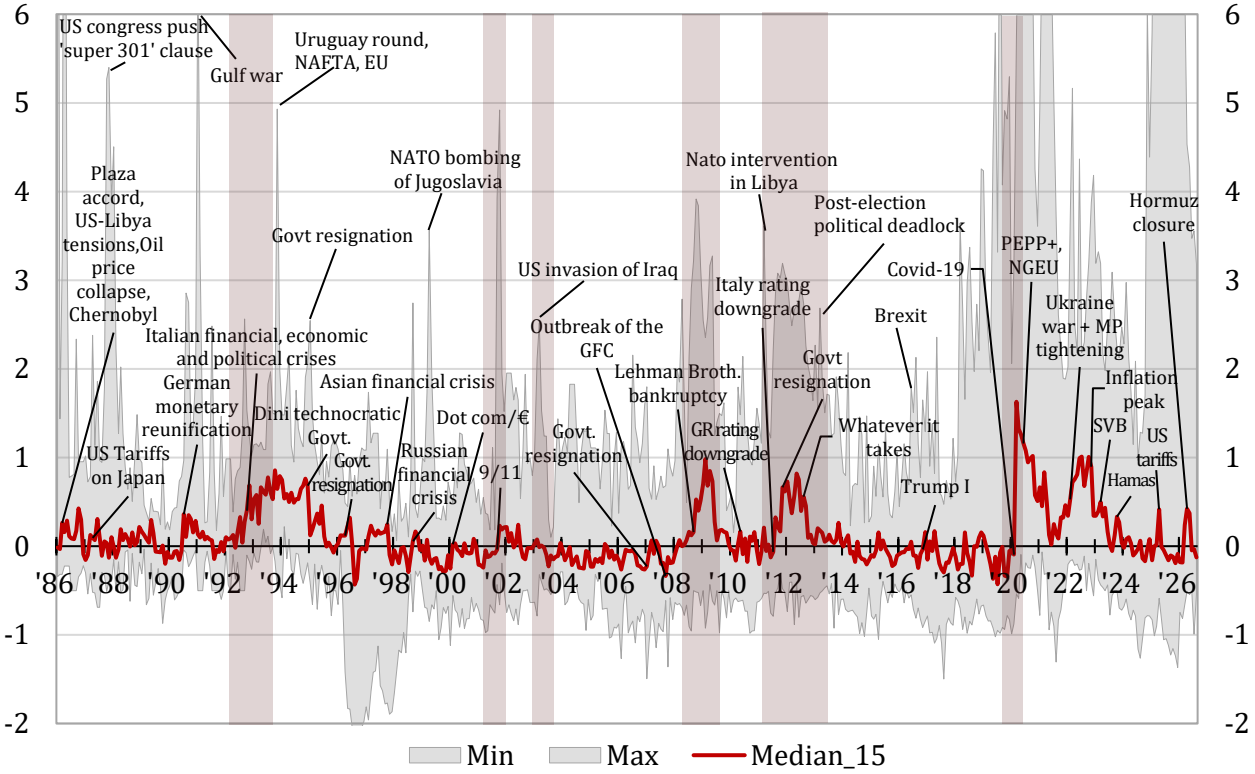
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1) Disagreement - consumers&firms	-	0.1	0.3	-0.1	0.6	0.5	0.4	0.3	0.2	0.3	0.0	-0.4	-0.1	-0.3	0.0
2) Disagreement - financial analysts	0.1	-	0.5	0.0	0.6	0.6	0.4	0.4	0.4	0.2	0.1	0.0	0.1	-0.2	0.1
3) Disagreement - professional forecasters	0.3	0.5	-	-0.1	0.6	0.6	0.7	0.7	0.5	0.6	0.4	-0.1	0.1	0.0	0.4
4) "Don't know" response rate - consumers	-0.1	0.0	-0.1	-	0.0	0.3	-0.1	-0.1	0.0	0.0	-0.3	0.0	-0.1	0.0	0.0
5) Dispersion - consumer prices and income	0.6	0.6	0.6	0.0	-	0.5	0.4	0.5	0.3	0.1	0.1	-0.6	-0.2	-0.4	0.7
6) Difficulty in predicting - consumers&firms	0.5	0.6	0.6	0.3	0.5	-	0.4	0.6	0.2	0.0	0.1	-0.2	0.4	0.0	0.8
7) Confidence volatility	0.4	0.4	0.7	-0.1	0.4	0.4	-	0.8	0.4	0.5	0.3	-0.1	-0.1	0.0	0.2
8) Volatility of macro surprises	0.3	0.4	0.7	-0.1	0.5	0.6	0.8	-	0.4	0.4	0.3	-0.1	0.0	-0.1	0.3
9) Volatility of official revisions	0.2	0.4	0.5	0.0	0.3	0.2	0.4	0.4	-	0.5	0.1	-0.1	0.0	-0.2	0.1
10) Conditional volatility of forecast errors	0.3	0.2	0.6	0.0	0.1	0.0	0.5	0.4	0.5	-	0.2	-0.1	0.0	-0.1	0.1
11) Economic policy uncertainty	0.0	0.1	0.4	-0.3	0.1	0.1	0.3	0.3	0.1	0.2	-	0.3	0.2	0.3	0.5
12) International trade uncertainty	-0.4	0.0	-0.1	0.0	-0.6	-0.2	-0.1	-0.1	-0.1	-0.1	0.3	-	0.3	0.4	-0.1
13) Geopolitical risk index	-0.1	0.1	0.1	-0.1	-0.2	0.4	-0.1	0.0	0.0	0.0	0.2	0.3	-	0.2	0.0
14) World uncertainty index	-0.3	-0.2	0.0	0.0	-0.4	0.0	0.0	-0.1	-0.2	-0.1	0.3	0.4	0.2	-	0.2
15) Composite financial stress indicator	0.0	0.1	0.4	0.0	0.7	0.8	0.2	0.3	0.1	0.1	0.5	-0.1	0.0	0.2	-

Notes: The table reports the unconditional bivariate correlations among the 15 uncertainty indicators for Italy listed on the left. Correlations are calculated over the period August 2004–April 2026, for which all indicators are available, to ensure comparability of results. Indicators 5 and 6 are exceptions, as their time series have much shorter historical depth.

Two further pieces of evidence are worth highlighting. First, text-based indicators display the lowest degree of correlation with the other measures (see rows 11–14 of Table 1). This evidence is consistent with their narrower or thematic nature: they react to policy, trade or geopolitical shocks that are not always transmitted with equal force to the behaviour of domestic households, firms and markets. Second, several uncertainty measures are only weakly correlated with financial stress (Table 1, row 15). This suggests caution in adopting simplistic interpretations of possible divergences between uncertainty and markets: in the absence of a strong and stable historical correlation, such divergences cannot automatically be described as forms of "misalignment".

The analysis of the time series provides a further check of the main stylised facts emerging from the empirical literature. Figure 5 offers an overview of the historical behaviour of the indicators. Considering the median of the fifteen uncertainty measures, a clear countercyclical pattern emerges: uncertainty tends to be high in periods of economic slowdown or crisis and low during expansions. This pattern is visible both in the economic, political and financial crisis of the early 1990s and in the recessions of the early 2000s, the global financial crisis, the sovereign debt crisis and the pandemic recession of 2020. Uncertainty indicators also tend to increase in response to the main adverse exogenous shocks that occurred over the period, including domestic political crises, trade wars and armed conflicts. In this sense, the Italian evidence appears fully consistent with the international literature, which documents a tendency for uncertainty to rise during phases of macroeconomic, financial, or political tensions.

Figure 5: Median and min-max range of uncertainty indicators for Italy



Notes: The chart shows the median of the 15 uncertainty measures calculated for Italy (see Figure 4 and appendix A), together with the corresponding minimum-maximum range. Shaded areas indicate recession periods and labels identify the main events affecting the indicator's dynamics. The median, minimum and maximum refer, in each period, to the indicators actually available, so the composition is not uniform over time. A positive value means that the median indicator is above its own historical median. The minimum (Min) and maximum (Max) series are truncated for visualisation purposes.

A second stylised fact that emerges clearly concerns the relevance of dispersion across indicators, already partly supported by the correlation analysis. The range between the minimum and maximum values of the different measures is indeed very wide in several historical episodes. This evidence confirms that the so-called "uncertainty about uncertainty" (Ahir et al. 2025, Forbes 2016) is an empirically significant phenomenon in the Italy as well. The divergence across the signals provided by the different metrics generally tends to increase in phases in which overall uncertainty rises; however, there are also periods in which dispersion increases while the median remains relatively low. This suggests that the heterogeneity across signals may itself contain information on the state of the macrofinancial system and on the nature of the shocks under way.

With regard to the most recent period, the picture that emerges is nuanced. In April 2025 and in March 2026 – following the announcement of tariffs by the US administration and the outbreak of the war in the Persian Gulf, respectively – the median of the 15 uncertainty measures saw significant but very short-lived spikes. In August 2026, the latest available observation, median uncertainty had largely returned to the low levels prevailing before the outbreak of the war in Iran. At the same time, the dispersion across indicators has remained extremely high. In particular, the international trade uncertainty indicator continued to stand at elevated levels, while other metrics – including many of those more firmly rooted in macroeconomic and financial data, surveys or models – were relatively low (see appendix A for graphical evidence of these dynamics).

This evidence calls for a cautious interpretation. The persistence of strong heterogeneity across indicators implies that the overall picture cannot be adequately summarised by a single measure or by a simple median. At the same time, it cannot be ruled out that some components of uncertainty – although not decisive for the median level – may contain relevant information in terms of prospective risks for the economy and the financial system. This is precisely the possibility that motivates the analysis developed in the following section.

4. Association between uncertainty and macrofinancial tail risks

To assess the informational content of the different uncertainty measures, and hence their usefulness for monitoring macrofinancial stability, the analysis adopts a growth-at-risk-type framework based on quantile regressions. The focus, therefore, is on whether higher uncertainty is associated with a widening of the future distribution of macroeconomic and financial variables, and especially with a deterioration in adverse tail risks, rather than with average economic outcomes. The specification of the quantile regression model is as follows:

$$\mathbb{Q}_\tau\left(\Delta Y_{t,t+h} \mid \mathcal{J}_t\right) = \alpha_\tau + \beta_\tau \Delta Y_{t-3,t} + \gamma_\tau FSI_t \quad + \boldsymbol{\delta_\tau} Uncertainty_t \tag{1}$$

The exercise is conducted on a set of target variables (Y) covering both the real and financial sides of the economy, thereby providing robustness to the results and allowing to assess the relevance of the different transmission channels reviewed in the introduction. On the real side, the analysis considers the OECD composite leading indicator (CLI), industrial production (IPI), the composite Purchasing Managers' Index (PMI) and the unemployment rate (URATE) as indicators of overall economic activity; retail sales of durable goods (RSD) and investment goods production (IGP) are used as sectoral indicators related to specific transmission channels. On the financial side, the analysis includes the composite financial stress indicator for Italy (FSI, Miglietta and Moller 2026), the loan risk premium (LRP, the spread between interest rates on new bank loans and risk-free rates of comparable maturity) and the stock of bank loans (LOAN).

For each target variable, the distribution of future changes is studied across different horizons ($h = 3, 12, 24$ months) and percentiles ($\tau = 20, 50, 80$).[5] The baseline specification controls for the recent dynamics of the target variable and for the current value of the FSI (Alessandri et al. 2019), so as to assess whether including an uncertainty indicator[6] provides additional information.

[5] The choice of the 20th (80th) percentile represents a compromise between the objective of focusing on the tail of the distribution and the need to retain enough effective observations to obtain efficient estimates.

[6] The two measures of subjective uncertainty labelled 5 and 6 in Figure 4 are excluded from this exercise owing to the limited historical depth of the corresponding data series; the FSI is also excluded as it is already part of the Bank of Italy's baseline growth-at-risk model.

Table 2: Target variables used in the analysis of the relation between uncertainty and tail risks

Target variable	Memo	Transformation	Adverse	Source
Composite Leading Indicator	CLI	Percentage change	Left ($\tau = 20$)	OECD
Industrial production index	IPI	Percentage change	Left ($\tau = 20$)	Istat
Composite Purchasing Managers' Index	PMI	Change in level	Left ($\tau = 20$)	S&P Global
Unemployment rate	URATE	Change in level	Right ($\tau = 80$)	Istat
Retail sales of durable goods	RSD	Percentage change	Left ($\tau = 20$)	Istat
Investment goods production index	IGP	Percentage change	Left ($\tau = 20$)	Istat
Composite financial stress indicator	FSI	Change in level	Right ($\tau = 80$)	Banca d'Italia
Loan risk premium (spread between interest rates on new loans to firms and households and the risk-free rate)	LRP	Change in level	Right ($\tau = 80$)	Banca d'Italia, LSEG and author calc.
Bank loans to the private non-financial sector (stock)	LOAN	Percentage change	Left ($\tau = 20$)	Banca d'Italia

Notes: The table reports the target variables used in the analysis of the association between uncertainty indicators and macrofinancial tail risks, the corresponding acronyms used in Figures 6 and 7, the transformation used to measure their change over the different future horizons (h=3,12,24 months), the tail of the respective distribution associated with adverse macrofinancial risks, and the source.

The period considered in the analysis runs from January 1998 to October 2025, excluding the Covid-19 pandemic period between March 2020 and May 2021.[7] In-sample predictive performance is assessed through the improvement, relative to the baseline model, in the weighted mean absolute error, measured by the R^1 statistic of Koenker and Machado (1999):

$$R^1(\tau) = 1 - \frac{\sum_{t=1}^{T} \rho_\tau\left(\Delta Y_{t,t+h} - \hat{\alpha}_\tau - \hat{\beta}_\tau \Delta Y_{t-3,t} - \hat{\gamma}_\tau FSI_t - \hat{\delta}_\tau Uncertainty_t\right)}{\sum_{t=1}^{T} \rho_\tau\left(\Delta Y_{t,t+h} - \hat{a}_\tau + \hat{b}_\tau \Delta Y_{t-3,t} - \hat{c}_\tau FSI_t\right)}$$

where $\rho_\tau(u) = u(\tau - I(u < 0))$ denotes the tilted absolute value loss function for the τ^{th} percentile.

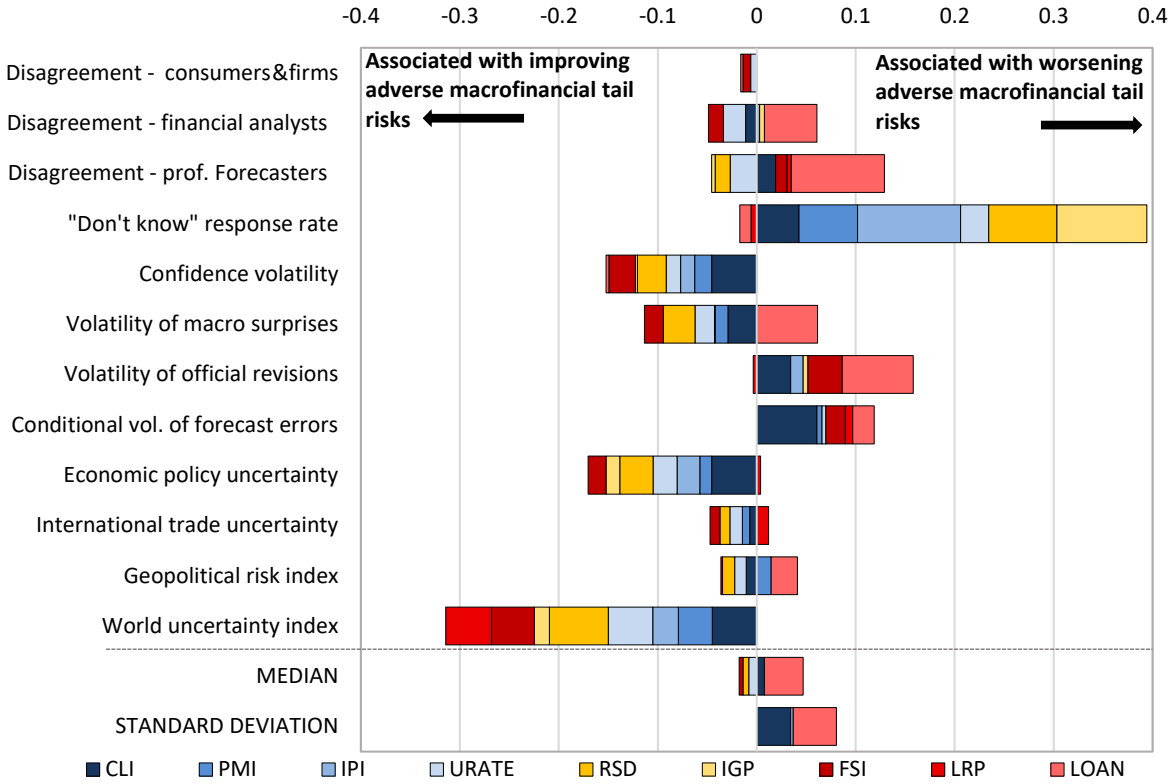
The association between uncertainty and tail risks estimated through this exercise cannot be interpreted neither as a causal effect nor as a real-time forecasting performance. The identification of uncertainty shocks and their relationship with the business cycle is the subject of a broad debate in the literature, which has produced mixed results depending on the indicators considered and the empirical strategies adopted (Herwartz and Lange 2024). The present analysis should instead be interpreted as an assessment of historical early-warning properties: the aim is to establish whether the different uncertainty measures are useful, from a full-sample predictive perspective, in anticipating a deterioration in macrofinancial conditions.

The results show marked heterogeneity in the informational content of the different metrics (Figure 6). Some measures are systematically associated with a worsening of adverse tail risks, especially in terms of bank lending dynamics and, to a lesser extent, overall economic activity. Others display modest or no informational content once financial stress is controlled for. Still others show an association with macrofinancial tail risks with the opposite sign to that expected. This heterogeneity is consistent, on the one hand, with the fact that the different measures capture non-overlapping dimensions of the

[7] Two uncertainty indicators used in the analysis (numbers 8 and 9 in Figure 4) are available only from August 2004 onwards; the results obtained for the different indicators are therefore not fully comparable. The choice of starting the sample in January 1998 represents a compromise between panel balance and the number of observations. Robustness checks confirm that the results are unchanged when the sample is started in August 2004.

phenomenon and, on the other, with the hypothesis that the different indicators may have varying relevance depending on the multiple transmission channels and institutional contexts considered.

Figure 6: Association between uncertainty indicators and adverse macrofinancial tail risks in Italy



Notes: The figure shows, for the percentile associated with the adverse tail (80 for URATE, FSI and LRP, and 20 for the others), the average performance (R^1) across the different time horizons obtained for each uncertainty indicator reported on the vertical axis. The results for each target variable shown in the legend are stacked horizontally. The performance measure R^1 is conventionally assigned a negative sign when the estimated coefficient has the opposite sign to that expected and is set to zero when it is not statistically significant at a 90 per cent confidence level. The last two rows report the results for the median and standard deviation of the uncertainty indicators.

Among the most relevant results, the consumers' "don't know" response rate appears particularly informative for downside risks to economic activity. This shows that a relatively simple measure of subjective uncertainty may contain a relevant signal about the prospective deterioration of the real outlook. At the same time, some measures of objective unpredictability – in particular the volatility of official revisions and the conditional volatility of forecast errors – as well as some measures of disagreement also display significant informational content. Their in-sample predictive performance is more modest but also more broad-based, showing good results for both real and financial variables.

By contrast, text-based indicators (economic policy uncertainty, world uncertainty index, international trade uncertainty and, to a lesser extent, the geopolitical risk index) play a counterintuitive role. Their contribution to the prediction of tail risks appears relevant, but mostly with the opposite sign to that expected. This may be due to their focus on politics-related shocks which, although attracting considerable media attention, are not always relevant from a macrofinancial perspective. Moreover, in some cases these shocks may be associated with pre-existing situations of instability – as after the 2008 financial crisis, which required the adoption of unconventional policies – or may themselves trigger expansionary policy responses, as in the case of external military threats.

Similar evidence is also obtained for the volatility of consumer and business confidence, which is associated, counterintuitively, with milder macrofinancial tail risks. The result is interesting in light of the decoupling observed in recent years between declining consumer confidence and the positive aggregate dynamics of consumption and economic activity in general (Hacıoğlu Hoke et al. 2025, P. Haines Christiansen 2026). This decoupling indeed suggests that, at least since the Covid-19 pandemic, confidence may have been influenced by factors disconnected from macroeconomic fundamentals and therefore have limited predictive content for the business cycle.

An interesting result concerns the comparison between the informational content of the median of the 15 uncertainty measures and that of their cross-sectional standard deviation (used as a proxy for the "uncertainty about uncertainty"). The median, which provides an unweighted synthesis of the available signals, shows an in-sample predictive performance in the expected direction but of relatively modest magnitude. The standard deviation, by contrast, appears to be more strongly associated with adverse tail risks, especially for economic-activity variables. This suggests that heterogeneity across indicators should not be regarded solely as a source of noise or measurement instability but may itself represent an economically meaningful signal.

The evidence obtained for $\tau = 50$ shows that uncertainty is more informative about adverse tail risks than about the central tendency of the macrofinancial outlook (Figure B1 in appendix B). This is consistent with the idea that uncertainty operates mainly by changing the distribution of future outcomes – widening it and/or making it more asymmetric – rather than by affecting the expected median value (Jovanovic and Ma 2022). Moreover, since in the literature this is often found to be a feature of systemic risk indicators, it suggests that uncertainty measures may contain information on systemic risks to financial stability. The evidence on favourable tail risks is instead more heterogeneous and less easily attributable to a single interpretative framework (Figure B2): for some indicators, the pattern is consistent with a widening of the distribution in both tails, in line with theoretical expectations (Haddow et al. 2013); for others, especially some text-based measures or simpler proxies, a combination emerges of greater relevance for the right tail and lower relevance for the left tail.

5. A composite indicator of macrofinancial uncertainty for Italy

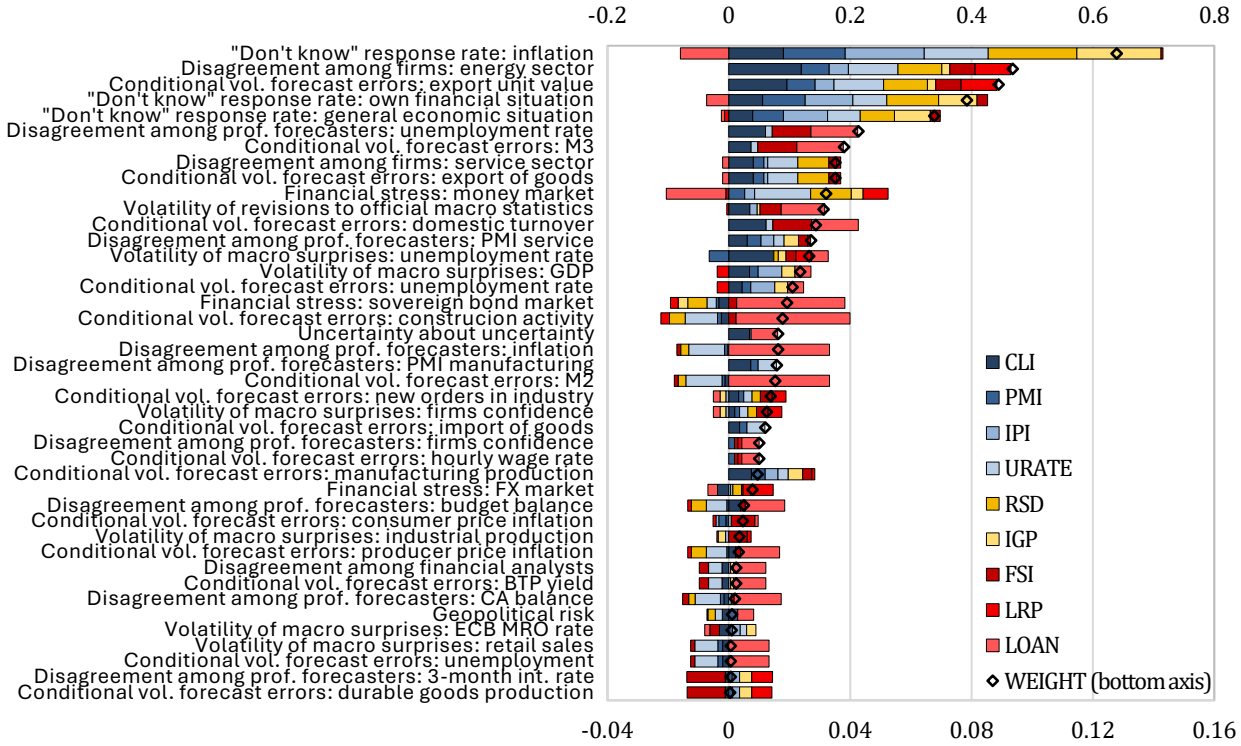
The heterogeneity of the results discussed in the previous section motivated the construction of a composite indicator of macrofinancial uncertainty for Italy, optimised with respect to its historical early-warning properties. The underlying idea is simple: if uncertainty measures are not equally informative, then an effective synthesis should not be limited to a simple unweighted summary measure of the available signals but should assign greater weight to the metrics that display a stronger and more consistent association with tail risks. Moreover, since several indicators themselves contain heterogeneous subcomponents, it is reasonable to expect similar heterogeneity to be found also among them. For this reason, the statistical exercise illustrated in the previous paragraph was replicated, at a granular level, for the 84 elementary components of the initial 15 indicators[8] – with the addition of the indicator of

[8] For the indicators of volatility of official revisions and disagreement among financial analysts, it was not considered appropriate to disaggregate the analysis, since their components are highly heterogeneous in terms of historical depth/frequency and too idiosyncratic, respectively; the two indicators are included in aggregate form among the measures tested. The components of the two measures of subjective uncertainty labelled 5 and 6 in Figure 4 are also excluded owing to the limited samples. The components of the FSI are instead now included to test their predictive performance conditional on the aggregate FSI.

"uncertainty about uncertainty", which displayed strong predictive performance – in order to select the most informative components within each family of indicators.

More specifically, equation (1) was estimated using each of these 85 metrics as an independent variable; the in-sample predictive performance measures (R^1) were conventionally assigned a negative sign whenever the estimated coefficient δ_τ had the opposite sign to that expected, that is, whenever it indicated a negative relationship between uncertainty and downside risks to macrofinancial stability. For each predictor i, the average performance ($\bar{R}^1{}_i$) across the different target variables Y and time horizons h was then calculated; indicators with non-positive average performance were excluded, for a total of 31. To avoid redundancy, indicators that displayed a sufficiently high linear correlation coefficient (conventionally defined as ≥ 0.7) with a better-performing indicator were also excluded, for a total of 12. Finally, the optimised composite indicator was calculated as a weighted average of the measures associated with a deterioration in adverse tail risks, assigning each indicator a weight proportional to its predictive performance ($w_i = \bar{R}^1{}_i / \sum_{i=1}^{N} \bar{R}^1{}_i$). Based on this procedure, 42 of the 85 measures tested enter the final composite indicator (Figure 7).

Figure 7: Association between uncertainty sub-indicators and adverse macrofinancial tail risks



Notes: The figure shows, for the percentile associated with the adverse tail (80th percentile for URATE, FSI and LRP, and 20th for the others), the average performance ($\bar{R}^1_{i,Y}$) across the different time horizons obtained for each uncertainty sub-indicator reported on the vertical axis. Results for the different target variables shown in the legend (Y) are stacked horizontally. The performance measure $R^1_{i,Y,h}$ is conventionally assigned a negative sign whenever the estimated coefficient δ_τ has the opposite sign to that expected and is set to zero when it is not statistically significant at a 90 per cent confidence level. The diamond marker indicates the weight assigned to each metric in the composite indicator. Sub-indicators that do not enter the composite are not shown in the figure.

Some of the results of the granular analysis are worth highlighting.

The previous section showed that the average consumers' "don't know" response rate to questions on future macroeconomic developments ranks among the best-performing indicators. The more granular

analysis shows that, although all its subcomponents display good predictive ability, that result is driven mainly by consumers' subjective uncertainty about price inflation. This indicator provides particularly informative signals for economic-activity variables, while it is less effective for financial variables.

The second-best indicator according to the performance metric adopted is disagreement among firms active in the energy sector about the three-month outlook for the general economic situation, which shows strong in-sample predictive performance for both economic-activity and financial variables. Disagreement among firms in the service sector also provides a useful informational content. These findings are particularly relevant considering the evidence reported in the previous section, where the aggregate indicator of disagreement among consumers and firms was among those least associated with adverse tail risks; they proves the usefulness of conducting the analysis at a higher level of granularity. At the same time, indicators of disagreement among consumers – not shown in Figure 7 – are associated with a reduction in adverse tail risks, which helps explain the weak performance of the aggregate. Interestingly, different measures of consumer uncertainty – in particular disagreement and the "don't know" response rate – display very different associations with tail risks, calling for caution in drawing general conclusions, in this specific case about consumers' uncertainty.

Finally, good in-sample predictive performance – especially with respect to financial risks – is also found for professional forecasters' disagreement about the unemployment rate, unemployment-rate surprises, and the conditional volatility of forecast errors for the unemployment rate. This result suggests that, beyond the type of metric considered, the choice of the variable with respect to which uncertainty is measured may play a significant role for risk monitoring. Within the same categories, predictive content is also found for professional forecasters' disagreement about the services PMI (especially for economic-activity variables), and about consumer prices – which turns out to be the most associated with downside risks to bank loans – as well as for GDP surprises. As for the indicator based on forecast errors' conditional volatility, 16 out of its 36 components show a relevant association with adverse macrofinancial tail risks, with two of the three best-performing among them related to the export sector.

In addition to the data-driven selection of indicators reported in Figure 7, the composite indicator also includes the 7 components of the subjective uncertainty measures labelled 5 and 6 in Figure 4 – which could not be included in the statistical analysis due to the limited length of their time series but can be considered as approximate direct measures of uncertainty. These indicators were assigned a weight equivalent to what they would have received in a simple average, subtracting their weight proportionally from that of the 42 indicators reported in Figure 7.

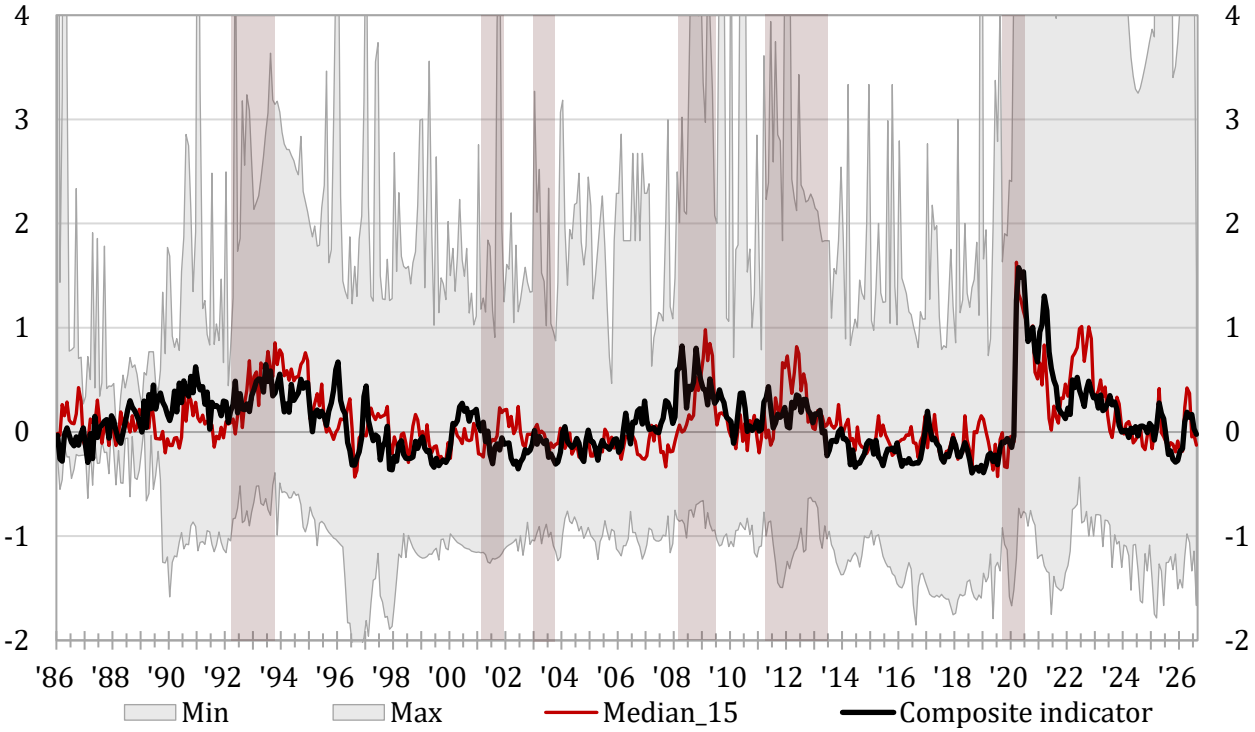
The composite indicator resulting from the aggregation of these uncertainty measures, plotted in Figure 8, has three noteworthy properties. First, it tends to stand at higher levels than the simple median of the 15 aggregate indicators reported in Table 1 in the periods preceding episodes of macroeconomic and/or financial stress, thus signalling stronger early-warning performance. While this result follows partly by construction, it is worth noting that the same pattern is also observed before the 1992 financial crisis, which was excluded from the estimation sample used for the analysis.

Second, over the past few years the indicator has usually stood at levels below those of the median of the 15 measures, suggesting that the global geoeconomic tensions have only partly translated into higher uncertainty and greater adverse macrofinancial tail risk at the domestic level. Unsurprisingly, among the components of the composite indicator that have contributed most to its increase in the aftermath of the

war in Iran are uncertainty indicators related to geopolitical tensions, inflation, monetary policy and firms' subjective perception about the predictability of their own business situation (Figure B3 in appendix B).

Third, as with the initial 15 indicators, dispersion across the components of the composite indicator has remained relatively high in the most recent period. This evidence cautions against reading the aggregate signal in an overly clear-cut way. More generally, the composite indicator should be interpreted as a monitoring tool that organises heterogeneous signals rather than as a substitute for analytical judgement.

Figure 8: The composite indicator of macrofinancial uncertainty for Italy



Notes: The chart reports the composite indicator of macrofinancial uncertainty for Italy, retrospectively optimised for early-warning properties with respect to tail risks, together with the minimum-maximum range of its components and, for comparison, the simple median of the 15 uncertainty indicators also reported in Figure 5. Shaded areas indicate recession periods. The minimum (Min) and maximum (Max) series are truncated for visualisation purposes.

6. Dynamic response of the economy to macrofinancial uncertainty innovations

This section investigates the dynamic responses of the Italian economy to innovations in the composite macrofinancial uncertainty indicator. The analysis relies on the structural quantile vector autoregressive model (QVAR) developed by Chavleishvili and Manganelli (2024). Unlike a conventional VAR, which characterises the dynamic responses of the conditional mean, the QVAR makes it possible to trace these responses at different points of the conditional distribution of the endogenous variables. It is therefore particularly well suited to assessing whether the propagation of uncertainty varies across normal and adverse macrofinancial conditions.

The model specification is relatively parsimonious and includes five monthly endogenous variables (with 12 lags), in the following order: the industrial production index, employment and the stock of bank loans, expressed as log changes, and the financial stress indicator and the composite uncertainty measure, in levels. Such parsimony is especially important in QVARs, where the curse of dimensionality is more severe than

in conventional VARs because parameters vary across quantiles, the recursive representation introduces additional conditional relationships, and tail dynamics are estimated with lower precision.

Structural identification is achieved through recursive short-run restrictions. The endogenous variables are collected in the vector $\tilde{x}_t$. For a given quantile τ, the recursive QVAR is specified as:

$$\tilde{x}_{t+1} = \omega_\tau + A_{0,\tau}\tilde{x}_{t+1} + A_{1,\tau}\tilde{x}_t + \cdots + A_{13,\tau}\tilde{x}_{t-12} + \varepsilon_{t+1,\tau}$$

with

$$\Pr\left[\varepsilon_{i,t+1,\tau} \leq 0 \mid \mathcal{F}_{it}\right] = \tau, i = 1,2,3,4,5$$

where $\varepsilon_{t+1,\tau}$ denotes the vector of structural quantile innovations and $\mathcal{F}_{it}$ is the recursive information set associated with the i-th equation. Identification is obtained by restricting the 5×5 matrix $A_{0,\tau}$ to be lower triangular, with zeros on the main diagonal, following the same logic as the standard Cholesky identification scheme. This means that each variable responds contemporaneously only to innovations in variables preceding it. The uncertainty indicator, ordered last, may therefore respond within the same period to innovations in all the other endogenous variables, while its innovations may affect the other variables only with a lag.

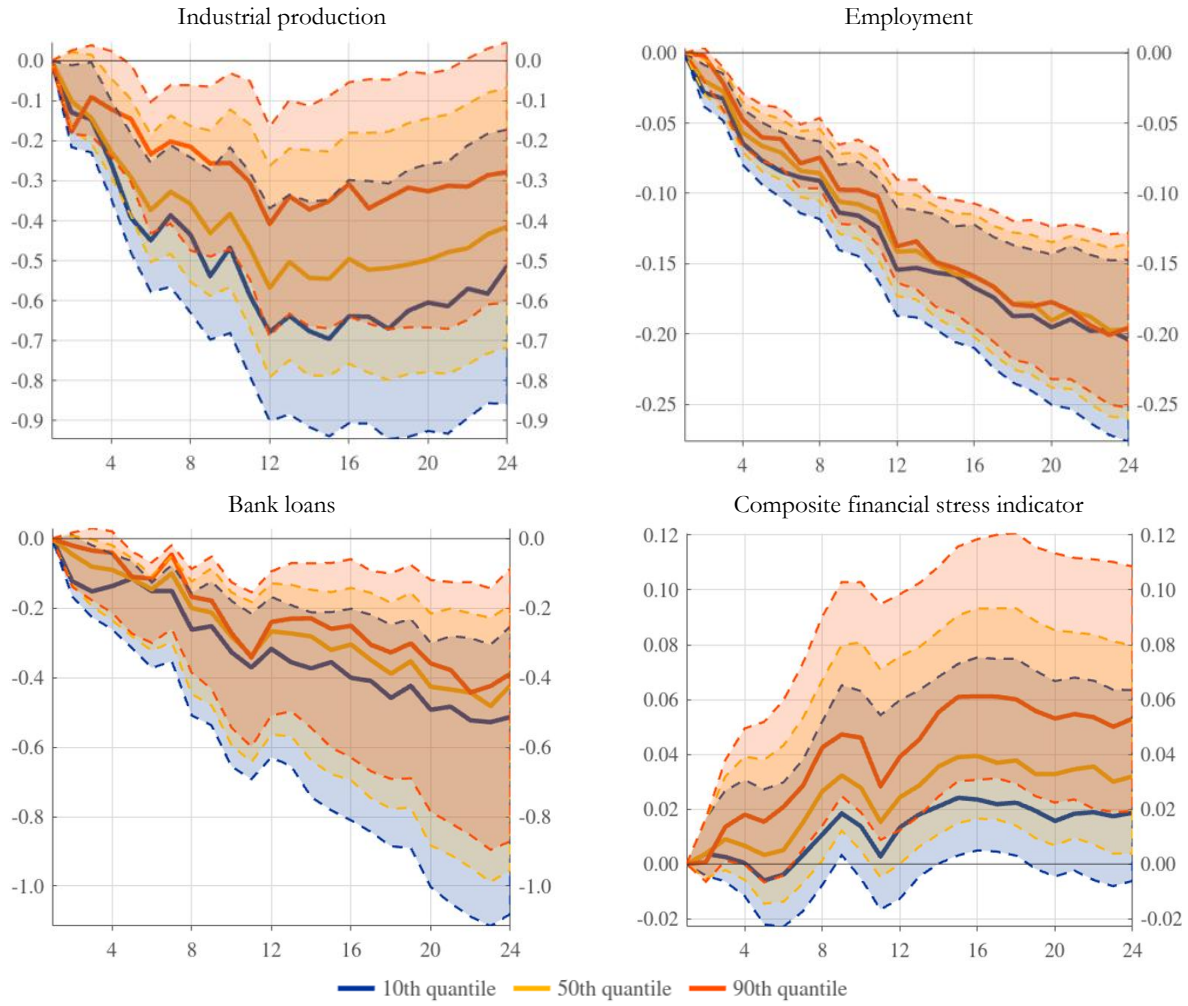
This ordering is consistent with the possibility that observed increases in uncertainty partly reflect an endogenous response to deteriorating macroeconomic and financial conditions, rather than exclusively representing an independent source of economic fluctuations (Ludvigson et al. 2021). Accordingly, the structural innovation in uncertainty is identified as the component of the innovation in the uncertainty indicator that is orthogonal to contemporaneous innovations in industrial production, employment, loans and financial stress.[9] However, this recursive identification does not fully resolve the distinction between exogenous uncertainty shocks and endogenous movements in uncertainty, as it rests only on assumptions about the within-period timing of the relationships among the variables.

The baseline model is estimated over the period from March 1991 to February 2020. This sample choice limits the influence of the extreme fluctuations in industrial production associated with the Covid-19 pandemic, when monthly growth rates reached values of around twenty standard deviations in magnitude. Although excluding the subsequent period entails a loss of potentially informative observations, it reduces the risk that these exceptional realizations dominate the estimation of quantile-specific dynamics. As a robustness check, the model has been re-estimated over the full sample through April 2026, yielding qualitatively similar results, at least in terms of short-run impacts on real activity variables (see Figure B4 in appendix B).

Figure 9 reports the dynamic responses of the system following a one-standard-deviation structural innovation in the composite macrofinancial uncertainty indicator. The responses are shown at $\tau = (10, 50, 90)$ to assess whether the magnitude and persistence of transmission vary across different regions of the conditional distribution.

[9] The assumption that structural innovations in uncertainty are orthogonal to contemporaneous innovations in financial stress, while common in the literature, is especially strong, considering that the composite macrofinancial uncertainty indicator and the composite financial stress indicator (FSI) share some components and that, more generally, they are meant to measure closely related phenomena. However, the informational overlap is limited and, as shown in table 1, the correlation between the FSI and other uncertainty indicators is moderate at best, thereby alleviating this concern.

Figure 9: Dynamic responses to a structural innovation in macrofinancial uncertainty



Notes: Dashed lines show 68 percent bootstrap standard error bands. The QVAR model is estimated on monthly data spanning the period March 1991 – February 2020. The impulse is set equal to one standard deviation of the structural innovations in the composite macrofinancial uncertainty indicator. For the monthly log-change of industrial production, employment and bank loans, cumulated responses are shown.

Results show that an unexpected increase in uncertainty is followed by a decline in production, employment and bank loans, and heightened financial market stress in the short to medium-term. More specifically, the distribution of industrial production becomes more left-skewed, with the lower tail shifted down by −0.7 per cent at peak impact (after 15 months), the median by −0.5 per cent and the upper tail by −0.4 per cent. Similarly, the estimated response is stronger for the upside risk to financial market stress than for its central tendency; for the lower tail it is mostly not statistically significant at the 68 per cent confidence level, suggesting that episodes of disconnect between market stress and broader uncertainty are not inherently anomalous.

These results show that identified uncertainty innovations are particularly relevant for the magnitude of adverse macrofinancial outcomes, or tail risks. The estimated responses are also economically meaningful: given that the largest identified uncertainty innovations exceed three standard deviations, the corresponding response of industrial production would be around −2 per cent in an adverse macroeconomic scenario.

In contrast, the responses of employment and bank loans are milder, more persistent and broadly homogeneous across quantiles. This suggests that unexpected increases in uncertainty tend to be followed by weakening labour and credit markets in both favourable and adverse economic states, with broadly similar intensity.

7. Conclusions

Macrofinancial uncertainty is intrinsically multidimensional and cannot be adequately captured by a single metric. It manifests through different channels and agents, with different implications for economic activity and the financial system. The substantial heterogeneity across the measures considered for Italy supports a monitoring approach based on a broad set of complementary indicators.

The evidence obtained for the Italian economy is consistent with the main stylised facts documented in the literature. The 15 different indicators computed show that macrofinancial uncertainty tends to increase during recessions and in the presence of adverse exogenous shocks. This is also the case for the geoeconomic shocks that hit the global economy in recent years. At the same time, the different measures do not always move in tandem. Dispersion across indicators is therefore a relevant element of the overall picture and may signal phases in which high "uncertainty about uncertainty" may make any aggregate assessment more fragile and may itself represent an additional source of uncertainty.

The analysis of the association between uncertainty and macrofinancial tail risks shows that not all metrics are equally useful for financial stability monitoring. Many measures are associated with a deterioration in adverse tail risks, especially for bank lending dynamics and, less uniformly, for economic activity; others have weaker or even counterintuitive informational content. This points to the need to distinguish among different forms of uncertainty and to avoid conclusions based on a single indicator or on an unweighted summary measure.

Against this background, the proposed composite indicator of macrofinancial uncertainty for Italy aims to provide a monitoring tool capable of organising information from many different sources in a robust and forward-looking way, by selecting those components that have historically been more closely associated with heightened macroeconomic and financial tail risks. With reference to the most recent period, the composite indicator shows that the global geoeconomic tensions have only partly translated into higher uncertainty and adverse macrofinancial tail risk at the domestic level.

The quantile vector autoregression analysis shows that structural innovations in the composite uncertainty indicator tend to be followed by lower production, employment and bank loans, and higher financial market stress in the short to medium-term. Moreover, the estimated responses show that uncertainty innovations are particularly relevant for the magnitude of adverse macrofinancial outcomes, suggesting that the monitoring of uncertainty should play a relevant role in the assessment of financial stability risks.

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Appendix A. Uncertainty measures considered

1. Disagreement

1.1 Disagreement among consumers and firms about future developments in macroeconomic variables

Description: Average of the standard deviations of the shares of positive and negative responses to survey questions addressed to consumers and firms regarding future macroeconomic developments in Italy. The standard deviation is calculated for each of the economic sectors of the firms surveyed – services, energy, capital goods, intermediate goods and consumer goods – on responses concerning developments in aggregate economic activity over the next three months, and for consumers on responses concerning developments in aggregate economic activity and consumer prices over the next twelve months. It is calculated as the square root of the sum of the share of positive responses and the share of negative responses minus the square of their difference, as in Bachmann et al. (2013). Before aggregation, each disagreement measure is standardised.

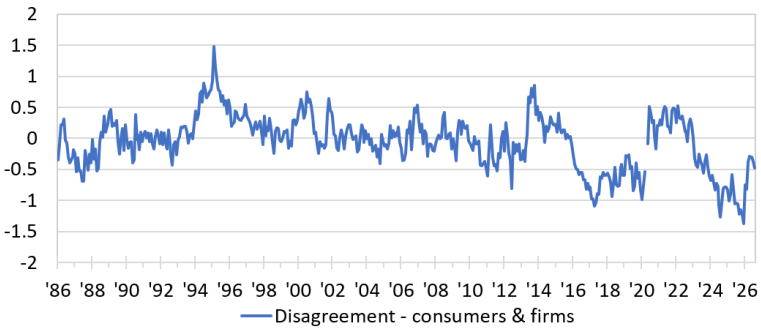
References: Bachmann et al. (2013); Girardi and Reuter (2017); Giordano et al. (2019); Parliamentary Budget Office, Nota sulla congiuntura, April 2017.

Source and data availability: Istat data and author's calculations. The series starts in January 1986; the services sector is included from January 2003.

Pros: The indicator has substantial historical depth; provides a sectoral breakdown; takes into account a very large number of consumers and firms; and provides an ex-ante proxy for uncertainty.

Cons: Disagreement is, in general, an uncertainty indicator with relatively weak theoretical foundations, although it is empirically strongly associated with more direct measures of uncertainty (Zarnowitz and Lambros, 1987; Bomberger, 1996; Bachmann et al., 2013). Uncertainty indicators based on disagreement reflect, in addition to uncertainty proper, differences in opinions and in respondents' understanding of the same phenomena (Lahiri and Sheng, 2010). That said, unlike Girardi and Reuter (2017) and the Parliamentary Budget Office (2017), the measure computed here does not consider responses to questions on microeconomic developments, thereby minimising the distortion due to heterogeneity in respondents' idiosyncratic outlooks.

Chart:



1.2 Disagreement among financial analysts about future sales of listed companies

Description: Average of the standard deviations of financial analysts' forecasts of twelve-month-ahead sales for Italian listed companies. The sample includes the two largest firms – listed at least since 2000 – in

each of the economic sectors defined by Datastream (Aerospace and Defense, Automobiles and Parts, Banks, Beverages, Construction and Materials, Electricity, Gas, Water and Multi-utilities, Household Goods and Home Construction, Industrial Engineering, Investment Banking and Brokerage Services, Media, Medical Equipment and Services, Non-life Insurance, Oil, Gas and Coal, Pharmaceuticals and Biotechnology, Telecommunications Service Providers) and covers 77 per cent of the total capitalisation of the Italian equity market.

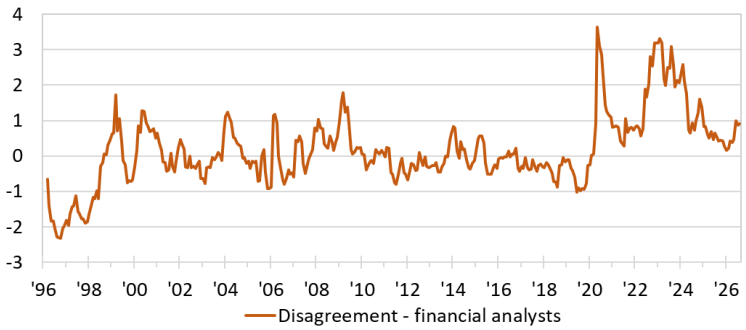
References: Barron et al. (2009); Haddow et al. (2013).

Source and data availability: LSEG Datastream data and author's calculations. The series starts in January 2000.

Pros: The indicator has fairly substantial historical depth; provides a sectoral breakdown; and provides an ex-ante proxy for uncertainty.

Cons: See Section A.1.1.

Chart:



1.3 Disagreement among professional forecasters about future developments in macroeconomic variables

Description: Average of the standard deviations of:

1. point forecasts provided by members of the Consensus Economics panel for Italian real GDP, consumer spending, fixed investment, the consumer price index, industrial production, the current-account balance, the general government balance and short- and long-term interest rates. The standard deviations of point forecasts for the current year and the following year are interpolated so as to simulate a constant twelve-month horizon.
2. point forecasts provided by members of Reuters Polls panels for the Italian manufacturing PMI, services PMI, business confidence and consumer confidence for the following month.

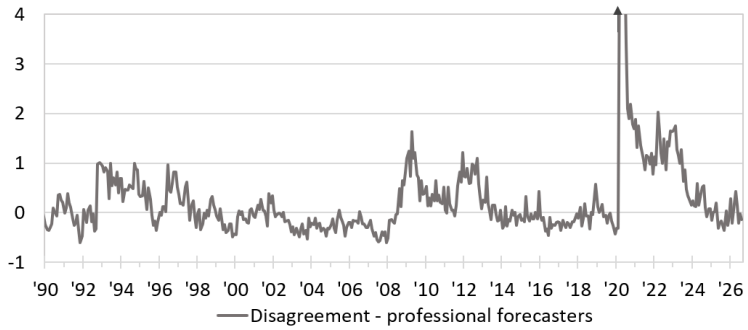
References: Levi and Makin (1980); Zarnowitz and Lambros (1987); Bloom (2009); ECB Economic Bulletin No. 8/2016, Article 1; IMF Global Financial Stability Report, October 2024, Chapter 2.

Source and data availability: Consensus Economics and Reuters Polls data, and author's calculations. The series starts in October 1989; the Reuters Polls series are included from January 2005.

Pros: The indicator has substantial historical depth; is based on forecasts by qualified professionals; covers a broad set of macroeconomic variables and provides the corresponding breakdown; and constitutes an ex-ante proxy for uncertainty.

Cons: See Section A.1.1, with the additional limitation of the relatively small panel size – about 25 forecasters.

Chart:



2. Subjective uncertainty

2.1 Consumers' "don't know" response rate to questions regarding future developments in macro- and microeconomic variables

Description: Average rate of "don't know" responses provided by Italian consumers to questions on the expected twelve-month change in the general economic situation, unemployment, inflation and the household's financial situation. Although this indicator is not used in the literature on economic uncertainty, its validity as a measure of uncertainty has nevertheless been discussed and supported in the literature (see references).

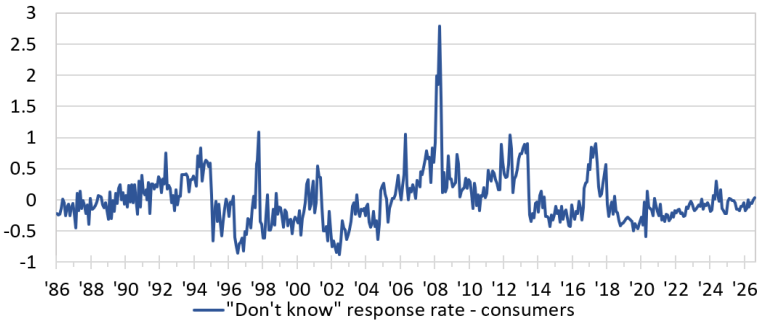
References: Jonung (1986); Reiche and Meyler (2022).

Source and data availability: Istat consumer survey data and author's calculations. The series is available from January 1984.

Pros: The indicator is a direct, albeit approximate, measure of consumers' ex-ante subjective uncertainty; it has substantial historical depth; it covers a few macroeconomic variables and provides the corresponding breakdown.

Cons: The "don't know" response is not an explicit indication of uncertainty; it conflates lack of information, limited interest and genuine subjective uncertainty, without capturing its intensity; non-responses are also reported in the "don't know" category; it captures only consumers' uncertainty.

Chart:



2.2 Dispersion in probability distributions reported by consumers regarding future price and income growth

Description: Average of the median interquartile range of the self-reported probability distributions provided by consumers on twelve-month inflation and on twelve-month income growth prospects.

References: Zarnowitz and Lambros (1987); Altig et al. (2022); Bańkowska et al. (2021).

Source and data availability: ECB Consumer Expectations Survey data and author's calculations. The series is available from April 2020.

Pros: This is the measure closest to a direct observation of ex-ante subjective uncertainty.

Cons: Extremely limited historical depth; coverage restricted to a small number of macroeconomic variables; data are released with a one-month lag relative to the reference month.

Chart:



2.3 Reported difficulty among firms and consumers in making forecasts about their business situation and household finances

Description: Weighted average of the difference between the share of respondents reporting high forecasting difficulty and the share reporting low difficulty. For consumers, the question concerns the difficulty of forecasting the household's financial situation over the next twelve months. For firms, the question concerns the difficulty of forecasting the business situation over the next three months. The business component covers services, construction, retail trade and industry.

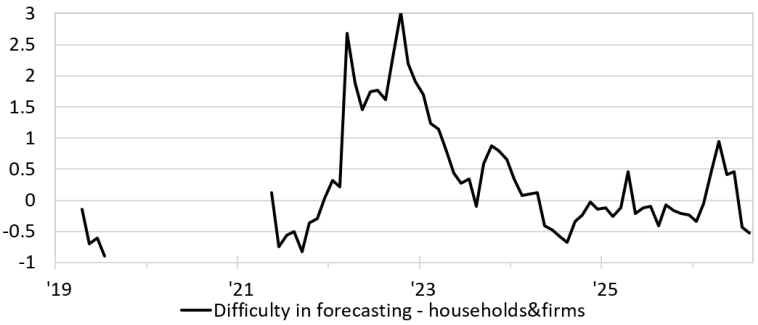
References: European Commission, European Business Cycle Indicators, 3rd quarter 2021; ECB Economic Bulletin No. 8/2024, Box 3.

Source and data availability: Istat consumer and business survey data and author's calculations. The series is available from April 2019.

Pros: It is among the measures closest to a direct observation of ex-ante subjective uncertainty; it provides a sectoral breakdown.

Cons: Extremely limited historical depth; coverage restricted to a small number of macroeconomic variables; data are released with a one-month lag relative to the reference month.

Chart:



3. Confidence volatility

3.1 Volatility in consumer and business confidence

Description: Six-month realised volatility of the Economic Sentiment Indicator.

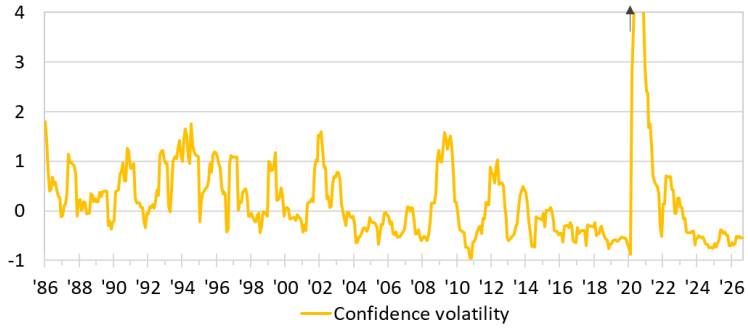
References: Desroches and Gosselin (2002); Caglayan and Xu (2016); Liu and Gupta (2022); ECB Economic Bulletin No. 8/2016, Article 1.

Source and data availability: Istat consumer and business survey data and author's calculations. The series is available from April 1985.

Pros: Simplicity; substantial historical depth.

Cons: Indirect, relatively crude and ex-post proxy for uncertainty.

Chart:



4. Objective unpredictability

4.1 Volatility of macroeconomic surprises

Description: Following Scotti (2016), surprise-based uncertainty is calculated as the average of three-month realised volatilities of standardised surprises (defined as the square root of the three-month moving average of squared surprises, where the surprise is the difference between the consensus forecast and the preliminary official release) across the following macroeconomic indicators for Italy: monthly consumer-price inflation, monthly industrial-production growth, the unemployment rate, monthly retail-sales growth, quarterly real GDP growth, business confidence, consumer confidence and the ECB main refinancing operations rate. Quarterly GDP surprises are carried forward for two months to obtain a monthly series.

For some indicators, the series start after August 2004. Unlike Scotti (2016), surprises are aggregated here using a simple rather than weighted average, and the indicator has a monthly rather than daily frequency.

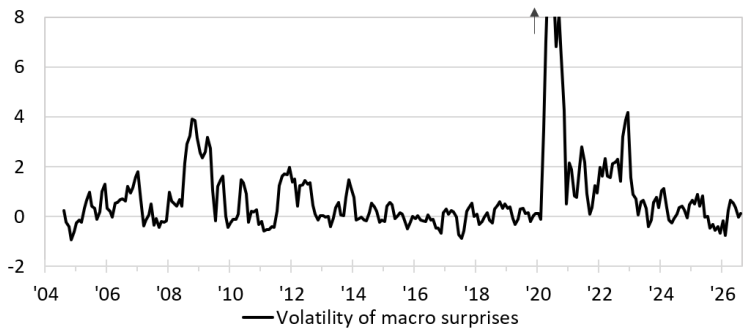
References: Scotti (2016); Rossi and Sekhposyan (2015).

Source and data availability: Reuters Polls and Istat data, and author's calculations. The series is available from August 2004.

Pros: Objective measure of the degree of unpredictability of macroeconomic variables.

Cons: Ex-post measure of uncertainty; limited historical depth; some components are released more than one month after the reference month.

Chart:



4.2 Revisions to official macroeconomic statistics ("transitory data uncertainty")

Description: Average of the standardised absolute percentage revisions between the preliminary estimate, or first release, and the first official estimate, or second release, of the same data point, calculated for the following macroeconomic indicators (all seasonally adjusted).

Monthly indicators: retail sales, industrial production, manufacturing production, exports of goods, imports of goods, trade balance, labour force, employed persons, unemployed persons, unemployment rate (where the absolute revision rather than the absolute percentage revision is used), consumer confidence indicator, business confidence indicator, economic sentiment indicator.

Quarterly indicators: GDP, final consumption expenditure of households, final consumption expenditure of general government, gross fixed capital formation, exports of goods and services, imports of goods and services, implicit GDP deflator, employed persons, unemployed persons, unemployment rate (absolute revision rather than the absolute percentage revision is used), changes in inventories, acquisitions less disposals of valuables, labour cost per unit of output in industry (absolute revision rather than the absolute percentage revision is used), gross disposable income of households.

For each indicator, the revision is recorded on the date of publication of the preliminary estimate and carried forward until the publication date of the next release. The resulting indicator is very similar, in spirit, to Scotti's (2016) uncertainty indicator, with revisions to official data replacing the surprises used in that work. Unlike Scotti's indicator, however, the uncertainty measured here is assigned to the month in which the preliminary estimate is published rather than to the reference month of the data point. This is justified by the objective of measuring the uncertainty produced by data inaccuracy, and therefore by the intention to capture what is known as "transitory data uncertainty". Although this indicator has not been used in the economic-uncertainty literature, the value of revisions to official statistics as a measure of uncertainty has been discussed and supported. In terms of measurement, Dibiasi and Sarferaz (2023) propose a Jurado et

al. (2015)-style uncertainty indicator in which data revisions replace forecast errors. Here, an analogous exercise is carried out but using Scotti's (2016) methodology as the reference.

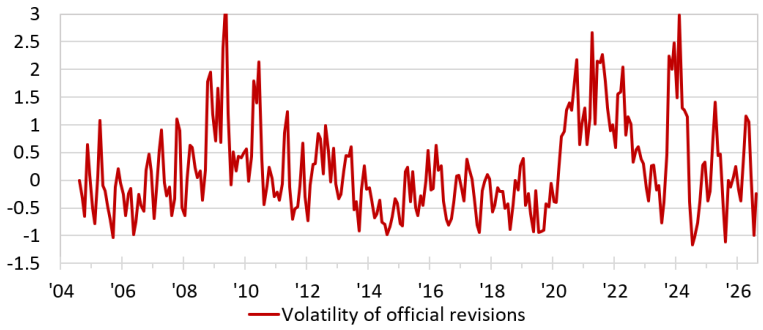
References: Shrestha and Marini (2013); Manski (2015); Mazzi et al. (2021); Dibiasi and Sarferaz (2023).

Source and data availability: Istat data and author's calculations. The series is available from August 2004.

Pros: Objective measure of the degree of unpredictability of macroeconomic variables; it exploits a broad information set; compared with other similar measures based on forecast errors, it captures what is known as "transitory data uncertainty", an aspect that is in some sense logically prior to unpredictability; it is useful for assessing the quality of current macroeconomic information.

Cons: Ex-post measure of uncertainty; limited historical depth; some components are released more than one month after the reference month.

Chart:



4.3 Conditional volatility of forecast errors for macroeconomic variables

Description: Following Jurado et al. (2015), uncertainty is calculated as the average conditional volatility of one-month-ahead forecast errors for the following 40 monthly macroeconomic indicators for Italy, available at least from January 1991 and all transformed into annual changes (in most cases percentage changes):

Prices: CPI, CPI excluding food and energy, PPI, export unit-value index, import unit-value index, terms of trade, Bank of Italy price-competitiveness indicator, contractual hourly wages for all employees, hourly wages for industrial workers.

Interest rates: three-month interbank deposit rate, short-term repo rate, gross yield on government securities.

Monetary aggregates: M1 – Italian contribution to the euro area, M2 – Italian contribution to the euro area, and M3 – Italian contribution to the euro area.

Currency: exchange rate of the Italian currency against the US dollar.

Stock market: Comit Milan general share-price index.

Economic activity: industrial production, manufacturing production, production of capital goods, production of non-durable consumer goods, production of durable consumer goods, energy production, production of intermediate goods, production of investment goods, order books in industry, order books in construction, industrial turnover, domestic turnover index, retail sales, level of construction activity from

business surveys, new passenger-car registrations, exports of goods, imports of goods, trade balance in goods, export turnover index.

Labour market: unemployed persons, unemployment rate.

Confidence: business confidence indicator and consumer confidence indicator.

Forecasts are based on a FAVAR model in which the factors are obtained as principal components of the 40 indicators and the conditional volatility of forecast errors is obtained through a stochastic-volatility model.

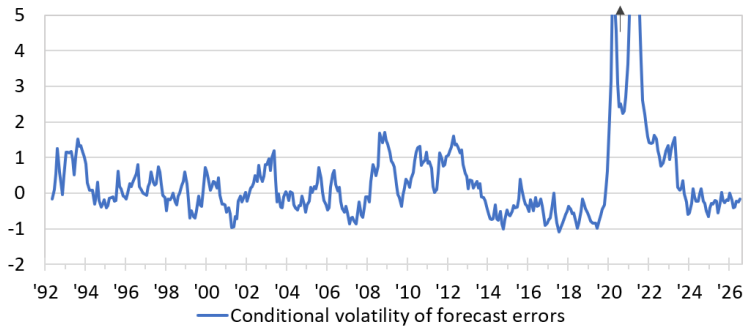
References: Jurado et al. (2015); Geraci and Mohimont (2024); Comunale and Nguyen (2025); IMF Global Financial Stability Report, October 2024, Chapter 2; ECB Economic Bulletin No. 8/2024, Box 3.

Source and data availability: Istat data and author's calculations. The series is available from May 1992.

Pros: Conceptually among the indicators closest to a direct measurement of the objective unpredictability common to several macroeconomic aggregates; it exploits a broad information set.

Cons: Ex-post measure of uncertainty; most input data are published with a two-month lag relative to the reference month; the estimate of uncertainty at time t uses information that was not available at time t, because both the factors, obtained through principal components, and the coefficients of the forecasting model are estimated over the full sample, the assumed law of motion for forecast-error volatility is a smooth stochastic process, and historical data rather than real-time vintages are used; the resulting uncertainty indicator is highly persistent by construction.

Chart:



5. Perceived uncertainty

5.1 Economic Policy Uncertainty (EPU-Italy)

Description: Frequency of articles containing the terms "uncertain"/"uncertainty" and "economic"/"economy", together with one or more terms related to economic policy, in the newspapers Corriere della Sera and La Stampa.

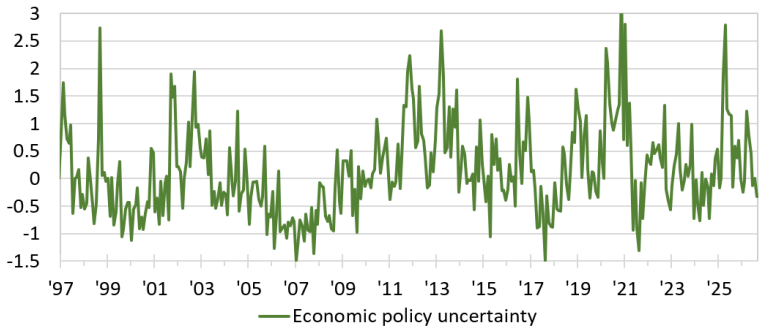
References: Baker, Bloom and Davis (2016).

Source and data availability: Data available at www.policyuncertainty.com. The series is available from January 1997.

Pros: Substantial historical depth; provides an intuitive and transparent measure of uncertainty related to economic policy, which may be difficult to capture through traditional quantitative data.

Cons: It measures the media salience of uncertainty rather than actual uncertainty; it is subject to editorial and news-coverage biases; it may react to external events that are not necessarily relevant for Italian economic conditions; it has a narrow focus and may fail to capture economic uncertainty in a broader sense.

Chart:



5.2 International trade uncertainty

Description: Weighted average of Baker et al.'s (2016) US trade policy uncertainty index, Caldara et al.'s (2019) US trade policy uncertainty index, Baker et al.'s (2026) stock-market volatility trackers related to trade and US trade policy – each weighted one sixth – and Ahir et al.'s (2022) quarterly trade uncertainty index for Italy (WTUI, interpolated to monthly frequency), weighted one half. The indicators, standardised before aggregation, measure the frequency of newspaper articles, or Economist Intelligence Unit reports in the case of the WTUI, related to trade and trade policy uncertainty.

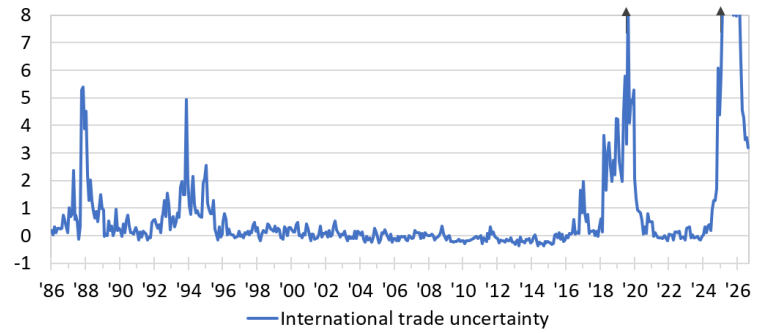
References: Baker et al. (2016), Caldara et al. (2019), Baker et al. (2026), Ahir et al. (2022).

Source and data availability: Data available at www.policyuncertainty.com, www.matteoiacoviello.com and www.worlduncertaintyindex.com. The series is available from January 1984.

Pros: Substantial historical depth; provides an intuitive and transparent measure of uncertainty related to international trade, which may be difficult to capture through traditional quantitative data.

Cons: See Section A.5.1. In addition, this is the only measure based on data that do not refer entirely to Italy, for which the only available series has a quarterly rather than monthly frequency.

Chart:



5.3 Geopolitical risk index (GPR-Italy)

Description: Frequency of newspaper articles that mention terms related to geopolitical tensions and Italy at the same time.

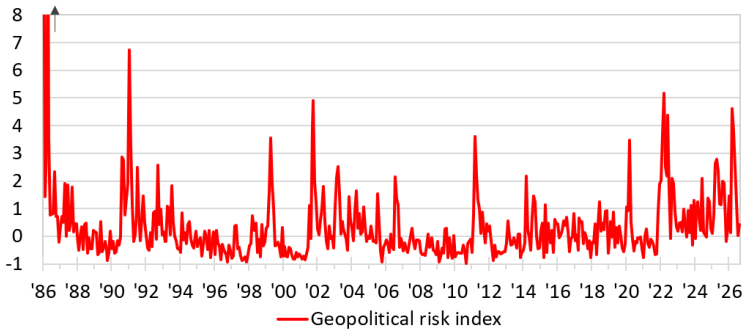
References: Caldara and Iacoviello (2022).

Source and data availability: Data available at www.matteoiacoviello.com. The series is available from January 1985.

Pros: Substantial historical depth; provides an intuitive and transparent measure of uncertainty related to geopolitical risks, which may be difficult to capture through traditional quantitative data.

Cons: See Section A.5.1.

Chart:



5.4 World Uncertainty Index (WUI-Italy)

Description: Frequency counts of "uncertainty" (and its variants) in the quarterly Economist Intelligence Unit (EIU) reports on Italy. The series has a quarterly frequency until December 2007: it is converted to monthly frequency by keeping it constant in the three months of each quarter.

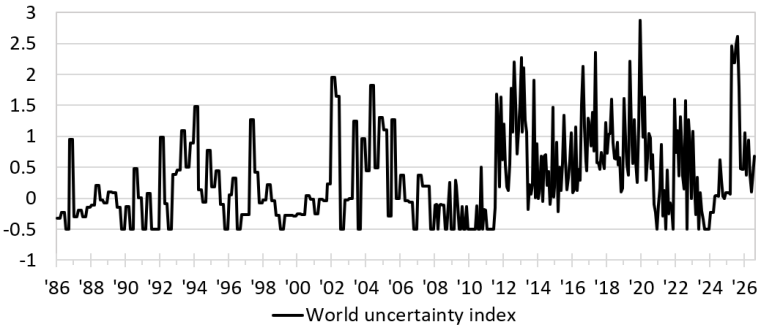
References: Ahir et al. (2022).

Source and data availability: Data available at www.worlduncertaintyindex.com. The series is available from January 1952, with monthly frequency from January 2008.

Pros: Substantial historical depth; the only text-based measure that captures uncertainty in a broad sense in an intuitive and transparent way; unlike other text-based uncertainty measures, it does not rely on newspaper articles but uses country reports on the Italian economy prepared by experts.

Cons: It measures perceived uncertainty rather than actual uncertainty; until 2008, the series is quarterly and converted to monthly frequency.

Chart:



6. Priced financial uncertainty

6.1 Composite financial stress indicator (FSI)

Description: Weighted average of financial stress indicators – volatility, yield spreads, correlations and valuation losses – in Italian equity, bond, foreign-exchange and money markets.

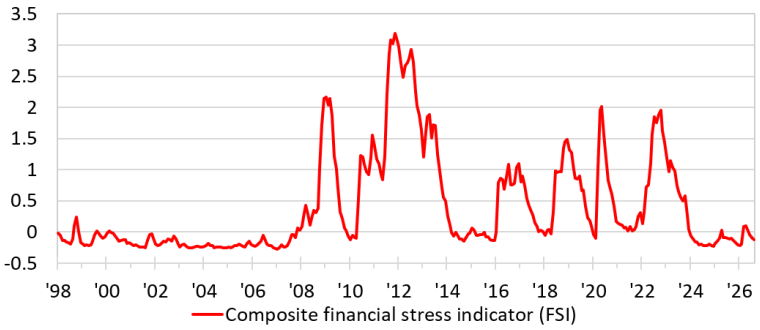
References: Bloom (2009); Holló, Kremer and Lo Duca (2012); Engle and Campos-Martins (2023); Miglietta and Moller (2026).

Source and data availability: LSEG data and author's calculations. The series is available from January 1998.

Pros: It captures the uncertainty actually priced in financial markets; it has good historical depth; it is based on daily data and is therefore very timely.

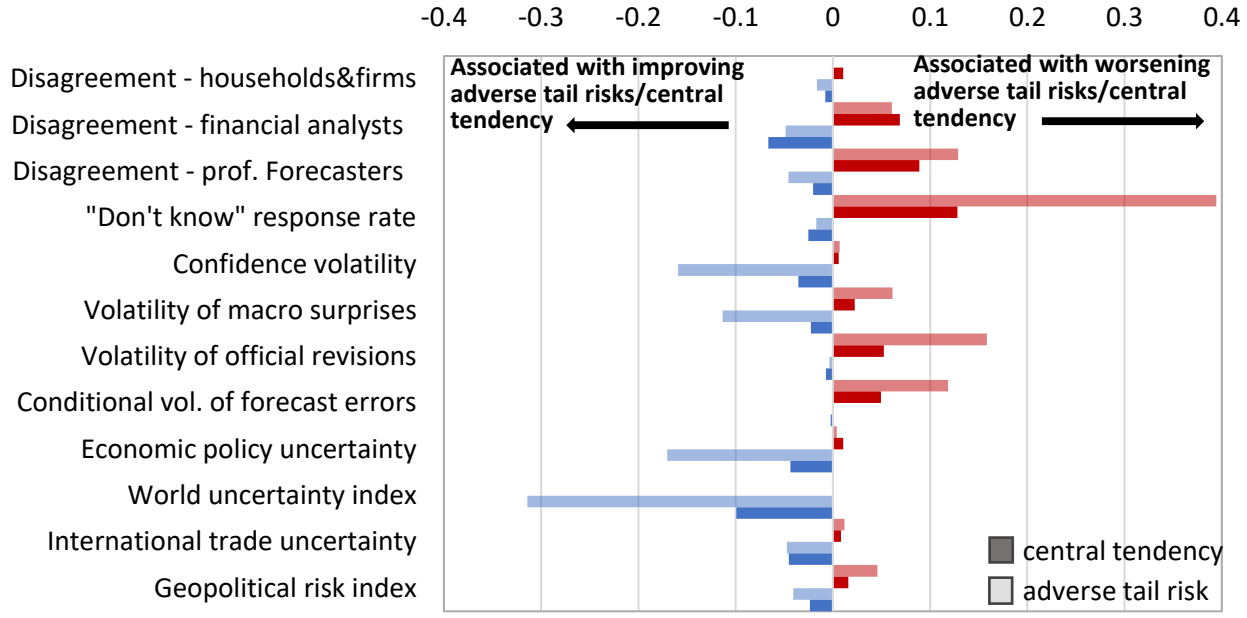
Cons: It may conflate uncertainty with risk aversion; it may be affected by market-liquidity conditions and technical factors; it may be relatively uninformative during episodes in which markets are disconnected from fundamentals.

Chart:



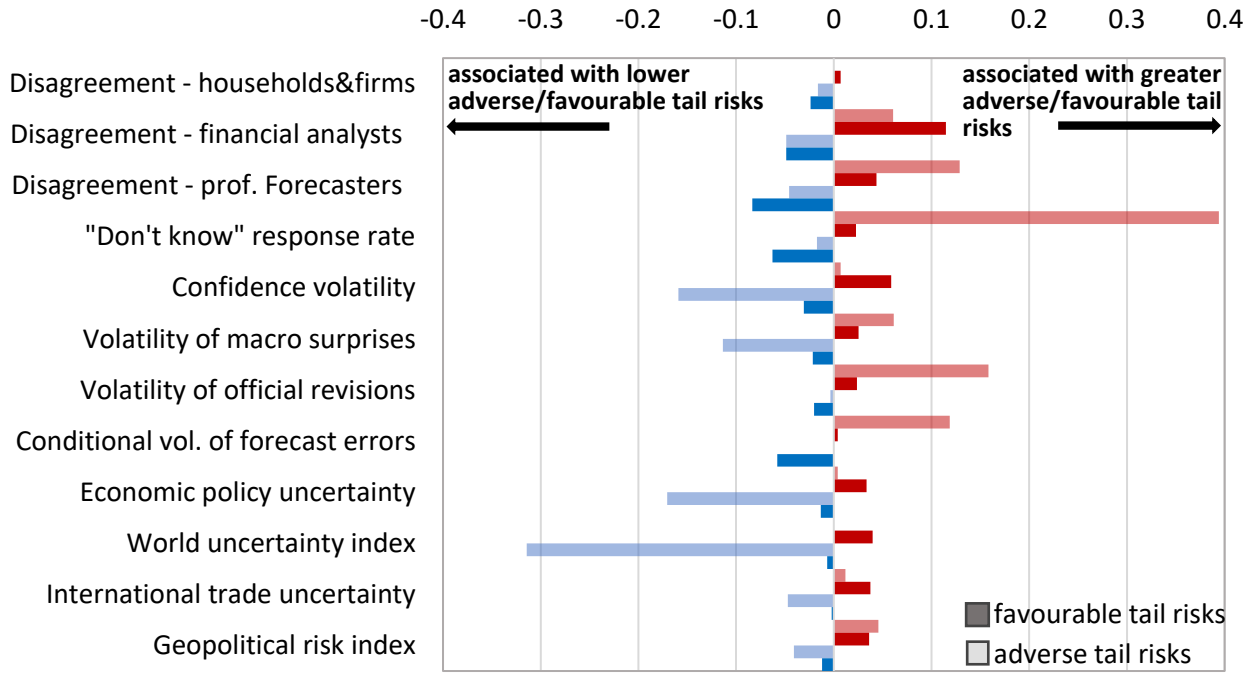
Appendix B. Further results

Figure B1: Macrofinancial uncertainty is more strongly associated with adverse tail risks than with the central tendency



Notes: The figure shows the same results as those reported in Figure 6 (transparent bars), without the breakdown by target variable and with a different colour for those for which the estimated coefficient $\delta\tau$ has the opposite sign to that expected (light blue), alongside the results obtained for the central tendency (τ=50; solid bars).

Figure B2: Macrofinancial uncertainty is more strongly associated with adverse tail risks than with favourable tail risks



Notes: The figure shows the same results as those reported in Figure 6 (transparent bars), without the breakdown by target variable and with a different colour for those for which the estimated coefficient $\delta\tau$ has the opposite sign to that expected (light blue), alongside the results obtained for the favourable tail risk (τ=20 for URATE, FSI, LRP and 80 for the others; solid bars).

Figure B3: Main drivers of the increase in the composite macrofinancial uncertainty indicator for Italy between February and May 2026

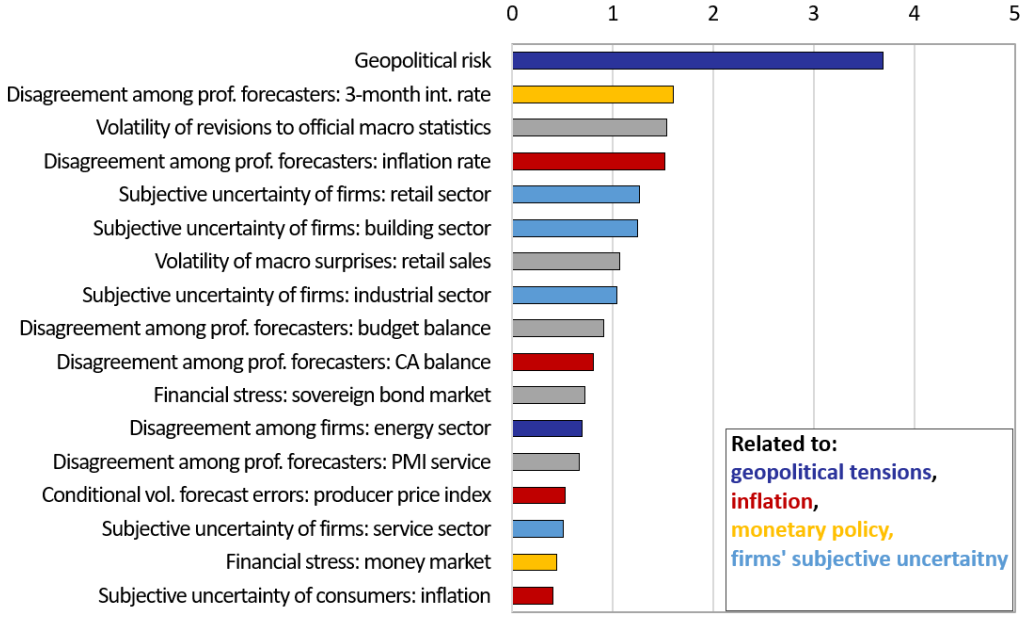
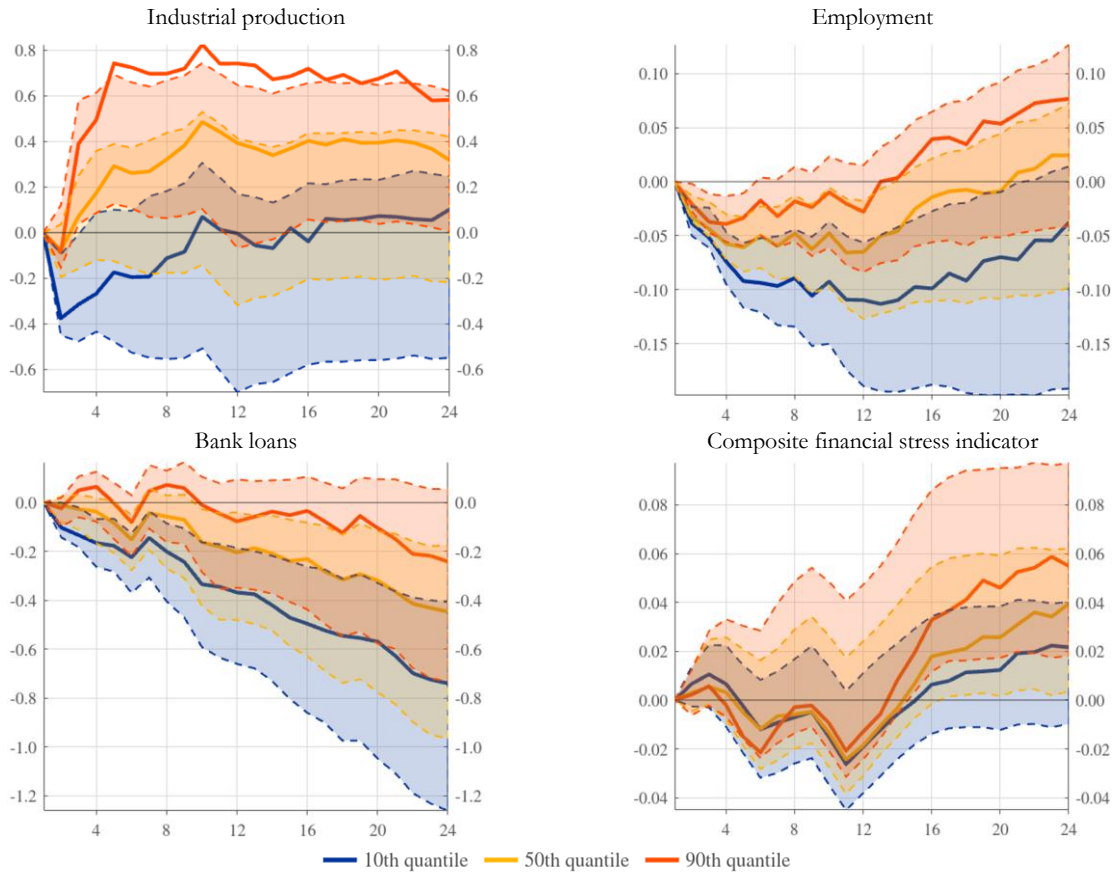


Figure B4: Dynamic responses to a structural innovation in macrofinancial uncertainty – full sample estimates



Notes: Dashed lines show 68 percent bootstrap standard error bands. The QVAR model is estimated on monthly data spanning the period March 1991 – April 2026. The impulse is set equal to one standard deviation of the structural innovations in the composite macrofinancial uncertainty indicator. For the monthly log-change of industrial production, employment and bank loans, cumulated responses are shown.