Economic Policy Uncertainty, Political Uncertainty and the Greek Economic Crisis

Gikas A. Hardouvelis*
Georgios I. Karalas**
Dimitrios I. Karanastasis*
Panagiotis K. Samartzis*

Second draft: May 1, 2018

*   University of Piraeus
**   London School of Economics

Gikas A. Hardouvelis: Department of Banking and Financial Management, University of Piraeus, 80 Karaoli & Demetriou Street, Piraeus 18534, Greece and CEPR. Email: gikas.hardouvelis@gmail.com. Georgios I. Karalas: Department of Finance, London School of Economics, London WC2A 2AE, UK. Email: G.Karalas@lse.ac.uk. Dimitrios I. Karanastasis: Department of Banking and Financial Management, University of Piraeus, 80 Karaoli & Demetriou Street, Piraeus 18534, Greece. Email: dkaranastasis@unipi.gr. Panagiotis K. Samartzis: Department of Banking and Financial Management, University of Piraeus, 80 Karaoli & Demetriou Street, Piraeus 18534, Greece. Email: psamartzis@webmail.unipi.gr.

1

Economic Policy Uncertainty, Political Uncertainty
and the Greek Economic Crisis

May 1, 2018

Abstract

We use textual analysis to construct an index of economic policy uncertainty (EPU) for Greece from 1998 to 2017, similar to other international EPU indices. We also construct indices of political uncertainty (POLU) and economic uncertainty (EU), plus EPU sub-indices related to fiscal policy (EPUF, partitioned into debt EPUD and tax EPUT)), monetary policy (EPUM), banking (EPUB), currency or Grexit possibility (EPUC), and pension policy (EPUP). The indices are positively correlated yet retain substantial idiosyncratic variability. With the exception of EPUM, they all rose during the international and subsequent Greek crises. There is also positive correlation of EPU with international EPU indices, which rose in the international crisis but declined during the Greek crisis.

Positive shocks to EPU and to the other indices are associated with a subsequent decline in investment, industrial production, GDP, employment, household deposits, economic sentiment and the stock market, and with an increase in bond yields. These shocks go a long way to explain not only the direction but also the magnitude of the changes in macro and financial variables during the crisis. AVAR forecast error variance decomposition suggests specific aspects to uncertainty, related to debt, banking or Grexit, together with bond yields are consistent with not only the depth but the length of the crisis as well.

Economic Policy Uncertainty, Political Uncertainty and the Greek Economic Crisis

1   Introduction

The economic depression Greece has experienced since 2008 and, particularly, since the end of the international financial crisis in 2009, is unprecedented. In the six years from 2008 to 2013, GDP fell by more than 25% while the general government debt-to-GDP ratio exploded from around 100% in 2007 to around 180% in 2016. The depth of this contraction is unusual for a developed country in Western Europe and compares with the US depression of the 1930s. Ex post, this dramatic reduction in Greece's GDP appears to be partly justified by the earlier large macroeconomic imbalances and the deep structural problems of the Greek economy (Gourinchas, Philippon and Vayanos (2017); Meghir et.al. (2017)). These imbalances were particularly evident in the large fiscal and current account deficits early on, well before the crisis erupted and provided strong warning signals to policy makers. They were flagged out on time by economists, yet given the euphoria of the period up to the international crisis, the imbalances were simply ignored by politicians and policy makers.[1,2]

A second striking feature of the Greek depression is its unusual length, which has made the Greek depression a lot worse than the US depression of the 1930s. Ten years after the outburst of the 1929 crisis, in 1939, the US real GDP was back up at approximately 95% its starting level in 1929, whereas in 2017 Greek real GDP remains at a level less than 75% of its starting level in 2007. This unusual and surprising length of the Greek crisis is due to the crisis' two separate and distinct phases. The first phase was the phase of return to equilibrium during which policy makers took steps to cure the imbalances. Indeed, after six years of contraction at the end of 2013 and under the strict supervision of European lenders and the IMF, the so-called Troika, the major fiscal and - to a large extent - current account imbalances were over and a set

---

[1]   Already prior to the international crisis, Hardouvelis (2007) pointed out three major imbalances in Greece: the fiscal, the current account and the skewed distribution of income.

[2]   One of the early attempts to justify the current account imbalances in Greece and in other Southern European countries is due to Blanchard and Giavazzi (2002). They proposed the hypothesis that during the early EMU days of the decade before the international crisis, the large current account deficits in the countries of the European South could be rationally explained or justified by the increase in the households' permanent income due to the countries' EMU participation.

of structural reforms had already taken hold, particularly in the labor market. Real GDP had stabilized and began growing in 2014, with economic sentiment recovering. Yet in 2015 a new second phase began, this time not related to macroeconomic imbalances, but to policy and political mistakes, which heightened economic and political uncertainty and stalled the expansion.

The fresh Greek government of January 2015 adopted a confrontational strategy with the country's lenders, which led to renewed Grexit fears,[3] a second wave of bank deposit withdrawals, new funding pressures on the government and on domestic banks, capital controls, stock market volatility, and an unbalanced fiscal mix, with taxation rising to new unprecedented levels. Economic policy and political uncertainty appear to be major factors contributing to this second phase of the crisis and, hence, to the unusual length of the depression.[4]

Attempts by academic economists to dig into the forces behind the Greek crisis are so far restricted to calibration exercises within DSGE models. The first such attempt was by Gourinchas, Philippon and Vayanos (2017). They point to the large fiscal consolidation and the increase in funding costs as the main culprits. Economides, Papageorgiou and Philippopoulos (2017) emphasize institutional quality as a reason for the crisis. Finally, Dellas, Malliaropulos, Papageorgiou and Vourvachaki (2017) emphasize the existence of the informal sector (black economy) in Greece, claiming it grew substantially during the crisis and had a negative effect on tax revenues and economic activity. All these papers provide good insights into the crisis yet restrict the analysis to the maximization assumptions underlying the DSGE models. They are criticized by Blanchard (2017), who had an insider's view of the IMF policy position during the crisis and knows that fiscal policy, banking policy, pension policy or structural reform policy were not the results of Greek optimizing agents' decisions, but rather the targets imposed by lenders (the EMU members and the IMF) on Greek policy makers.

---

[3]   "Grexit" is the adopted term of describing the event that Greece leaves the European Monetary Union (EMU).

[4]   See Hardouvelis and Gkionis (2016) or the calendar of events in the appendix, Table A.1. We document later that uncertainty increased dramatically in late 2014/early 2015. This is when discussions on the succession of the Greek President took place, parliament was dissolved early, and in the subsequent late January national elections, anti-memorandum or anti-lender political forces gained power. Six months later, with the new government trapped without liquidity and the economy turning south, a referendum was called. Uncertainty increased again after the announcement of the referendum, which risked the country's position in the European Monetary Union.

In this paper we investigate the role of uncertainty and find evidence it may have played a key role in the depth and length of the crisis. Earlier, Brunnermeier (2017) in his discussion of the Gourinchas, Philippon and Vayanos paper had made the point he seriously suspected political uncertainty to be the key to understanding the Greek crisis. Yet so far no one has explored the quantitative role of uncertainty, political or economic for that matter, since variables that directly capture uncertainty in Greece are missing. In the paper we fill the gap in the existing literature and construct for the first time such measures of economic policy uncertainty and political uncertainty, as well as aspects of that uncertainty, originating from the possibility of Grexit, the debt crisis or the banking crisis. Subsequently we move to explore their association with the Greek macroeconomy and the crisis.

The measurement of uncertainty and its empirical effects on economic activity has a long history (Bernanke (1983); McDonald and Siegel (1986); Dixit and Pindyck (1994); Bloom, Bond and Van Reenen (2007); Bloom (2009); Pastor and Veronesi (2012, 2013); Baker, Bloom and Davis (2016), among others). Lately, the technique of textual analysis has shown particular usefulness for measuring uncertainty. Assuming the public consults the news for political, fiscal, and financial matters, news itself becomes an indicator for gauging both uncertainty and the public response. Specifically, one can construct an uncertainty index by quantifying the frequency and types of "uncertainty-inducing" words printed over time. Politics and economics are particularly prevalent topics within newspapers and can therefore be readily used as the base for an uncertainty index. Baker, Bloom and Davis (2016) have proposed such a methodology. They quantified economic policy uncertainty (EPU hereafter) with a set of words appearing in newspaper articles, and have done it for 16 major countries.

The objective of this paper is fourfold. First, following Baker, Bloom and Davis (2016), we construct a similar measure of economic policy uncertainty for Greece based on newspaper coverage frequency. We use the same key words they used, so that our generated index can be used in parallel with their international EPU indices in research work. The Greek EPU index is derived from a subset of articles in a universe of over half a million articles published from 1998 to 2017 in four Greek newspapers. This subset of articles contains at least one term indicative of the economy, uncertainty, and economic policy. The index captures major global events of the past, including the 9/11 attacks, the second Gulf War, or the Post Lehman financial crisis. It also

records significant local events such as the 2010 Greek bailout request, the 2012 & 2015 Greek elections, or the 2015 Greek referendum.

The value of our constructed index was high in the first part of the sample, before euro was introduced into the Greek economy in 2001. Subsequently from 2003 to 2007, it declined, but then rose again following the international and the Greek crisis. The index is highly correlated with the corresponding European, US and global indices generated by Baker, Bloom and Davis (2016), which suggests that uncertainty in Greece is influenced not only by local, but by global events as well. In fact, prior to the outburst of the Greek crisis the high values of EPU occurred mainly during international events. Later, during the Greek crisis, the positive correlations of the Greek EPU index with foreign EPU indices shrunk in size and gradually collapsed, especially the correlations with indices outside Europe, suggesting the Greek crisis has a particular Euro Area flavor to it.

The second goal of the paper is to decipher the sources or dimensions of economic policy uncertainty, such as fiscal (which is partitioned into expenditure or debt related and tax related), monetary, currency, banking and pension-related. We create separate sub-indices for each policy category and examine their evolution over time. It turns out their contribution to total economic policy uncertainty depends on the phase of the economy and the phase of the crisis. Among the categories we examine, the dominant ones are related to fiscal, currency and banking uncertainty. When we examine separately the pre-crisis and the crisis periods, we find that during the pre-crisis period the most significant source of economic policy uncertainty was the fiscal one, whereas during the crisis period currency, debt and banking uncertainties were the dominant ones. Monetary policy uncertainty had a non-negligible association with economic policy uncertainty only in the period before Greece joined the European Monetary Union (EMU) in 2001 and showed little influence afterwards.

Along similar lines, we also construct an independent index of political uncertainty, POLU.[5] Political uncertainty was a significant feature of the crisis in Greece, being connected to policy uncertainty and driven by intense political polarization.[6] We use a similar methodology to

---

[5]   We also construct a new index of economic uncertainty, EU, which slightly more general than EPU.

[6]   Two main opposite political views emerged in Greece early on during the crisis, a relatively more rational one, espoused by the traditional center-right and center-left parties, which supported (at least reluctantly) the reform process and took seriously the memoranda of understanding with Greece's lenders, and another diametrically opposite one, which ignored Greece's macroeconomic imbalances and claimed the Greek depression was

Baker, Bloom and Davis (2016) to construct the index and subsequently we explore its relation to the remaining uncertainty indices and sub-indices. We also put our political and economic uncertainty variables to a contest in order to see which one dominates in explaining economic fluctuations. We first do this through their effects on the Greek sovereign bond yield spread over the corresponding German yield, which is considered today to be an index of EMU country risk. Then we compare results of reduced-form models of the macro-economy, in which we substitute different uncertainty indices at a time.

The third goal is to evaluate the association of policy uncertainty with macroeconomic and financial variables through the lens of structural vector auto-regressions (VARs), which are estimated at both the monthly and quarterly frequencies. The monthly VAR results show that policy uncertainty shocks have the expected intuitive association, namely a statistically and economically significant negative relation to industrial production, employment, bank retail deposits, the stock market and economic sentiment, and a simultaneous positive relation to domestic bond yields. The quarterly VAR results also suggest a significant and a persistent negative association with both economic activity and investment. These results are broadly consistent with the findings in Baker, Bloom and Davis (2016) and with theories that highlight the negative economic effects of uncertainty shocks. Although causality cannot be claimed from these VAR results, they do suggest that policy uncertainty shocks are related to subsequent significant macroeconomic fluctuations in a way consistent with theory. Specific sub-indices, like fiscal, banking and currency uncertainty were particularly important.

The fourth penultimate goal is to evaluate the effect of uncertainty during the very unique Greek crisis period, especially its potential contribution to the depth and length of the crisis. Earlier authors have provided theoretical arguments on the causes of the crisis, but empirical estimates are so far missing. It turns out the depth of the crisis is consistent with VAR cumulative responses to uncertainty shocks of similar size as the ones that took place across the two regimes, from the calm pre-crisis period to the crisis period.

---

initiated by Greece's lenders and the austerity they imposed to cure the imbalances, hence it suffices to "kick the lenders out," tear apart the memoranda with a single law in Parliament and impose a unilateral debt repudiation. The latter view was prevalent within the coalition government of SYRIZA-ANEL that came to power in January 2015 and was more or less espoused in a July 2015 referendum. Yet a week after the referendum, a U-turn took place in the earlier anti-lender rhetoric and behavior of SYRIZA-ANEL and the former rational view has become the dominant one ever since.

EPU increased on average by approximately 22% from the period 1/1998-7/2007 (the period until the beginning of the international crisis) to the period of consecutive crises 8/2007-12/2017. According to the model estimates, at the monthly frequency, this increase in uncertainty is consistent with a drop of -18.2% in industrial production (the actual change was -24.0%), a decrease of -11.4% in employment (the actual change was -13.4%), a decrease of -76.0% in the level of the domestic stock market (the actual change was -83.4%), an increase of 1,197 basis points of the Greek sovereign bond yield (the actual change was 592 basis points), a decrease of -41.5% in the level of household bank deposits (the actual change was -30.4%) and a decrease of -21.3% in the economic sentiment index (the actual change was -30.4%). At the quarterly frequency, a similar size EPU shock is slightly less potent. It predicts a drop of -6.2% in the level of GDP (the actual change -25.5%) and of -22.2% in the level of investments (the actual change -70.3%). Overall, the VAR models suggest that the association of key variables of the economy with EPU not only have the correct algebraic signs, but also the plausible sizes to justify the large crisis.

We also compute a VAR forecast error variance decomposition, which provides indirect evidence not only on the depth of the crisis but its unusual length as well. In particular, shocks to two macro-variables, the bond yield and specific EPU sub-indices (either debt or banking or currency), are able to explain both the increase in forecast error variability from the pre-crisis period to the crisis period and the variability during the crisis period itself. We interpret this as indirect evidence that those variables play a role in both the depth and length of the crisis.

The structure of the rest of the paper is as follows: Section 2 reviews the relevant literature. Section 3 describes the construction of the Greek EPU index, its sub-indices and POLU and presents their main statistical properties over the full sample and during sub-periods. The same section also explores in detail the econometric relation of EPU with its sub-indices. Section 4 examines the relation of the uncertainty indices with other variables related uncertainty like other international EPU indices or the Greek sovereign bond spreads. Section 5 performs the VAR analysis, exploring the relation of the various uncertainty indices with key macroeconomic and financial variables both before the crisis and during the crisis. Section 6 concludes. An appendix contains a calendar of economic and political events from 1998 to 2017, a more detailed analysis of the relation of EPU to its sub-indices, plus a wide array of tables and figures, which provide complementary information to the analysis of the main text.

2   Uncertainty and the Macro-economy: Literature Review

The negative effects of uncertainty on economic activity are well established in the literature. They run through both household (Carroll (1996), or Bansal and Yaron (2004)) and firm behavior (Bernanke (1983); McDonald and Siegel (1986); Dixit and Pindyck (1994)). These effects become particularly striking when it comes to a small Euro Area economy such as Greece, whose participation in the Euro Area is questioned and its banking system flirts with default, as it is hit by the effective defaults of both the government and the crisis-stricken private sector.[7]

Recent empirical work on economic policy uncertainty confirms the earlier literature. Baker, Bloom and Davis (2016) show that high levels of economic policy uncertainty predict lower output, investment and employment both in the U.S. economy and in an international setting. Bloom (2009) shows that uncertainty shocks induce a quick drop and a subsequent rebound in both output and employment. Gulen and Ion (2015), Kang, Lee and Ratti (2014) (for the U.S.) and Rodrik (1991) (for developing countries) have shown that uncertainty causes capital investment and productivity to plummet. Leduc and Liu (2016) find that an uncertainty shock increases unemployment, lowering at the same time inflation. Pastor and Veronesi (2012) show that higher policy uncertainty is related with lower stock prices, higher volatility and higher correlations among stock returns.

Turning to political uncertainty, there is an extensive literature on the subject as well. Alesina and Tabellini (1989) develop a general equilibrium model featuring two different government types alternating randomly into the office.[8] Lensink, Hermes and Murinde (2000)

---

[7] Stock prices of the banking sector, plunged in the vicinity of zero two times. The first time was in early 2012 due to the effective government default on its bonds, through the so called Private Sector Initiative (PSI), which wiped out all of the banks' capital (book capital turned negative). The second time was in November 2015, eleven months after a new confrontational government came to power, causing a second crisis to reignite and non-performing loans to skyrocket once again, thus necessitating a new Asset Quality Review by the regulators and new stress tests. See Haliassos, Hardouvelis, Tsoutsoura and Vayanos (2017).

[8] Most of their theoretical predictions seem to be supported by the Greek data (not only during the crisis but also before it). The uncertainty about the implementation of fiscal policies generates capital flights, small domestic investment and over-accumulation of external government debt. Their model also predicts that left-wing governments are more inclined to impose capital controls (something that happened in the Greek case) and that the possibility of debt repudiation is increased if a left-wing government is in the office at the final period of their model (after the over-accumulation of debt).

utilize a large sample of developing countries and argue that political risk is related to capital flights. Jens (2017) finds that political uncertainty around gubernatorial elections in the US induces a negative impact on investments. Pastor and Veronesi (2013) show that political uncertainty is related to a risk premium in the stock market, making individual stock returns more volatile and correlated to each other.

Our study is also connected with a series of papers that examine how specific aspects of policy uncertainty affect macroeconomic and financial variables. Baker, Bloom and Davis (2016) find that tax policy uncertainty is the largest source of policy uncertainty in the U.S. Kydland and Zarazaga (2016) show that uncertainty about fiscal policy (and, more specifically, tax policy) accounts for the weaker than expected recovery of the U.S. economy after the crisis of 2008-2009.[9] Sinha (2016) finds that an increase in interest rate uncertainty leads to lower output, while Husted, Rogers and Sun (2017) find that an increase in monetary policy uncertainty in the United States raises interest rates and yield-spreads and lowers output and inflation.[10]

Regarding currency uncertainty, Aghion et al. (2009) find that real exchange rate volatility could significantly affect output growth while Aguiar (2005) finds that after the Mexican Peso devaluation, a weak balance sheet effect prevails and outweighs the potential benefits on exports.[11]

Brunnermeier et al. (2016), develop a model that highlights the connection between sovereign and banking risk. The banking uncertainty is also related with bank-runs (Diamond and Dybvig (1983), Postlewaite and Vives (1987)). Kane (2000) provides evidence about the connection between capital outflows, banking insolvency and silent runs in the Asian crisis. Finally, regarding pension uncertainty, the related literature shows the importance of life-cycle income uncertainty on pre-cautionary savings (Gourinchas and Parker (2002), Guiso, Jappelli and Padula (2013)).[12]

---

[9] Edmiston (2004) and Gulen and Ion (2016) find a negative relation between tax uncertainty and the level of investments.

[10] Baker, Bloom and Davis (2016) also find that monetary uncertainty is an important source of policy uncertainty.

[11] Baker, Bloom and Davis (2016) find that currency uncertainty contributes only marginally to the US EPU. However, as it is revealed by our results, this might not be the case for a small country like Greece.

[12] O'Donnell and Tinios (2003) explore the difficulties of the implementation of pension reforms in Greece due to public ignorance and the desire to protect against the privileges of particular groups of interest.

3 Indices of economic policy and political uncertainty

3.1 Construction of the indices

We search the available digital archives of four major and widely circulated Greek newspapers from January 1998 to December 2017. We end up searching more than half a million articles. To create the indices we follow the techniques of Baker, Bloom and Davis (2016), namely, we obtain a monthly frequency of articles per newspaper that contain the required information per index, standardize the monthly frequencies, take the cross sectional average of the standardized series across the four newspapers and, finally, rescale the time series values of each index to have a sample mean of 100. The details are contained in Section A.1 in the appendix.

For the creation of the main index of economic policy uncertainty EPU, we require that an article must contain terms in all three categories pertaining to (1) uncertainty, (2) the economy and (3) policy. For purposes of compatibility and comparability with similar indices in other countries, the words in each category are chosen to conform to earlier work on the US and other countries by Baker, Bloom and Davis (2016). Panel A of Table 1 contains the three groups of words.[13]

[Table 1]

Figure 1 displays the monthly evolution of the Greek EPU index. The index captures important international events such as the 9/11 terrorist attack or the Iraq war in 2003. It also captures significant local events such as the first Greek bailout in 2010, the public discussion about a referendum in November 2011, the Greek double elections of 2012, the elections of 2015, or the actual referendum of June 2015.

[Figure 1]

The EPU sub-indices come from different subsets of the set of articles that are used to create EPU. This is because we require that an article contains terms from earlier groups (1), (2)

---

[13] Notice that if we relax the requirement and an article contains words only form groups (1) and (2), then the index of Economic Uncertainty EU is created.

and (3), plus a fourth group which is different per sub-index and characterizes the sub-index. Panel B of Table 1 contains the sub-indices and the fourth group of words utilized to construct each sub-index. We construct five major categories: Fiscal Policy uncertainty (*EPUF*), Monetary Policy uncertainty (*EPUM*), Currency uncertainty (*EPUC*), Banking uncertainty (*EPUB*) and Pension uncertainty (*EPUP*). We further partition the Fiscal Policy group of keywords into two subsets, which are then utilized to make up the sub-indices of Tax uncertainty (*EPUT*) and Debt uncertainty (*EPUD*).

Plots of EU and the sub-indices are aggregated together in Figure 2. Most plots are similar to Figure 1 for EPU. They show that in the early part of the sample, following Greece's entrance into EMU in 2001, uncertainty declined and remained at low levels during the years 2003-2007, a period during which international uncertainty was also relatively low. Uncertainty went up after the outburst of the global financial crisis and stayed at elevated levels during the following years of the domestic economic crisis. One particular sub-index deviates from the normal pattern, EPUM. Monetary policy uncertainty was high only at the time before Greece joined EMU.

[Figure 2]

Finally, for the creation of the index of political uncertainty POLU, we require that an article contains words from the same group (1) we used for EPU, plus a second group of words more specific to politics. Panel C of Table 1 contains the words of this second group. Figure 3 plots POLU over time. POLU is a lot smoother and less volatile than EPU, mainly in the first half of the sample.

[Figure 3]

3.2 Statistical properties of the indices

Table 2 records the mean, standard deviation and first order autocorrelation of each uncertainty index during the full sample and during interesting sub-periods. The first half of the sample reflects a typical economic period, whereas the second half is a period of consecutive crises. It begins with the international crisis and is followed by phase I and then phase II of the

Greek crisis. Phase I was the period during which the severe macroeconomic imbalances were cured, whereas phase II was driven by domestic politics.

The means of the indices are by construction 100 during the full period. With the exception of monetary policy uncertainty, the mean of all other uncertainty indices increases during the second half of the sample, which almost entirely consists of the crisis period. The increase is particularly strong during the two phases of the Greek crisis. Standard deviations do not show a strong pattern, with some rising but others falling in the second half. First order autocorrelations are positive and most range in the neighborhood of 0.65. They remain at similar levels during the second half of the sample.

[Tables 2]

Table 3 reports the contemporaneous correlations between the various indices. The correlations of EPU with the rest of the indices in the full sample range from the lowest 34.3% with EPUM to the highest of 93.5% with EU. The high correlation of EPU with EU is a rather expected result given that the set of articles on which EPU is based on, is a subset of the set of articles used to construct EU. The low correlation of EPU (and all other indices) with monetary uncertainly reflects the fact that since Greece's EMU membership in 2001, monetary policy is decided at the EMU level and is apparently immunized from other types of locally-driven uncertainty.

Among its main sub-indices, EPU has the highest correlations with banking uncertainty EPUB (87.8%), fiscal uncertainty EPUF (82.7%) and currency uncertainty EPUC (76.2%). These three sources of uncertainty are indeed the dominant ones behind EPU, as our later analysis in this section shows.

[Table 3]

Partitioning the sample into its first half (pre-crisis) and its second half (the consecutive crises) reveals some interesting relations between the different uncertainty indices. The correlations of EPU with currency uncertainty EPUC and banking uncertainty EPUB increased from 64.7% / 82.4% during the pre-crisis period to 80.8% / 89.0% during the crisis period, making them the most important categories of EPU during the crisis. These two subcategories are the most highly correlated with EPU during the crisis, suggesting that the public discussion

about Grexit and the instability of the banking system (with the withdrawal of bank deposits) were the major sources of economic policy uncertainty during the crisis. On the contrary, the correlations of EPU with EPUF, EPUD, EPUT and EPUM are smaller during the second part of the sample, an indication that their relative contribution to the more general EPU index was reduced during the crisis.

The sample partition also shows that some of the POLU correlations went up during the years of the crisis. Its correlation with EPUC went up from 44.5% to 76.3%, with EPUB from 57.4% to 74.1%. The correlation between EPUC and EPUB, on the other hand, declined. Apparently, whereas Grexit fears and banking fears became more correlated with political uncertainty during the crisis, the two became less attached to each other.

3.3 Which EPU sub-indices matter for EPU?

We now turn to a more detailed analysis of the relation of EPU to its five major sub-indices. We conduct a number of time-series regressions of log (EPU) on the logarithms of each sub-index. The regression results are in Table 4 and are presented for the full sample and for each half of the sample as well.[14] They provide two pieces of information: The first is the adjusted-R^2, which reveals the proportion of EPU's variability that is captured by the specific categories. The second is the magnitude and statistical significance of each individual EPU sub-index.

In the full sample (column (1)), the adjusted R^2 is 86.0%, showing that the five sub-indices capture most of the variability of log (EPU). Moreover, the coefficients of the logs of four of the five sub-indices (all except EPUM) are statistically significant. According to both the variable point estimates and their t-statistics, their ranking from higher to lower is: EPUB, EPUF, EPUC, EPUP and EPUM. In column (2) we replace EPUF by its two constituents, EPUD and EPUT. The results remain similar.

Columns (3) and (4) of Table 4 repeat the basic regression of column (1) in the two halves of the sample. Column (3) examines the first half and column (4) the second half. The results remain similar yet show some interesting differences across the two sub-samples: First, the regression explanatory power increases in the second half of the sample from 82.2% to 88.2%, revealing our sub-indices are better in capturing EPU during the crisis period. Second,

---

[14] Tests of multicollinearity show there is no such problem in the regressions. See Section A.2 in the appendix.

currency uncertainty EPUC and banking uncertainty EPUB become more influential contributors to EPU during the crisis period, whereas fiscal uncertainty EPUF and pension uncertainty EPUP become less influential.

Figure 4 presents charts of the relative contributions of the five sub-indices to EPU. These contributions are calculated using the lmg methodology proposed by Lindeman, Merenda and Gold (1980, p. 119 ff.)[15]. The lmg methodology provides a way of assigning the co-variability of the sub-indices into each sub-index. Hence, information in Figure 4 differs from the information in Table 4 in two important respects. The first is that each sub-index's contribution in Figure 4 is quantified and normalized so that they all sum up to 100%. The second is that the lmg methodology in Figure 4 accounts for the correlation among the uncertainty indices.

In the chart pies, the five individual contributions to total EPU variability add up to 100%. The figure shows that banking, fiscal and currency uncertainties are the most important dimensions of EPU. Banking uncertainty plays an important role in both sub-periods. Fiscal uncertainty is the most important contributor in the pre-crisis period. Currency uncertainly becomes important in the crisis period.

[Table 4],

[Figure 4]

---

[15] For details see Section A.3 in Appendix.

4. Comparison to other Measures of Uncertainty

In this section we examine the relation of our constructed uncertainty indices with other proxies of uncertainty. We first examine the relation of the Greek EPU index with similar EPU indices of other countries. We then examine the relation of EPU, EU and POLU to the Greek sovereign spread, a widely followed financial indicator of country risk.[16]

4.1 The Relation of the Greek EPU Index to other International EPU Indices

One way to evaluate the Greek EPU index is to compare it with its international counterpart EPU indices. Table 5 presents the correlations between the Greek EPU index and other major international EPU indices. Column (1) shows the correlations over the full sample. They are positive and quite high, indicating that news about global events tend to spread across the globe and influence uncertainty in various countries – including Greece - in the same direction in the same month (see also Figure A3 in the appendix).

Observe in column (4) the correlations during the time of the global financial crisis are the highest. Apparently, the crisis boosted the international elements that drive uncertainty in Greece. Then, during the Greek crisis, the correlations declined during phase I (column (5)) and collapsed in the later second phase II of the Greek crisis (column (6)). This is strong evidence on the idiosyncratic nature of the Greek crisis, which decoupled from international events and became even more idiosyncratic as time passed.[17]

The collapse in correlations from the time of the international crisis to Phase II of the Greek crisis is particularly strong in the cases of the European and Global EPU indices. They both declined drastically from 74.7% (European) and 85.4% (International) during the global crisis, to almost zero in the second phase of the Greek crisis. The explanation for this result is that during the last years of the sample, European and global economies exhibit declining uncertainty, whereas uncertainty in Greece remained elevated, following an idiosyncratic path.

---

[16] We have also checked the relation of the uncertainty variables with Greek stock market volatility and found a strong positive association. See a figure A4 in the appendix.

[17] In particular, the Greek EPU correlations with the Spanish and British EPU indices became negative during Phase II of the Greek crisis. For the correlation with the British EPU index, what took place appears clear: The Greek EPU gradually declined during the years 2016 and 2017, while at the same time British EPU increased because of the Brexit.

The drop in correlation also conforms to the casual observation that the Greek crisis is no longer a concern for other Europeans, as was the case back in 2010 or 2011 when the Greek crisis was transformed into an EMU crisis.

[Table 5]

4.2 Policy Uncertainty and the Sovereign Bond Spreads

The spread of an EMU country's domestic government bond yields over German yields of the same maturity is a widely followed financial indicator regarding the country's economic health and credit risk level. Given that all Euro Area countries issue bonds denominated in the same currency (the euro), differences in their yields cannot arise from macroeconomic factors like inflation differences, depreciation of the currency, etc. Non-zero spreads could reflect temporary liquidity characteristics of the bonds, but persistent and wide spreads can only arise from the perception that the issuing country may fail to properly fulfill its debt obligations in the future in the same manner Germany would.[18] The Greek spread fluctuated widely in the second half of the sample, moving with the ebb and flow of the crisis (see Figure A5 in the appendix).

We conduct time-series OLS regressions, in which the dependent variable is the change in the spread of the 10-year Greek Government bond yield over the corresponding 10-year German Government bond yield, from the last trading day of month t-1 to the last trading day of month t. All data are described in Table 6. The independent variables, the uncertainty indices, are measured in between those two dates, throughout month t:

$$\Delta(SPREAD)_t = a + \beta_{EPU}\Delta(log(EPU))_t + \beta_{EU}\Delta(log(EU))_t + \beta_{POLU}\Delta(log(POLU))_t + \varepsilon_t$$

The above econometric framework facilitates the interpretation of our results since events that drive the evolution of our uncertainty variables during the month can be seen to affect the spreads at the end of the month. The framework is also dictated by the stationarity properties of the variables under consideration. The SPREAD variable is non-stationary, whereas the simple

---

[18] In the 1990s, prior to the formation of the European Monetary Union, this spread reflected a bond spread in different currencies and was widely interpreted as an indicator of the probability that the country would eventually join the monetary union (see Hardouvelis, Malliaropulos and Priestley(2006, 2007)). Back then markets paid no special attention to the possibility of a differential credit risk premium among the different countries.

change in SPREAD is stationary. Similarly, the explanatory variables are all stationary and in percentage change form in order to allow for a common interpretation of the coefficients.

Table 7 presents six different regressions estimated over various time periods. The first three in columns (1), (2) and (3), are univariate regressions with each of the EPU, EU and POLU indices as the only independent variables. A fourth regression in column (4) includes EPU and EU, a fifth one in column (5) includes EPU and POLU and a sixth one in column (6) includes EU and POLU. The high correlation between the three uncertainty indices limits the freedom to include all three of them in the same regression.

Panel A of Table 7 presents the results for the full sample, which show that all three indices affect the spread positively and in a statistically significant way. Specifically, a 1% increase in EPU/EU/POLU would lead the spreads to increase by 176/161/187 basis points (Panel A, Columns 1, 2 & 3). Among the three univariate regressions, we achieve the highest adjusted R-square with POLU (8.4%). When we include simultaneously EPU and EU (column 4), neither remains significant. When we include simultaneously EPU and POLU (column 5) or EU and POLU (column 6), political uncertainty POLU is the one that remains significant. Overall, the results indicate that in the case of Greece, political uncertainty is the most influential kind of uncertainty regarding the financial markets' perception of risk.

During the pre-crisis period the influence of uncertainty on spreads is lower and not statistically significant. However, in the special period until May 2000, before it was officially decided that Greece would join EMU, the explanatory power of the uncertainty indices is much higher, with adjusted R^2 reaching 15.8% in the univariate regression of EU.

In the second half of the sample, during the period of consecutive crises, all three uncertainty indices show similar and statistically significant impacts. Yet POLU is the most significant index (adjusted R-square 14.3% compared to 9.7% of EPU and 7.0% of EU). Apparently, during those crises political uncertainty seems to take the lead over economic uncertainty. This may be due to fact that during the crisis political uncertainty in Greece was transformed into economic policy uncertainty thanks to the polarization in the proposed economic policies of the biggest political parties. Recall the presence of Greece in the Euro Area was at stake at that time.

[Table 6], [Table 7]

5. Policy Uncertainty and Aggregate Economic Activity

This section examines the relation of uncertainty to macroeconomic performance. It first provides evidence for Greece parallel to the findings in other countries, which confirms the negative and economically significant association of uncertainty with macroeconomic and financial variables. This negative association is true for EPU as well as the other uncertainty indices and sub-indices and is robust to the inclusion of the global EPU in the models, suggesting the information in the Greek EPU is driven by local events as well. The section subsequently focuses on the Greek crisis and the important role uncertainty played in the depth and length of the crisis. It provides quantitative estimates missing thus far from the existing academic literature.

5.1 Policy Uncertainty and Aggregate Economic Activity: A VAR Analysis

To gauge whether policy uncertainty relates to weaker macroeconomic performance, we estimate a series of Vector Auto-Regressive models (VARs) at both the monthly and quarterly frequency. VAR models are useful in describing dynamic relationships, although one ought to be careful not to draw explicit causal inferences. The structural form of each model is represented by the following equation:

$$x_t = A_1 x_{t-1} + A_2 x_{t-2} + \cdots + A_p x_{t-p} + B z_t + \varepsilon_t,$$

where x is the vector that contains the variables of interest, p is the lag order, A_i and B are matrices of coefficients, ε_t is a vector of unobservable zero mean white noise processes and z_t gives the deterministic terms (constant drift and time trend). The optimal lag length p is evaluated using Akaike's Information Criterion (AIC). It turns out that both in the monthly and the quarterly frequency, a lag value of p =2 is the optimal number.

We begin with a monthly VAR of seven variables, two lags (p=2), and a Cholesky decomposition of the contemporaneous relations of the following ordering: (i) the logarithm of EPU, (ii) the 10-year bond yield (r), (iii) the logarithm of the stock market index (ASE), (iv) the logarithm of the employment rate (E), (v) the logarithm of industrial production (IP), (vi) the

harmonized CPI rate of inflation (Infl) and (vii) the logarithm of the Economic Sentiment Indicator (ESI). The basic VAR model is similar to Baker, Bloom and Davis (2016) for the United States, slightly modified to capture special features of the Greek economy.[19]

The results below indicate that EPU embeds information not captured by the other variables. The ordering of the VAR implies that EPU affects all other variables and is unaffected by them contemporaneously, making it the most exogenous variable in the system by construction. Similarly, the bond yield r contemporaneously influences all variables while responsive only to EPU, and so on for the other variables.[20] To control for the trending behavior in IP, E, Infl, ESI, r and ASE we also introduce a deterministic time trend into the model.

The inclusion of ESI, the index of economic sentiment, serves a useful role. It controls for the possibility that EPU may reflect negative news. The word "uncertainty" has a negative connotation on its own and may be used more frequently together with bad news rather than with good news. The presence of ESI picks up the effect of such news and allows EPU to symmetrically capture second moment effects more precisely.

Figure 5 provides impulse responses of the basic monthly VAR model of order 2 for a total of 36 months after the shock. Red dashed lines represent the 95% confidence interval. Similarly, the first column of Panel A in Table 8 reports the peak marginal responses from those impulse response functions of Figure 5 together with their t-statistic in brackets, along with the month that they occurred in parentheses. The EPU shock size in both Figure 5 and Table 8 is 22% and corresponds to the percentage change in average EPU across the two halves of the sample, from the pre-crisis period (1/1998 to 7/2007) to the crisis period (8/2007 to 12/2017).[21]

---

[19] The results do not change considerably when we use the exact formulation in Baker, Bloom, and Davis (2016). Yet our preferred formulation departs slightly from theirs to account for the idiosyncrasies of the Greek economy. One main difference regards the ordering in the Cholesky decomposition. Given the importance of sovereign risk, especially during the second half of the sample, we switch the ordering between the 10-year bond yield (r) and the stock market index (ASE) relative to their formulation, bringing the bond yield first. The second difference is the inclusion of two additional variables in the VAR at the end of the ordering, namely, the rate of harmonized inflation (Infl) and the index of economic sentiment (ESI). Inflation controls for the deflationary forces during the crisis, while ESI mitigates a potential concern that the estimated impulse response functions to EPU may not reflect the influence of true policy uncertainty shocks (second moment effects), but rather the influence of bad news about the economy or fear of downside risk (first moment effects).

[20] We also do the analysis using different orderings in Cholesky decomposition and the results do not change considerably.

[21] Note that the cumulative responses of the variables would originate by adding up those marginal responses. They are presented later in Section 5.4. Also note that Table 8 contains additional information for the remaining uncertainty indices and sub-indices, which we discuss later in Section 5.3.

Both column (1) of Panel A in Table 8 and Figure 5 show statistically significant declines in industrial production, employment, sentiment and the stock market index. The figure shows a peak estimated fall of 0.58% in industrial production, after about fifteen months or five quarters. The effect is statistically significant two quarters after the shock and up to two years, indicating both the persistence of the shock as well as the lag to take effect. Baker, Bloom and Davis (2016) observe a 1.1% drop in the U.S. industrial production, using an almost triple in magnitude shock of 90%. In a similar vein, Arbatli et al. (2017) report a 0.8% reduction in Japanese industrial production for a unit standard deviation of the corresponding EPU index.

The employment response is modest in size, but highly persistent and significant, which is similar to the case of Japanese employment (Arbatli et al. (2017)). Specifically, the maximum estimated decrease in employment E is 0.47%. Baker, Bloom and Davis (2016) report a 0.35% reduction in U.S. employment.

Concerning the stock market index, the impact of an EPU shock after a quarter yields a 4.81% fall in the ASE index, with the effects being significant immediately after the shock and up to 7 months later. Our result is in the same direction with results in the literature but of higher in magnitude. More specifically, Zalla (2017) observes a 0.5% decline in the Irish Stock Exchange (ISEQ) following a 70 points increase in EPU. Moreover, Brogaard and Detzel (2015) find that a one-standard deviation increase in EPU is associated with a 1.5% increase in forecasted 3-month abnormal U.S. stock returns.

Bond yields increase by 46.1 basis points (peak response occurs three months later) and the effect remains significant up to two quarters after the shock. The effect on inflation is not statistically significant. Finally, concerning the effect on the sentiment indicator, the maximum fall after five months is 2.22%, which is consistent with the proposition that the two concepts of uncertainty and sentiment are tightly linked (Ilut and Schneider (2014)).

Figure 6 and Panel B in Table 8 explore a slightly different monthly VAR, tailored to capture the behavior of deposits.[22] The VAR model continues to have two lags and seven variables, but this time it contains household deposits instead of the stock market index. The

---

[22] This behavior is hard to correctly capture with any VAR model. This is because in addition to the two waves of deposit withdrawals and the shortage of bank liquidity, capital controls were also imposed in June 2015. While average deposits across the two halves of the sample dropped by 30.4%, the drop was a lot bigger since their peak at the end of 2009. Between end 2009 and June 2015, a time of relative deposit stability in other European countries such as Ireland, Italy, Portugal and Spain, household deposits in Greek banks dropped by about 50% in two major waves.

Choleski contemporaneous ordering is as follows: log (EPU), log of household deposits (HD), r, log (E), log(IP), Infl and log(ESI). The first part of Figure 6 provides the impulse responses and the first column of Panel B in Table 8 reports the peak response with the corresponding month that it occurs and its significance. The response of household deposits to an EPU shock is significant even after 36 months, which signifies the importance of increased uncertainty on the sustained flight of deposits. Specifically, the effect of a 22% shock on EPU leads to a marginal monthly decrease of 1.24% in HD even after two years.

Turning our attention to the quarterly frequency and the effect of uncertainty on the aggregate GDP and investment, we estimate a VAR model with the following Cholesky ordering: log (EPU), r, log (ASE), log (I) where I represent real Investment, and log (GDP). Figure 7 reports the impulse responses, while the first column of Panel C in Table 8 reports the peak responses. The figure shows that upward EPU innovations imply weaker aggregate GDP performance and investment. EPU shocks account for sizable movements in both variables, with both effects being highly persistent. A 22% upward EPU innovation foreshadows a peak fall in GDP of 0.89% after about a year. Luk et al. (2017) report similar results with a 1% drop in Hong Kong GDP, while Arbatli et al. (2017) find a 0.3% fall in real GDP after one year in the case of Japan. Bloom et al. (2012) estimates that uncertainty shocks can explain drops and rebounds in the U.S. GDP of around 3%, while Gilchrist, Sim and Zakrajšek (2014) show that an uncertainty shock leads to a 0.2% drop in GDP.

The maximum marginal quarterly response of investment, I, is a 3.89% drop and occurs after three quarters. The persistent effect of a shock in uncertainty on both GDP and investment growth can be linked to the L-shaped recession (non-recovery) of the Greek economy. This result is comparable with the results of other studies in different economies. In the case of U.S., Baker, Bloom and Davis (2016) find a 6% decline in investment, while Arbatli et al. (2017) and Luk et al. (2017) estimate a 1% and 2% reduction in investment, respectively.

Finally, recall that when the underlying data generating process cannot be well approximated by a VAR model, impulse response functions tend to be biased and misleading. Jordà (2005) introduced an alternative method for computing impulse response functions based on local projections that do not require specification and estimation of the unknown true multivariate dynamic system itself. For robustness, we re-estimated the impulse response functions using the Jordà technique and the results remain qualitatively similar. They are

presented in Figure A6 in the appendix. The results suggest that responses of all variables of interest (ASE, r, GDP and I) are significantly more persistent to EPU shocks, when compared to the regular impulse responses.

[Table 8]

[Figures 5, 6, 7]

5.2 Global EPU: Does it foreshadow the influence of Country EPU?

In this section we explore the possible influence of global EPU on our results. It is part of a more general and extensive robustness analysis of our specification, some results of which are included in the appendix.[23] Given the positive correlation between country EPU and global EPU, one may wonder about the extent to which our estimated impulse response functions reflect general global policy uncertainty shocks rather than country uncertainty. To investigate this issue, we modify our basic VAR to include an extra variable, the logarithm of Global EPU (Global). We place Global before the country EPU in the causal ordering (since it is more probable that global uncertainty shocks affect regional uncertainty) and find that the estimated peak effects of a country policy uncertainty shock on industrial production, employment, interest rates, the stock market and sentiment remain approximately the same as before in the earlier simpler VAR of Table 8 (-0.65%, -0.54%, 52.2bps, -3.64%, and 1.62%, respectively). The effect on inflation remains statistically insignificant.[24]

To shed more light on the effect of global uncertainty on Greece and how it evolved during the pre-crisis and crisis periods, we conduct forecast error variance decomposition in the

---

[23]   Figure A7 of the Appendix shows the trajectory of Industrial Production based on different VAR specifications. Five different impulse response functions are very similar despite the fact they originate from a modified VAR. The modifications pertain to the nature of the set of included variables, the causal ordering and the sample period: One and three lags instead of two in the VAR, including stock market volatility σ_m (after EPU), dropping ASE, dropping ESI and using the two halves of the sample, the first running from 1/1998 to 7/2007 while the second from 8/2007 to 12/2017. The impulse response functions differ substantially only when we estimate the model using only the second half of the sample.

[24]   Figure A8 in the Appendix depicts the impulse responses. These results indicate that conditional on the other variables, EPU contains idiosyncratic information over and above the corresponding one in Global EPU, and is quite relevant for the prediction of future output and employment movements in Greece.

previous VAR, which includes Global EPU. We also estimate the same VAR two more times, once using the pre-crisis period, and a second time using the crisis period.

Table 9 presents some of the results from a variance decomposition, which utilizes a 3-year horizon and is performed separately over the full sample and in its two halves. The table presents the proportion of the variability of the different VAR variables, which is due to either Global EPU or country EPU. Observe, first, that during the pre-crisis period, Global EPU shocks explain a larger proportion of the volatility of the variables of interest compared to the crisis period. The only exceptions are with the exception the variability of GDP and I. Hence, during the calm period global uncertainty spillovers are quantitatively important in explaining the dynamics of key domestic macroeconomic variables. Second, during the crisis period, global EPU shocks explain a very small proportion of the volatility of the variables. During the domestic crisis period, global EPU shocks were significantly less important than domestic EPU shocks.

Next, in Panel B of Table 9, for more completeness we present the variability of global and local EPU. The own shocks tend to explain a lot of the own variance, with an explanatory power that rises during the crisis period for both shocks.

Overall, the results of Table 9 bode well with the results in Section 4.1, Table 5, and Figure A3 in the appendix, which show that during the pre-crisis period the correlations between the Greek EPU and international EPUs were positive and quite high but, subsequently they declined and then collapsed in phase II of the Greek crisis. Evidently, during the Greek crisis local events became extremely important overshadowing global events in influencing domestic uncertainty, which in turn primarily influenced domestic economic developments.

[Table 9]

5.3 POLU, EU, Sub-indices of EPU and Aggregate Economic Activity

We now expand the analysis to explore the relation of POLU, EU and the sub-indices of EPU with the domestic economic and financial variables. Earlier Table 3 showed a substantial positive contemporaneous correlation between all the uncertainty indices and sub-indices. Our later detailed analysis on the bond yield spread in Table 7 also alerted us to the fact that the influence of EPU, EU and POLU on the spread is quite similar, with perhaps POLU being

slightly more dominant than each of the other two. Hence the open question of whether or not in the current VAR framework the alternative uncertainty indices deliver similar responses as EPU does. Recall the VAR includes the yield instead of the yield spread plus the remaining macro variables.

We run the analysis separately at a time for each index or sub-index. That is, we replace EPU each time with one of EU, POLU, or a particular sub-index of EPU and repeat the estimation of the basic VARs of Panels A, B and C of Table 8. We report the peak response results in columns 2 to 8 of Table 8. For purposes of comparability, we use the same size shock everywhere, a 22% increase, as we did earlier in the case of EPU. The Newey-West t-statistics are reported inside the brackets and the month in which each peak response is observed is reported inside the parentheses.[25]

Both EU and POLU show statistically significant negative impacts on economic activity, employment, household deposits, economic sentiment and the stock market and positive impacts on the yield of sovereign bonds. The results are presented in columns 2 and 3 of Table 8. The magnitude and level of significance of their coefficients are very close to those of EPU, as was expected due to the high correlations between the three indices. Interestingly, consistent with the evidence on the yield spread of Table 7, the bond yield (r) responds more strongly to the shock in POLU relative to the shocks in EU and EPU. Yet we caution that the results for each index are not directly comparable since they stem from separate VAR models.

Turning to the EPU sub-indices, all of them exert a negative impact on economic activity, employment, household deposits, economic sentiment and the stock market and a positive impact on the yield of sovereign bonds. The peak results are included in columns 4 through 8 of Table 8. As expected, the coefficients of the sub-indices of EPU are smaller in magnitude compared to the corresponding coefficients of EPU itself. The coefficients of currency or Grexit uncertainty EPUC, banking uncertainty EPUB and fiscal uncertainty EPUF are statistically significant in all the dependent variables, indicating their important role as a dimension of EPU. Overall, there are

---

[25] The more detailed impulse response functions corresponding to the models of Table 8, which present the full trajectory of responses all the way forward to month t+36 or quarter t+12 are presented in the Appendix. Figures A9 to A16 in the Appendix report the response of log (ASE), log (E), log (IP), log (ESI), r, log (HD), log (I) and log (GDP) respectively, to a 22% shock on the various uncertainty indices or sub-indices. For reasons of presentation compactness, each figure contains information on eight different shocks originating from eight separate VAR models, those same models in each column of Table 8. Since the models corresponding to each shock inside a figure differ, no inference can be drawn by comparing their trajectories within a figure.

no major surprises in Table 8 in the effects of those alternative uncertainty indices in comparison to EPU.

5.4 Can Policy Uncertainty explain the Depth and Length of the Greek Crisis?

In this section we extend our analysis to focus on one of the most unusual events of the last decade, the Greek crisis. Thus far researchers have only used calibration analysis to justify the Greek Depression and have excluded uncertainty from their toolbox, apparently due to lack of data availability.[26] Our paper is the first one to bring uncertainty to the forefront and claim it played a critical role in the macroeconomic developments, being responsible for a big component of the drop in GDP and its subsequent stagnation.

We begin by computing the long-run cumulative effects of higher uncertainty on key macro-economic and financial variables of the economy. We do this for a three year horizon by triggering a representative 22% shock to EPU and other uncertainty indices, as we did earlier in Table 8. It turns out the cumulative effects are large and reasonable and explain a big component of the shift in some key macroeconomic variables, including GDP, employment industrial production, interest rates, the stock market, bank household deposits, economic sentiment, etc.

Subsequently we concentrate on the sources of the forecast error variance decomposition over the same three year horizon. The earlier impulse response functions of Section 5.1 reveal that a horizon of three years, with the exception of employment and household deposits, is long enough to essentially capture most of the variance of the variables included in our vector auto-regressions. We are interested to know how much of the variance of a number of key macroeconomic variables that characterize the economy – not only GDP – can be explained by the variability in uncertainty. As we explain later, this type of analysis sheds light not only on the causes of the depth of the Greek depression but on the causes of its length as well.

[Table 10]

---

[26] See Gourinchas, Philippon and Vayanos (2017), Dellas, Malliaropulos, Papageorgiou and Vourvachaki (2017), or Economides, Papageorgiou and Philippopoulos (2017).

Table 10 provides evidence on the cumulative 3-year effects of uncertainty shocks on the macro and financial variables of our VAR models. The estimates originate from the same models that generated the impulse response functions of Figures 5, 6, and 7 and the results of Table 8 on the peak effects of a 22% shock in an uncertainty variable. Recall this shock size is equal to the percentage change of the average level of EPU between the periods 1/1998-7/2007 and 8/2007-12/2017.

The first column in Table 10 includes the cumulative effects of a 22% EPU shock and provides a sense of the magnitude of the effects of uncertainty. The remaining columns present the effects of alternative uncertainty shocks, which originate from separate models that exclude EPU and include another uncertainty variable in its place. The last column of Table 10 reports the actual changes of the variables in order to facilitate the comparison between the predicted changes and the realized ones.[27]

The results show that EPU can explain not only the direction of change but also the approximate magnitude of the change of the key variables. The predicted drop in industrial production of -18.2% is more than two thirds the actual -24% drop. The predicted drop in employment - within three years - of -11.4% is more than two thirds of the actual drop of -13.4%. Moreover, we know from the impulse response function that three years do not suffice to exhaust the long-run effect on employment. Similarly, household deposits are predicted to fall within three years by -41.5% and they fell by -30.1%.

At the quarterly frequency, the predicted effects on output variables are also reasonable, although not as strong as on the industrial production. GDP is predicted to fall by -6.2% and in fact it fell by -25.5%. Investment is predicted to fall by -22.2% when in fact it fell by -70.3%.

The predictions of the financial variables are also in the right ballpark. The Athens stock Exchange is predicted to fall by -76.0% and it fell by -83.4%. Bond yields are predicted to rise by 1,197 basis points and rose by 586. Here the prediction is a lot higher than the actual average change.

---

[27] The actual changes are computed as follows: For IP, E, ASE, HD, ESI, GDP and I, the computation is the percentage change from July 2007 to December 2017. For the bond yield r, the computation is the change in the average value from the period 1/2002-7/2007 to the period 8/2007-12/2017.

Finally, the predictions about economic sentiment are also reasonable. Economic sentiment is predicted to fall by -21.3% and it fell by -30.4%. Overall the model does surprisingly well with its cumulative predictions.

When other uncertainty variables take the place of EPU in the VARs, the results remain approximately the same. Only EPUP provides counter-intuitive results at the quarterly frequency for GDP and investment.

Next we turn to the variance decomposition analysis. Table 11 presents a selected set of results on the variance decomposition of four key variables of the economy. Those key variables are real GDP, real investment, household deposits and bond yields. Moreover, besides EPU the table presents the results for four additional uncertainty indices or sub-indices: debt uncertainty EPUD (a sub-index of fiscal uncertainty), currency uncertainty EPUC, banking uncertainty EPUB, and political uncertainty POLU.[28]

[Table 11]

Each VAR model in table 11 is run three times, once in the full sample and separately in the two halves of the sample, the pre-crisis period and the crisis period. The crisis represents a regime shift relative to the earlier more normal times. Estimating the models separately in three samples allows us to reach interesting conclusions about the sources of variance both within each regime and across the two regimes.

We begin the description with real GDP. In the full sample, its variability is explained by the variability in bond yield shocks (48.01%), its own autonomous shocks (41.89%) and EPU shocks (6.75%). Interestingly, specific aspects of EPU uncertainty are more successful than EPU itself in explaining the variance of GDP over the full sample: EPUD, EPUC and EPUB carry a large weight in the variance decomposition, a lot higher than EPU itself. Debt uncertainty EPUD has a weight of 21.29%, currency uncertainty EPUC 18.05% and bank uncertainty EPUB 17.55%. These weights are about half the weight of the bond yield r.

During the good times of the early part of the sample, the sources of variability are quite different. Back then investment shocks had a 54.52% contribution to GDP variance, its own GDP shock only 18.21%, the EPU shocks 13.07 % and the bond yield shocks 9.42%. Later on

---

[28] The full set of the results for all the macroeconomic and financial variables and for all the uncertainty indices are available upon request.

during the crisis period, the bond yield is dominant with a contribution of 63.97%, followed by EPU with 13.26% and by I with 11.61%. Surprisingly, its own GDP shocks explain very little of the GDP variance, only 8.69%. Put differently, during the crisis period the variability of GDP had very little to do with its own past fluctuating behavior and more to do with interest rates, uncertainty and investment.

During the crisis period, the EPU sub-indices carry a substantial fraction of the variance decomposition of GDP. Debt uncertainty EPUD is particularly dominant with a weight of 55.58%. Political uncertainty, on the other hand, does not seem to matter as much for the variability of GDP.

Comparing the three sets of estimates across the two sub-periods or regimes (pre-crisis and crisis) and the full sample period, it seems the bond yield r and the EPU sub-indices EPUD, EPUC, and EPUB are variables that can explain both the variance across the two regimes plus the variance within the crisis regime. Recall the Greek crisis is unusually prolonged with GDP hovering at the bottom to which it fell back in 2013. Hence a variable able to explain the variance of GDP from the pre-crisis regime to the crisis regime and its variance during the crisis years is a variable that can potentially explain both GDP's decline and stagnation. With this rationale in mind, bond yields plus economic policy uncertainty specifically related to debt, Grexit or banks (the three main aspects of the Greek crisis) appear to be related not only to the depth, but to the length of the crisis as well.

Turning to investment, a similar story holds. The EPU sub-indices and bond yields are the variables able to explain both the variability of investment across the two regimes and within the crisis regime. Investment itself used to explain its own variability during good times, in the first half of the sample (58.08%), but not so well in the second half (19.49%). During the crisis period, investment's own past behavior explains less of its variance decomposition than any of the three EPU sub-indices.

Household deposits appear to vary a lot due EPU shocks. The sample here is monthly and the main drivers of deposit variability are its own shocks (26.68%), EPU shocks (24.38%) and industrial production shocks (43.07%). The latter fail to explain the variability within regimes. Among the alternative uncertainty indices, currency uncertainty plays an important role plus political uncertainty as well. In fact political uncertainty shocks have large explanatory power within both regimes and across the two regimes. On the other hand, shocks to bond yields do not

play a big role in household deposit variability. It seems depositor behavior was driven mainly by uncertainty.

Finally, the variability of the bond yield r is explained by its own shocks (54.46%) plus shocks to industrial production (22.04%), shocks to EPU (12.30%) and shocks to inflation (6.20%). EPUC shocks explain a larger component of bond-yield variability (13.96%) than EPU shocks do in their VAR model (12.30%). POLU shocks explain 11.49% of the variability in bond yield forecast error volatility, which is close to the 12.30% of the EPU shocks.

To sum up, we provided important pieces of evidence that support the hypothesis that uncertainty may have played a key role in the generation and development of the Greek crisis. First the size of the cumulative responses to 22% uncertainty shocks are large and reasonable and can explain a non-negligible fraction of the change which occurred in all key macro and financial variables due to the crisis. Second, a substantial fraction of the variability of these variables can be explained by shocks to uncertainty. In particular, EPU sub-indices and bond yields can explain the within-crisis variability as well as the variability from the calm period to the crisis period. These EPU sub-indices are related to well-known aspects of the Greek crisis, namely a debt crisis, a banking crisis and a Grexit crisis. Explaining the within-crisis variability suggests that high uncertainty and level of interest rates may also lie behind the protracted stagnation, not only the depth of the crisis.

6. Conclusions

The paper makes two important contributions to the existing literature. First, it constructs a number of uncertainty indices for Greece, which can be used by researchers to do empirical work on this general subject matter. Second, it utilizes the indices to provide empirical support to the hypothesis that uncertainty was a critical factor in generating the depth and length of the recent Greek economic crisis.

The construction of economic policy uncertainty EPU for Greece follows the technique of textual analysis proposed by Baker, Bloom and Davis (2016) in a manner similar to theirs so that the index can be used along with other country EPU indices for cross country studies. The Greek EPU index increased substantially during the years of the Greek economic crisis. Hence it appears to be a strong candidate for explaining the crisis. Throughout time, it showed substantial positive correlation with other international EPU indices. This correlation increased during the international financial crisis but declined during the Greek crisis, pointing to the idiosyncratic nature of the Greek crisis.

The paper also constructs a number of EPU sub-indices, which capture specific aspects of EPU uncertainty, namely fiscal uncertainty (EPUF that can be further partitioned into debt uncertainty (EPUD) and tax uncertainty (EPUT)), monetary uncertainty (EPUM), currency uncertainty (EPUC), banking uncertainty (EPUB) and pension uncertainty (EPUP). As with the main EPU index, all these sub-indices rose significantly during the international and subsequent Greek crises. The only exception is monetary uncertainty EPUM, which has stayed low since Greece's entrance in the Euro Area, apparently due to the common monetary policy in the Euro Area. The EPU sub-indices explain 82.2% of the variation in EPU in the pre-crisis sample period and 88.2% during the crisis period. Among the individual sub-indices, debt uncertainty EPUD, currency or Grexit uncertainty EPUC and banking uncertainty EPUB seem to play an important role during the crisis.

The paper also constructs an index of political uncertainty (POLU) and its counterpart index of economic uncertainty (EU), which is a broader concept than EPU since it does not require the element of policy for its construction. The methodology is similar to the construction of EPU. The three uncertainty indices, EPU, EU and POLU are highly correlated but retain their idiosyncratic characteristics. When the three are put to a horserace to predict the unusual Greek sovereign spreads of the crisis period, POLU seems to slightly have the upper hand.

The uncertainty indices are subsequently put in a Vector Autoregressive model framework to check their association with key macroeconomic and financial variables. We find evidence consistent with theory: Uncertainty shocks are negatively related to economic activity, investment, the industrial production index, employment, economic sentiment, the stock market and household deposit behavior and positively related to bond yields. When we add the global EPU index in order to control for possible international contagion effects, the qualitative results remain the same.

Similar results are obtained with POLU, EU and most of the EPU sub-indices when they take the place of EPU in the VARs. Among the EPU sub-indices, the fiscal EPUF, the currency EPUC and banking EPUB uncertainties seem to dominate. They have the strongest and statistically significant impacts on the macro variables. They are related to the debt crisis, the grexit crisis and the banking crisis.

EPU can explain not only the direction of the change in key macroeconomic variables but their magnitude as well. The cumulative three-year effects of a 22% shock in EPU – this is how much it changed across the two halves of the sample - go a long way to explain a substantial proportion of the drop in key macro variables. Specifically, it explains two thirds of the drop in industrial production and one quarter in GDP. For other variables the relationship is closer to the actual change.

A forecast error variance decomposition analysis shows that uncertainty shocks explain a significant portion of the variation in real output variables, investment, financial variables and economic sentiment. In particular, EPUD, EPUC and EPUB, uncertainty variables intimately related to the Greek crisis, plus the bond yield seem able to explain the variability from the calm period to the crisis period and the variability within the crisis period, which suggests they may lie behind not only the depth, but also the length of the crisis. This suggests that inclusion of uncertainty into theoretical models would offer more complete explanations of the Greek crisis. Political uncertainty, on the other hand, appears important mainly for the explanation of the variation of interest rates and household deposits.

Future research into this area ought to focus on the unexplored issues of causality: Is it primarily uncertainty that caused the negative effects on the macroeconomy, or vice versa, primarily the crisis itself which adversely influenced uncertainty?

References

Aghion, Philippe, Philippe Bacchetta, Romain Rancière, and Kenneth Rogoff, "Exchange rate volatility and productivity growth: The role of financial development," Journal of Monetary Economics, 56 (2009), 494-513.

Aguiar, Mark, "Investment, devaluation, and foreign currency exposure: The case of Mexico," Journal of Development Economics, 78 (2005), 95-113.

Alesina, Alberto, and Guido Tabellini, "External debt, capital flight and political risk," Journal of International Economics, 27 (1989), 199-220.

Arbatli, Elif C., Steven J. Davis, Arata Ito, Naoko Miake, and Ikuo Saito, "Policy Uncertainty in Japan," National Bureau of Economic Research Working Paper, No. w23411 (2017)

Baker, Scott R., Nicholas Bloom, and Steven J. Davis, "Measuring Economic Policy Uncertainty," The Quarterly Journal of Economics, 131 (2016), 1593-1636.

Bansal, Ravi, and Amir Yaron, "Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles," The Journal of Finance, 59 (2004), 1481-1509.

Bernanke, Ben S., "Irreversibility, Uncertainty, and Cyclical Investment," The Quarterly Journal of Economics, 98 (1983), 85 - 106.

Blanchard, Olivier, "Comment on Gourinchas, Philippon and Vayanos" NBER Macroeconomics Annual, 31 (2017), 82 - 91.

Blanchard, Olivier, and Danny Quah, "The Dynamic Effects of Aggregate Demand and Supply Disturbances.", American Economic Review, 79 (1989), 655-673.

Blanchard, Olivier, and Francesco Giavazzi, "Current Account Deficits in the Euro Area: The End of the Feldstein-Horioka Puzzle?," Brookings Papers on Economic Activity, 2 (2002), 147-209.

Bloom, Nicholas, Stephen Bond, and John Van Reenen, "Uncertainty and Investment Dynamics," Review of Economic Studies, 74 (2007), 391-415.

Bloom, Nicholas, "The Impact of Uncertainty Shocks," Econometrica, 77 (2009), 623-685.

Bloom, Nicholas, Max Floetotto, Nir Jaimovich, Itay Saporta-Eksten, and Stephen Terry, "Really Uncertain Business Cycles," National Bureau of Economic Research Working Paper, No. w18245 (2012).

Brogaard, Jonathan, and Andrew Detzel, 2015, "The Asset-Pricing Implications of Government Economic Policy Uncertainty," Management Science, 61(2015), 3-18.

Brunnermeier, Markus, "Comment on Gourinchas, Philippon and Vayanos," NBER Macroeconomics Annual, 31 (2017), 92-99.

Brunnermeier, Markus K., Luis Garicano, Philip R. Lane, Marco Pagano, Ricardo Reis, Tano Santos, David Thesmar, Stijn Van Nieuwerburgh, and Dimitri Vayanos, "The Sovereign-Bank Diabolic Loop and ESBies," American Economic Review, 106 (2016), 508-512.

Carroll, C. D., "Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis," The Quarterly Journal of Economics, 112 (1997), 1-55.

Dellas, Harris, Dimitris Malliaropulos, Dimitris Papageorgiou, and Evangelia Vourvachaki, "Fiscal policy with an informal sector," CEPR Discussion Paper No. DP12494, (2017).

Diamond, Douglas W., and Philip H. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity," Journal of Political Economy, 91 (1983), 401-419.

Dixit, Avinash K, and Robert S Pindyck, "Investment under uncertainty," Princeton University Press, (1994).

Economides, George, Dimitris Papageorgiou, and Apostolis Philippopoulos, "The Greek Great Depression: a general equilibrium study of its drivers," pp. 205-221 in Political Economy Perspectives on the Greek Crisis, Ioannis Bournakis, Christopher Tsoukis, Dimitris K. Christopoulos, Theodore Palivos edt., 2017, Palgrave Macmillan, Cham.

Edmiston, Kelly D., "Tax Uncertainty and Investment: A Cross-Country Empirical Examination," Economic Inquiry, 42 (2004), 425-440.

Enders, Walter, "Applied econometric time series," Wiley (New York), (2004).

Gilchrist, Simon, Jae Sim, and Egon Zakrajšek, "Uncertainty, Financial Frictions, and Investment Dynamics," National Bureau of Economic Research Working Paper, No. w20038 (2014).

Gourinchas, Pierre-Olivier, and Jonathan A. Parker, "Consumption Over the Life Cycle," Econometrica, 70 (2002), 47-89.

Gourinchas, Pierre-Olivier, Thomas Philippon, and Dimitri Vayanos, "The Analytics of the Greek Crisis," NBER Macroeconomics Annual, 31 (2017), 1-81.

Guiso, Luigi, Tullio Jappelli, and Mario Padula, "Pension Wealth Uncertainty," Journal of Risk and Insurance, 80 (2013), 1057-1085.

Gulen, Huseyin, and Mihai Ion, "Policy Uncertainty and Corporate Investment," Review of Financial Studies, 29 (2015), 523 - 564.

Haliassos, Michael, Gikas Hardouvelis, Margarita Tsoutsoura and Dimitri Vayanos, " Financial Development and the Credit Cycle in Greece," pp. 251-305 in Beyond Austerity: Reforming the Greek Economy, Costas Meghir, Christoher Pissarides, Dimitri Vayanos and Nikolaos Vettas edt., 2017, MIT Press, ISBN 978-0-262-03583-5

Hardouvelis, Gikas A., "Macroeconomic Management and the post EMU Need for Structural Reforms in Greece," Economy & Markets, Eurobank Research, 2 (2007), 1-17, www. Eurobank.gr/research

Hardouvelis, Gikas A., and Ioannis Gkionis, "A Decade Long Economic Crisis: Cyprus versus Greece," Cyprus Economic Policy Review, 10 (2016), 3-40.

Hardouvelis, Gikas A., Dimitris Malliaropulos and Richard Priestley, "The impact of EMU on the equity cost of capital," Journal of International Money and Finance, (2007), 26:2, 305-327.

Hardouvelis, Gikas A., Dimitris Malliaropulos and Richard Priestley, "EMU and European Stock Market Integration," Journal of Business, (2006), 79:1, 365-392.

Husted, Lucas, John Rogers, and Bo Sun, "Uncertainty, Currency Excess Returns, and Risk Reversals," International Finance Discussion Paper, (2017), 1-32.

Ilut, Cosmin L., and Martin Schneider, "Ambiguous Business Cycles," American Economic Review, 104 (2014), 2368-2399.

Jens, Candace E., "Political uncertainty and investment: Causal evidence from U.S. gubernatorial elections," Journal of Financial Economics, 124 (2017), 563-579.

Jordà, Òscar, "Estimation and Inference of Impulse Responses by Local Projections." American Economic Review, 95 (2005), 161-182.

Kane, Edward J., "Capital movements, banking insolvency, and silent runs in the Asian financial crisis," Pacific-Basin Finance Journal, 8 (2000), 153-175.

Kang, Wensheng, Kiseok Lee, and Ronald A. Ratti, "Economic policy uncertainty and firm-level investment," Journal of Macroeconomics, 39 (2014), 42-53.

Kydland, Finn E., and Carlos E. J. M. Zarazaga, "Fiscal sentiment and the weak recovery from the Great Recession: A quantitative exploration," Journal of Monetary Economics, 79 (2016), 109-125.

Leduc, Sylvain, and Zheng Liu, "Uncertainty shocks are aggregate demand shocks," Journal of Monetary Economics, 82 (2016), 20-35.

Lensink, Robert, Niels Hermes, and Victor Murinde, "Capital flight and political risk," Journal of International Money and Finance, 19 (2000), 73-92.

Lindeman, Richard, Merenda Peter, and Gold Ruth, "Introduction to Bivariate and Multivariate Analysis," Scott, Foresman, Glenview, IL, (1980).

Luk, Paul, Michael Cheng, Philip Ng, and Ken Wong, "Economic Policy Uncertainty Spillovers in Small Open Economies: the Case of Hong Kong," Working Paper, (2017)

McDonald, Robert, and Daniel Siegel, "The Value of Waiting to Invest," The Quarterly Journal of Economics, 101 (1986), 707.

Meghir, Costas, Christopher Pissarides, Dimitri Vayanos, and Nikos Vettas, "Beyond Austerity: Reforming the Greek Economy," MIT Press, (2017).

O'Brien, Robert, "A caution regarding rules of thumb for variance inflation factors", Quality & Quantity, 41 (2007), 673– 690.

O'Donnell, Owen, and Platon Tinios, "The Politics of Pension Reform: Lessons from Public Attitudes in Greece," Political Studies, 51 (2003), 262-281.

Pástor, Ľuboš, and Pietro Veronesi, "Uncertainty about Government Policy and Stock Prices," The Journal of Finance, 67 (2012), 1219-1264.

Pástor, Ľuboš, and Pietro Veronesi, "Political uncertainty and risk premia," Journal of Financial Economics, 110 (2013), 520-545.

Postlewaite, Andrew, and Xavier Vives, "Bank Runs as an Equilibrium Phenomenon," Journal of Political Economy, 95 (1987), 485-491.

Rodrik, Dani, "Policy uncertainty and private investment in developing countries," Journal of Development Economics, 36 (1991), 229-242.

Sinha, Arunima, "Monetary policy uncertainty and investor expectations," Journal of Macroeconomics, 47 (2016), 188-199.

Zalla, Ryan, "Economic Policy Uncertainty in Ireland," Atlantic Economic Journal, 45.2 (2017), 269-271

Tables of the main text

Table 1:

Panel A: Groups of words for the construction of the Greek EPU Index

Group	English translation	Greek term
1	"uncertainty" or "uncertain"	"αβεβαιότητα" or "αβέβαιος"
1	"concern"	"ανησυχία"
1	"vagueness"	"ασάφεια"
1	"doubt"	"αμφιβολία"
2	"economy" or "economic"	"οικονομία" or "οικονομικός"
3	"reform"	"μεταρρύθμιση"
3	"structural changes"	"διαρθρωτικές αλλαγές"
3	"legislation" or "legislative"	"νομοθεσία" or "νομοθετικό"
3	"Bank of Greece"	"Τράπεζα της Ελλάδος"
3	"central bank"	"κεντρική τράπεζα"
3	"law"	"νόμος"
3	"minister"	"υπουργείο" or "υπουργός"
3	"prime minister"	"πρωθυπουργός"
3	"Maximos Mansion"	"Μαξίμου"
3	"deficit"	"έλλειμμα" or "ελλειματικό"
3	"deregulation"	"απορύθμιση"
3	"regulatory framework"	"ρυθμιστικό πλαίσιο" or "κανονιστικό πλαίσιο"
3	"Capital Market Commission"	"Επιτροπή Κεφαλαιαγοράς"
3	"Competition Commission"	"Επιτροπή Ανταγωνισμού"
3	"government"	"κυβέρνηση"
3	"Council of State"	"Συμβούλιο της Επικρατείας"
3	"parliament"	"βουλή"

Panel B: Term Groups for the Greek specific Policy Uncertainty Sub-Indices

Group	English term	Greek term
Fiscal Policy Uncertainty (EPUF)		
4	"government spending"	"δημόσιες δαπάνες" or "δαπάνες δημοσίου" or "κρατικές δαπάνες" or " δαπάνη γενικής κυβέρνησης"
4	"primary spending"	"πρωτογενής δαπάνη"
4	"defense spending"	"εξοπλιστική δαπάνη
4	"public investment"	"δημόσια επένδυση"
4	"budget"	"προϋπολογισμός"
4	"sovereign debt"	"κρατικό χρέος"
4	"public debt"	"δημόσιο χρέος" or "οφειλές δημοσίου"

4	"transfer payments"	"μεταβιβαστικές πληρωμές"
4	"public consumption"	"δημόσια κατανάλωση"
4	"benefit" or "allowance"	"επιχορήγηση" or "επίδομα"
4	"default of the country"	"πτώχευση της χώρας" or "πτώχευση της Ελλάδας" or "χρεοκοπίας της χώρας or "χρεοκοπία της Ελλάδας"
4	"tax"	"φορολογία" or φόρος"
4	"tax office or authority"	"εφορία"
4	"public revenue"	"τακτικά έσοδα" or "δημόσια έσοδα" or "έσοδα προϋπολογισμού"
4	"privatization revenues"	"έσοδα αποκρατικοποιήσεων"
4	"value added tax"	"φ.π.α."
4	"special consumption tax"	"ειδικός φόρος κατανάλωσης"

Debt Policy Uncertainty (EPUD)

4	"government spending"	"δημόσιες δαπάνες" or "δαπάνες δημοσίου" or "κρατικές δαπάνες" or " δαπάνη γενικής κυβέρνησης"
4	"primary spending"	"πρωτογενής δαπάνη"
4	"defense spending"	"εξοπλιστική δαπάνη
4	"public investment"	"δημόσια επένδυση
4	"budget"	"προϋπολογισμός"
4	"sovereign debt"	"κρατικό χρέος"
4	"public debt"	"δημόσιο χρέος" or "οφειλές δημοσίου"
4	"transfer payments"	"μεταβιβαστικές πληρωμές"
4	"public consumption"	"δημόσια κατανάλωση"
4	"benefit" or "allowance"	"επιχορήγηση" or "επίδομα"
4	"default of the country"	"πτώχευση της χώρας" or "πτώχευση της Ελλάδας" or "χρεοκοπίας της χώρας or "χρεοκοπία της Ελλάδας"

Tax Policy Uncertainty (EPUT)

4	"tax"	"φορολογία" or φόρος"
4	"tax office or authority"	"εφορία"
4	"public revenue"	"τακτικά έσοδα" or "δημόσια έσοδα" or "έσοδα προϋπολογισμού"
4	"privatization revenues"	"έσοδα αποκρατικοποιήσεων"
4	"value added tax"	"φ.π.α."
4	"special consumption tax"	"ειδικός φόρος κατανάλωσης"

Monetary Policy Uncertainty (EPUM)

4	"cost of money"	"κόστος χρήματος"
4	"monetary policy"	"νομισματική πολιτική"
4	"quantitative easing"	"ποσοτική χαλάρωση"
4	"interest rate"	"επιτόκιο" or "euribor"

Currency Uncertainty (EPUC)

4	"exchange rate"	"συναλλαγματική ισοτιμία" or "ισοτιμία του ευρώ"
4	"drachma"	"δραχμή"
4	"Eurozone"	"Ευρωζώνη or "ζώνη του ευρώ""

4	"national currency"	"εθνικό νόμισμα"
4	"economic and monetary union	"ονε" or "οικονομική νομισματική ένωση"
4	"grexit"	"grexit" or "έξοδος από το ευρώ"
4	"currency appreciation"	"ανατίμηση"
4	"currency depreciation"	"υποτίμηση"

Banking Uncertainty (EPUB)

4	"bank"	"τράπεζα"
4	"banking sector "	"τραπεζικός κλάδος" or "τραπεζικός τομέας"
4	"banking system"	"τραπεζικό σύστημα"
4	"interbank market"	"διατραπεζική αγορά"
4	"lending rate"	"επιτόκιο χορηγήσεων"
4	"deposit rate"	"επιτόκιο καταθέσεων"
4	"deposits"	"καταθέσεις"
4	"loans"	"δάνεια"

Pension Uncertainty (EPUP)

4	"pension"	"σύνταξη"
4	"pension insurance system"	"ασφαλιστικό σύστημα or "το ασφαλιστικό""
4	"insurance fund"	"ασφαλιστικό ταμείο"
4	"social insurance institute"	"ίδρυμα κοινωνικών ασφαλίσεων"
4	"pension reform"	"ασφαλιστική μεταρρύθμιση"
4	"social insurance"	"κοινωνική ασφάλιση"
4	"zero deficit clause"	"ρήτρα μηδενικού ελλείμματος"
4	"insurance contribution"	"ασφαλιστική εισφορά"
4	"funded pension scheme"	"κεφαλαιοποιητικό σύστημα"
4	"pay as you go pension scheme"	"διανεμητικό σύστημα"
4	"lump sum pension"	"εφάπαξ"

Panel C: Term Groups for the Greek Political Uncertainty Index

Group	English term	Greek term
Political Uncertainty (POLU)		
2	"ballot box"	"κάλπη"
2	"elections"	"εκλογές"
2	"party"	"κόμμα"
2	"absolute majority"	"αυτοδυναμία"
2	"no government formation"	"ακυβερνησία"
2	"proportional voting"	"αναλογική"
2	"parliamentary majority"	"δεδηλωμένη"
2	"parliament"	"βουλή"
2	"plenary session"	"ολομέλεια"
2	"political uncertainty"	πολιτική αβεβαιότητα"
2	"political instability"	"πολιτική αστάθεια"
2	"political crisis"	"πολιτική κρίση"
2	"political deadlock"	"πολιτικό αδιέξοδο"
2	"political developments"	"πολιτικές εξελίξεις"

2	"political landscape"	"πολιτικό τοπίο" or "πολιτικό σκηνικό"
2	"government"	"κυβέρνηση"
2	"government coalition"	"συμπολίτευση" or "συγκυβέρνηση"
2	"parliamentary vote"	"ψηφοφορία στη βουλή"
2	"reshuffle"	"ανασχηματισμός"
2	"polls"	"δημοσκοπήσεις"

Notes:

a. In Panel A, three groups of words are considered: 1, 2 and 3. The number (frequency) of articles containing at least one word from each of the three groups is used to construct the Economic Policy Uncertainty Index (EPU). If an article contains words solely from the first two groups, it would count in the construction of the broader Economic Uncertainty Index (EU).

b. In Panel B, the fourth group of words is different according to the particular sub-index. Notice that the term "drachma" (or "δραχμή") in the list appears only with its singular tense because it is this tense which reflects the notion of currency uncertainty. The plural tense, "drachmas" (or "δραχμές"), denotes a unit of account, namely the value of goods and services or the value of assets.

c. In Panel C, the construction of POLU utilizes words from group 1 of Panel A and words of its own group 2.

Table 2: Mean, standard deviation and first-order autocorrelation of the uncertainty indices

Period	1/1998-12/2017	1/1998-7/2007	8/2007-12/2017	8/2007-9/2009	10/2009-11/2014	12/2014-12/2017
	Whole Period	First Half of the Sample	Second Half of the Sample	International Financial Crisis	Greek Crisis Phase I	Greek Crisis Phase II
EPU	100	89.57	109.59	95.99	110.83	117.08
	(27.7)	(24.7)	(27.1)	(19.6)	(25.7)	(31.0)
	[0.65]	[0.65]	[0.56]	[0.59]	[0.41]	[0.65]
EU	100	90.78	108.48	105.63	107.45	112.21
	(27.2)	(27.0)	(24.8)	(19.0)	(25.6)	(27.2)
	[0.67]	[0.70]	[0.56]	[0.70]	[0.50]	[0.58]
POLU	100	84.98	113.50	84.30	115.49	130.38
	(36.1)	(22.0)	(40.8)	(16.3)	(39.1)	(44.96)
	[0.65]	[0.59]	[0.58]	[0.61]	[0.33]	[0.69]
EPUF	100	87.47	111.53	84.36	118.66	118.68
	(31.3)	(27.2)	(30.5)	(22.3)	(27.2)	(30.7)
	[0.61]	[0.52]	[0.56]	[0.58]	[0.34]	[0.54]
EPUD	100	85.33	113.49	90.19	131.43	99.81
	(42.9)	(37.9)	(43.1)	(34.2)	(45.1)	(31.7)
	[0.60]	[0.54]	[0.56]	[0.55]	[0.41]	[0.58]
EPUT	100	89.10	110.02	82.75	108.36	131.98
	(32.9)	(28.9)	(33.3)	(18.7)	(26.6)	(37.2)
	[0.54]	[0.41]	[0.55]	[0.47]	[0.24]	[0.49]
EPUM	100	109.95	90.85	117.81	78.97	91.79
	(41.2)	(40.3)	(40.0)	(47.9)	(31.9)	(37.9)
	[0.52]	[0.47]	[0.50]	[0.56]	[0.30]	[0.42]
EPUC	100	85.86	113.01	72.70	130.77	111.56
	(48.9)	(33.8)	(56.7)	(24.6)	(59.1)	(54.7)
	[0.69]	[0.60]	[0.68]	[0.59]	[0.54]	[0.78]
EPUB	100	87.87	111.16	102.44	113.37	113.56
	(34.2)	(31.4)	(33.1)	(33.8)	(33.6)	(31.8)
	[0.56]	[0.55]	[0.45]	[0.60]	[0.32]	[0.56]
EPUP	100	90.59	108.66	85.14	98.37	142.43
	(45.1)	(34.8)	(51.5)	(26.2)	(36.8)	(68.1)
	[0.49]	[0.28]	[0.55]	[0.28]	[0.35]	[0.52]

Notes:
a) The table reports the means, standard deviations (in parentheses) as well as the first order autoregressive parameters [in brackets] of the uncertainty indices for the whole period and various sub-periods.
b) The monthly EPU index is constructed from the three groups of words of Table 1, Panel A, in a manner similar to Baker, Bloom and Davis (2016). It is based on the frequency of those newspaper articles that contain words from all three groups in the same article. Four Greek newspapers are used for which an electronic data base exists. The total number of articles analyzed is over half a million: 512,973. The index is normalized to have a full sample mean of 100. The remaining indices are constructed in a similar manner from groups of words described in Tables 1, Panels B (for the policy-related indices) and C (for the political index).

c) Phase I of the Greek crisis begins in October 2009 with the revelation of a hidden up to that date very large government deficit in 2009, which caused market turmoil and political havoc that eventual led to a rescue by Europeans and the IMF.

d) Phase II begins in December 2014, well after growth had returned to positive territory and macroeconomic imbalances were cured. At that time political attempts to find the new President for the Republic failed, which led to premature January national elections a month later, the immediate resumption of Grexit fears, a new wave of bank deposit withdrawals and an increase in bank non-performing loans.

Table 3:
Bivariate correlations between the uncertainty indices

Panel A: Whole Sample Period

	EPU	EPUF	EPUD	EPUT	EPUM	EPUC	EPUB	EPUP	EU	POLU
EPU	100									
EPUF	82.7	100								
EPUD	71.1	83.6	100							
EPUT	68.0	86.0	50.3	100						
EPUM	34.3	22.8	20.5	22.2	100					
EPUC	76.2	62.2	57.1	44.1	20.7	100				
EPUB	87.8	69.9	61.0	56.6	44.4	75.2	100			
EPUP	49.7	49.3	34.0	52.2	11.9	25.9	39.0	100		
EU	93.5	71.7	64.1	56.5	33.3	64.7	79.2	44.7	100	
POLU	85.2	74.7	57.1	66.1	10.2	71.9	70.9	42.0	75.5	100

Panel B: First Half of the Sample (1/1998 – 7/2007)

	EPU	EPUF	EPUD	EPUT	EPUM	EPUC	EPUB	EPUP	EU	POLU
EPU	100									
EPUF	84.7	100								
EPUD	78.4	84.8	100							
EPUT	69.5	88.5	58.9	100						
EPUM	64.3	53.8	43.5	53.7	100					
EPUC	64.7	55.9	47.5	50.8	77.1	100				
EPUB	82.4	68.8	58.1	62.3	78.4	79.4	100			
EPUP	43.0	36.1	43.8	26.9	21.3	22.7	35.7	100		
EU	93.5	75.5	74.0	57.8	50.2	50.1	67.8	41.6	100	
POLU	82.7	77.2	67.8	63.0	40.5	44.5	57.4	38.4	77.6	100

Panel C: Second Half of the Sample (8/2007 – 12/2017)

	EPU	EPUF	EPUD	EPUT	EPUM	EPUC	EPUB	EPUP	EU	POLU
EPU	100									
EPUF	76.5	100								
EPUD	59.2	79.0	100							
EPUT	59.9	81.4	34.7	100						
EPUM	32.6	20.4	20.3	15.1	100					
EPUC	80.8	60.6	56.8	34.0	4.2	100				
EPUB	89.0	63.0	54.6	43.3	38.8	72.2	100			
EPUP	49.3	52.0	22.3	61.9	15.5	21.3	35.3	100		
EU	92.8	61.6	48.0	46.7	38.7	72.2	85.4	42.9	100	
POLU	86.4	69.7	45.3	63.0	14.2	76.3	74.1	38.0	75.6	100

Notes: Time-series correlations between the uncertainty indices. See Tables 1 for the construction of the uncertainty indices. Panels A, B and C report the correlation coefficients during the whole period, the pre-crisis and the crisis periods, respectively.

Table 4:
OLS regressions of EPU on its EPU sub-indices

	(1)	(2)	(3)	(4)
EPUF	**0.31** **(8.58)**		**0.40** **(8.49)**	**0.17** **(4.86)**
EPUD		**0.11** **(4.50)**		
EPUT		**0.15** **(4.77)**		
EPUM	0.01 (0.56)	0.00 (0.02)	0.03 (0.59)	0.03 (1.59)
EPUC	**0.07** **(2.47)**	**0.08** **(2.80)**	-0.03 (-0.45)	**0.14** **(5.86)**
EPUB	**0.39** **(10.09)**	**0.41** **(10.66)**	**0.36** **(5.87)**	**0.42** **(8.14)**
EPUP	**0.05** **(2.13)**	0.04 (1.88)	0.06 (1.61)	**0.05** **(2.48)**
CONST.	**0.81** **(5.26)**	**0.94** **(5.89)**	**0.81** **(3.59)**	**0.92** **(5.43)**
Adj-R^2 %	86.0	84.7	82.2	88.2
Obs.	240	240	115	125

Notes:
a) OLS regressions of log (EPU) on logarithmic values of EPU sub-indices in a contemporaneous setting.
b) See Table 1 for the definition of the uncertainty indices.
c) Columns (1) – (2) report the results for the full sample 1/1998-12/2017, column (3) for the first half of the sample period 1/1998-7/2007, and column (4) for the second half of the sample period 8/2007-12/2017.
d) Newey-West t-statistics (lags are specified using the AIC criterion) are reported inside the parentheses below the coefficients.
e) The last two rows report the adjusted R^2 and the number of observations respectively.
f) Statistically significant coefficients (at 5% confidence level) are denoted with bold.

Table 5:
Correlation among Greek and other international EPU indices

	(1) Full Sample 1/1998 – 12/2017	(2) First Half 1/1998 – 7/2007	(3) Second Half 8/2007 – 12/2017	Change between columns (2) and (3) (p-value)	(4) International financial crisis 8/2007-9/2009	(5) Greek crisis Phase I 10/2009-11/2014	(6) Greek crisis Phase II 12/2014-12/2017
US	49.7%	59.1%	27.2%	**0.00**	62.1%	41.3%	9.1%
EU	58.7%	69.2%	40.8%	**0.00**	74.7%	55.3%	0.6%
Global	57.0%	66.6%	39.7%	**0.00**	85.4%	52.7%	0.6%
France	52.3%	48.9%	39.2%	0.36	64.0%	31.6%	22.0%
Germany	52.9%	47.8%	41.5%	0.55	64.1%	53.2%	10.1%
Italy	47.1%	54.5%	32.7%	**0.04**	44.4%	29.6%	31.2%
Spain	53.6%	71.4%	38.4%	**0.00**	54.3%	58.5%	3.3%
UK	39.8%	62.6%	19.7%	**0.00**	65.0%	46.0%	-16.8%

Notes:
a) The main data source is the site on EPU policy uncertainty. See Table 6 for data definitions.
b) p-values smaller than the 5% confidence level are indicated with bold.
c) The Spanish EPU index starts from 1/2001.

Table 6: Data Summary

Name	Abbreviation	Units	Description	First Observation	Frequency	Source
Unemployment Rate	U	%	The unemployment rate tracks the number of unemployed persons as a percentage of the labor force (the total number of employed plus unemployed). These figures generally come from a household labor force survey.	4/98	M	Bloomberg
Industrial Production Index SA	IP	points	Industrial production measures the output of industrial establishments in the following industries: mining and quarrying, manufacturing and public utilities (electricity, gas and water supply). Production is based on the volume of the output.	1/98	M	Bloomberg
Greece, Govt. Bond 10 Year Acting as Benchmark	r	%	Month-end data. The rates are comprised of Generic EUR Greece government bonds. These yields are based on the bid side of the market and are updated intraday. Bloomberg pricing source for the bond: BGN.	3/98	M	Bloomberg
Germany, Govt. 10Year Yield		%	Month-end data. The rates are comprised of Generic German government bonds. These yields are based on the bid side of the market. Pricing source for the bond: BGN.	2/98	M	Bloomberg
Athens Stock Exchange General Index	ASE	points	Month-end data. The Athens Stock Exchange General Index is a capitalization-weighted index of Greek stocks listed on the Athens Stock Exchange. The index was developed with a base value of 100 as of December 31, 1980. It includes dividends.	1/98	M	Bloomberg
Greece Real GDP SWDA	GDP	millions	Gross domestic product (GDP) measures the final market value of all goods and services produced within a country. It is the most frequently used indicator of economic activity. The GDP by expenditure approach measures total final expenditures (at purchasers' prices), including exports less imports. This concept is adjusted for inflation.	1/98	Q	Bloomberg
Greece Real Gross Fixed Capital Formation SWDA	I	millions	Gross fixed capital formation is defined as the acquisition (including purchases of new or second-hand assets) and creation of assets by producers for their own use, minus disposals of produced fixed assets. The relevant assets relate to products that are intended for use in the production of other goods and services for a period of more than a year. The term "produced assets" means that only those assets that come into existence as a result of a production process recognized in the national accounts are included. This concept is adjusted for inflation.	1/98	Q	Bloomberg
Inflation Rate	Infl	%	Year-on-year percentage change of Greek CPI.	1/98	M	Bloomberg

Households Deposits	HD	millions	Deposits are sums of money placed with a financial institution during its month. Consists of sight deposits, savings, time deposits and repos	1/01	M	Bloomberg
Global EPU	Global	points	www.policyuncertainty.com	1/98	M	www.policyuncertainty.com
EU EPU	Europe	points	www.policyuncertainty.com	1/98	M	www.policyuncertainty.com
US EPU	US	points	www.policyuncertainty.com	1/98	M	www.policyuncertainty.com
Economic Sentiment Indicator	ESI	points	Composite indicator made up of five sectoral confidence indicators with different weights: industrial confidence indicator (40 %); construction confidence indicator (5%); services confidence indicator (30%); consumer confidence indicator (20%); retail trade confidence indicator (5%).	1/98	M	Europa[29]
Employment	E	%	E = 100% - U	4/98	M	Custom Calculation
ASE Realized Monthly Volatility	σ_m	%	The annualized standard deviation during the month of daily stock returns based on closing prices, expressed in percentage terms	1/98	M	Custom Calculation
Greek EPU	EPU	points	See section 3, Table 1 , Panel A	1/98	M	Custom Calculation
EPU Tax Uncertainty	EPUT	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
EPU Debt Uncertainty	EPUD	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
EPU Pension Uncertainty	EPUP	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
EPU Banking Uncertainty	EPUB	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
EPU Monetary Uncertainty	EPUM	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
EPU Currency Uncertainty	EPUC	points	See section 3, Table 1, Panel B	1/98	M	Custom Calculation
Political Uncertainty	POLU	points	See section 3, Table 1, Panel C	1/98	M	Custom Calculation
Economic Uncertainty	EU	points	See section 3, Table 1, Panel A	1/98	M	Custom Calculation

Notes: The last observation for all the variables is the 12/2017. The initial source for HD is the Bank of Greece.

---

[29] https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys/download-business-and-consumer-survey-data/time-series_en#economic-sentiment-indicator-esi

Table 7: The Relation between Bond Spreads and Uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Whole Period, obs.: 240					
Δlog (EPU)	**1.76**			2.13	-0.04	
	(2.96)			(1.78)	(-0.08)	
Δlog (EU)		**1.61**		-0.42		-0.28
		(3.10)		(-0.52)		(-0.47)
Δlog(POLU)			**1.87**		**1.90**	**2.04**
			(3.09)		**(2.15)**	**(2.21)**
adj. R^2	5.3%	3.9%	8.4%	4.9%	8.0%	8.1%
	Panel B: First Half of the Sample - Pre-crisis Period, obs.: 115					
Δlog (EPU)	0.15			-0.18	0.09	
	(1.58)			(-1.38)	(1.00)	
Δlog (EU)		0.20		0.37		0.20
		(1.79)		(1.72)		(1.60)
Δlog(POLU)			0.13		0.07	0.01
			(1.84)		(1.69)	(0.40)
adj. R^2	2.8%	5.6%	2.5%	5.6%	2.2%	4.7%
	Panel C: Pre-crisis / Pre-euro Period, obs.: 29					
Δlog (EPU)	0.46			-0.39	0.49	
	(1.43)			(-1.05)	(1.16)	
Δlog (EU)		0.60		0.94		0.74
		(1.63)		(1.52)		(1.64)
Δlog(POLU)			0.26		-0.03	-0.13
			(1.23)		(-0.12)	(-0.91)
adj. R^2	6.2%	13.7%	2.3%	11.5%	2.2%	10.7%
	Panel D: Pre-crisis / Euro Period, obs.: 86					
Δlog (EPU)	**0.04**			-0.00	0.03	
	(2.51)			(-0.05)	(1.73)	
Δlog (EU)		**0.05**		0.05		0.04
		(2.83)		(0.95)		(1.83)
Δlog(POLU)			**0.04**		0.01	0.01
			(2.06)		(0.51)	(0.33)
adj. R^2	4.5%	5.7%	3.0%	4.6%	3.5%	4.7%
	Panel E: Second Half of the Sample - Crisis Period, obs.: 125					
Δlog (EPU)	**3.38**			4.52	-0.30	
	(2.29)			(1.56)	(-0.24)	
Δlog (EU)		**3.05**		-1.29		-1.07
		(2.39)		(-0.72)		(-0.62)
Δlog(POLU)			**3.25**		**3.47**	3.92
			(2.74)		**(2.14)**	(1.92)
adj. R^2	9.7%	7.0%	14.3%	9.2%	13.6%	13.9%

Notes:

a) The uncertainty variables EPU, EU and POLU are defined in earlier Tables 1 and 2. The yield spread is defined in Table 6.

b) The table reports the coefficients of time-series OLS regressions of the change in the spread from the end of month t-1 to the end of month t, on the percentage change in uncertainty indices from month t-1 to month t. Yield spreads are expressed in percentages. The percentage changes of the uncertainty variables are expressed in %. Thus a coefficient of 1 reflects an increase of 100 basis points due to a 1% increase in the level of uncertainty.

c) In column (1) the uncertainty index is EPU, in column (2) EU, in column (3) POLU, in column (4) both EPU and EU, in column (5) both EPU and POLU, and in column (6) both EU and POLU. The constant term is not reported.

d) Panel A reports the results of the whole period, Panel B of the pre-crisis period (first half of the sample), Panel C of the pre-euro part of the pre-crisis period, Panel D of the euro part of the pre-crisis period and Panel E of the crisis period (second half of the sample). The sample periods are defined in Table 2. In Panel C, the pre-euro period lasts until June 2000. In Panel D, the euro-period begins in July 2000, when Greek entrance into EMU was officially decided. The number of observations for each period (obs.) is reported at the head row of each panel.

e) Inside the parentheses below the coefficients are Newey-West t-statistics (with lags specified using the AIC criterion). The statistical significant coefficients at 5% confidence level are indicated with bold.

f) The adjusted R^2 of each regression are reported in the last rows of each panel.

Table 8:
Peak Responses to Shocks of various Uncertainty Indices
(Homogeneous 22% Innovation)

	EPU	EU	POLU	EPUF	EPUM	EPUC	EPUB	EPUP
Panel A Basic Monthly Model								
IP	**-0.58%** **[-2.68]** **(15)**	**-0.58%** **[-2.44]** **(16)**	-0.31% [-1.85] (18)	**-0.46%** **[-3.04]** **(14)**	-0.21% [-1.87] (9)	**-0.30%** **[-2.44]** **(18)**	**-0.37%** **[-2.89]** **(10)**	-0.21% [-0.62] (3)
E	**-0.47%** **[-2.34]** **(33)**	**-0.44%** **[-2.13]** **(32)**	**-0.29%** **[-2.12]** **(28)**	**-0.37%** **[-2.69]** **(31)**	-0.15% [-1.61] (36)	**-0.26%** **[-2.54]** **(31)**	**-0.28%** **[-2.25]** **(33)**	-0.14% [-1.87] (36)
R	**46.1 bp** **[3.10]** **(3)**	**48.3 bp** **[3.21]** **(3)**	**51.9 bp** **[3.92]** **(3)**	**32.3 bp** **[2.18]** **(7)**	14.0 bp [1.46] (3)	**34.8 bp** **[3.78]** **(3)**	**24.0 bp** **[2.34]** **(1)**	**14.0 bp** **[1.96]** **(15)**
ASE	**-4.13%** **[-4.81]** **(3)**	**-5.38%** **[-6.30]** **(3)**	**-2.94%** **[-4.76]** **(1)**	**-2.09%** **[-2.54]** **(4)**	**-0.82%** **[-2.10]** **(1)**	**-2.27%** **[-4.35]** **(3)**	**-2.55%** **[-4.08]** **(3)**	-1.09% [-1.93] (5)
ESI	**-1.51%** **[-4.85]** **(5)**	**-1.64%** **[-5.06]** **(5)**	**-1.02%** **[-3.76]** **(5)**	**-0.99%** **[-4.28]** **(5)**	**-0.41%** **[-2.22]** **(9)**	**-0.66%** **[-3.52]** **(5)**	**-0.91%** **[-4.29]** **(5)**	**-0.41%** **[-3.52]** **(3)**
Panel B Alternative Monthly Model (**including HD instead of ASE**)								
HD	**-1.24%** **[-2.58]** **(26)**	**-1.20%** **[-2.35]** **(28)**	**-1.12%** **[-4.90]** **(6)**	**-1.00%** **[-2.60]** **(33)**	**-0.47%** **[-2.01]** **(30)**	**-0.67%** **[-2.53]** **(29)**	**-0.77%** **[-2.78]** **(31)**	**-0.42%** **[-2.00]** **(32)**
Panel C Quarterly Model								
GDP	**-0.89%** **[-3.30]** **(3)**	**-0.69%** **[-2.65]** **(3)**	-0.50% [-1.71] (3)	**-1.02%** **[-4.69]** **(3)**	-0.25% [-1.28] (3)	**-0.70%** **[-3.42]** **(4)**	**-0.90%** **[-3.37]** **(4)**	-0.18% [-0.18] (3)
I	**-3.89%** **[-3.27]** **(3)**	**-2.76%** **[-2.39]** **(3)**	**-3.32%** **[-2.50]** **(3)**	**-4.75%** **[-5.18]** **(3)**	-0.32% [-0.48] (5)	**-3.00%** **[-4.14]** **(3)**	**-2.80%** **[-2.98]** **(3)**	**-1.38%** **[-1.99]** **(1)**

Notes:
a) Variable definitions are in Table 6.
b) In panel A, for dependent variables IP, E, ASE and ESI, the VAR model uses monthly frequency and has the following ordering: log(uncertainty index), r, log(ASE), log(E), log(IP) and log(ESI).

c) In Panel B, for dependent variable HD, the VAR model uses monthly frequency and has the following ordering: log(uncertainty index), log(HD), r, log(E), log(IP) and log(ESI).

d) In Panel C, for dependent variables GDP and I, the VAR model uses quarterly frequency and has the following ordering: log(uncertainty index), r, log(ASE), log(I) and log(GDP).

e) Separate columns contain results from separate VARs, in which EPU is substituted by a different uncertainty index.

f) The table reports the peak responses for a fixed increase in each uncertainty index by 22%, which is the percentage increase in the average level of the EPU between the periods 1/1998 – 7/2007 and 8/2007 – 12/2017.

g) The table also presents the cumulative responses up to the month (or the quarter) of the peak responses, just below the moth or quarter in question.

h) The t-statistics are reported inside the brackets below each response. Statistical significant coefficients at 5% confidence level are indicated with bold. Inside the parentheses below each bracket, the month of the peak response is reported.

Table 9

Global vs Greek EPU:
Variance Decomposition of Macroeconomic Variables

Affected variable 3-years ahead	Type of EPU shock	1/1998-12/2017	1/1998-7/2007	8/2007-12/2017
		Whole Period	Pre-crisis period	Crisis Period
Panel A				
IP	Local	17.3%	0.7%	**21.2%**
	Global	0.4%	4.8%	4.4%
E	Local	**20.1%**	3.5%	**25.1%**
	Global	0.0%	11.3%	2.9%
r	Local	13.9%	1.0%	**21.8%**
	Global	0.1%	1.6%	2.9%
ASE	Local	7.0%	0.7%	**24.2%**
	Global	9.9%	10.2%	5.7%
ESI	Local	**22.7%**	1.2%	**24.5%**
	Global	2.7%	10.0%	2.4%
HD	Local	**25.3%**	5.6%	**39.1%**
	Global	1.2%	20.8%	2.8%
GDP	Local	2.8%	16.3%	16.4%
	Global	4.5%	11.4%	1.6%
I	Local	13.5%	16.7%	17.9%
	Global	0.8%	2.8%	0.9%
Panel B				
Greek EPU	Local	**53.4%**	17.8%	**59.5%**
	Global	**27.0%**	10.6%	13.0%
Global EPU	Local	6.7%	6.2%	11.5%
	Global	**69.3%**	28.0%	**40.5%**

Notes:
a) Variable definitions are in Table 6. In the table, "Local" denotes the Greek EPU and "Global" denotes the global EPU.
b) The table reports information extracted from the forecast error variance decomposition three years into the future of the variables of the first column. The information extracted is the percent contribution to that variance originating from either the Greek EPU shock or the global EPU shock.
c) Separate columns contain results from separate sample periods. The models have been estimated three times, using the full sample period and each sub-period.
d) For dependent variables IP, E, ASE and ESI, the VAR model (monthly frequency) has the following ordering: log(global EPU), log(Greek EPU), r, log(ASE), log(E), log(IP) and log(ESI).
e) For dependent variable HD, the VAR model (monthly frequency) has the following ordering: log(global EPU), log(Greek EPU), log(HD), r, log(E), log(IP) and log(ESI).
f) For dependent variables GDP and I, the VAR model (quarterly frequency) has the following ordering: log(global EPU), log(Greek EPU), r, log(ASE), log(I) and log(GDP).
g) In Panel B, we also report the influence of global and local EPU shocks on their own future variability, utilizing the quarterly model. The results are similar when we use the two alternative monthly models.
h) The statistically significant variance decompositions at the 5% significance level are indicated with bold.

Table 10:
Cumulative responses to Shocks of various Uncertainty Indices
(Homogeneous 22% Innovation)

	EPU	EU	POLU	EPUF	EPUM	EPUC	EPUB	EPUP	Actual
IP	**-18.2** **(-2.46)**	**-17.8** **(-2.26)**	-8.4 (-1.54)	**-14.5** **(-2.76)**	-6.6 (-1.82)	**-9.1** **(-2.30)**	**-11.9** **(-2.57)**	-5.3 (-1.95)	**-24.0%**
E	**-11.4** **(-2.76)**	**-11.1** **(-2.52)**	**-7.8** **(-2.43)**	**-9.4** **(-3.19)**	-2.9 (-1.40)	**-6.5** **(-2.91)**	**-6.6** **(-2.53)**	-2.4 (-1.49)	**-13.4%**
r	**1,197** **(2.20)**	1,114 (1.93)	**881** **(2.20)**	**885** **(2.28)**	410 (1.60)	**758** **(2.61)**	**676** **(2.02)**	**414** **(2.04)**	**586**
ASE	**-76.0** **(-1.99)**	**-99.6** **(-2.32)**	-32.6 (-1.08)	-48.5 (-1.66)	-20.0 (-1.02)	**-55.0** **(-2.50)**	**-52.6** **(-2.06)**	-30.4 (-1.92)	**-83.4%**
ESI	**-21.3** **(-2.57)**	**-23.3** **(-2.60)**	-9.4 (-1.58)	**-13.3** **(-2.29)**	**-7.7** **(-1.99)**	**-9.7** **(-2.24)**	**-14.0** **(-2.74)**	**-7.9** **(-2.58)**	**-30.4%**
HD	**-41.5** **(-3.13)**	**-40.0** **(-2.87)**	**-33.6** **(-3.27)**	**-31.0** **(-3.17)**	**-13.7** **(-2.14)**	**-23.0** **(-3.20)**	**-24.1** **(-2.92)**	**-13.2** **(-2.42)**	**-30.4%**
GDP	**-6.2** **(-2.13)**	-4.3 (-0.88)	-1.5 (-0.37)	**-9.9** **(-2.44)**	-1.4 (-0.51)	**-6.7** **(-2.17)**	**-8.2** **(-2.15)**	0.4 (0.06)	**-25.5%**
I	-22.2 (-1.75)	-16.1 (-1.21)	-12.3 (-1.10)	**-32.5** **(-2.96)**	-1.3 (-0.20)	**-21.6** **(-2.58)**	**-21.8** **(-2.11)**	2.0 (0.76)	**-70.3%**

Notes:

a) The table reports the cumulative responses for a fixed increase in each uncertainty index by 22%, over a period of 3 years.

b) All the numbers except of that reported for r are percentages. The interest rate (r) and all the numbers in the corresponding row are measured in basis points.

c) Variable definitions are in Table 6.

d) For dependent variables IP, E, ASE and ESI and r, the VAR model uses monthly frequency and has the following ordering: log(uncertainty index), r, log(ASE), log(E), log(IP) and log(ESI).

e) For dependent variable HD, the VAR model uses monthly frequency and has the following ordering: log(uncertainty index), log(HD), r, log(E), log(IP) and log(ESI).

f) For dependent variables GDP and I, the VAR model uses quarterly frequency and has the following ordering: log(uncertainty index), r, log(ASE), log(I) and log(GDP).

g) The actual changes for IP, E, ASE, HD, GDP, ESI and I are the % changes of their values from July 2007 to December 2017.

h) The actual change r is the change of the average values from the period 1/2002-7/2007 to the period 8/2007-12/2017.

i) The statistically significant responses at the 5% confidence level are indicated with bold.

Table 11:
Variance Decomposition of Macroeconomic Variables

Panel A: GDP

Full Sample

	Uncertainty index	r	ASE	I	GDP
EPU	6.75	48.01	0.96	2.40	41.89
EPUD	21.29	36.28	0.93	3.08	38.41
EPUC	18.05	39.73	0.53	3.24	38.45
EPUB	17.55	45.22	0.30	2.72	34.21
POLU	1.66	49.95	3.05	1.53	43.81

Pre-crisis Sample

	Uncertainty index	r	ASE	I	GDP
EPU	13.07	9.42	4.78	54.52	18.21
EPUD	4.77	7.00	6.93	64.27	17.04
EPUC	5.93	9.88	1.76	59.78	22.66
EPUB	7.34	14.50	4.91	55.57	17.67
POLU	13.92	3.88	9.54	47.17	25.49

Crisis Sample

	Uncertainty index	r	ASE	I	GDP
EPU	13.26	63.97	2.47	11.61	8.69
EPUD	55.58	28.30	1.65	2.28	12.20
EPUC	35.57	47.19	0.98	4.86	11.40
EPUB	17.77	61.04	1.47	11.11	8.61
POLU	3.65	69.96	4.52	11.41	10.46

Panel B: Investment (I)

Full Sample

	Uncertainty index	r	ASE	I	GDP
EPU	12.19	50.07	1.43	17.74	18.57
EPUD	28.33	34.74	1.01	17.04	18.88
EPUC	25.80	39.75	0.84	16.68	16.94
EPUB	17.01	48.75	0.41	18.63	15.19
POLU	8.11	51.94	2.23	18.91	18.80

Pre-crisis Sample

	Uncertainty index	r	ASE	I	GDP
EPU	4.63	8.97	22.15	58.08	6.18
EPUD	3.66	9.75	26.83	49.91	9.86
EPUC	8.06	8.94	17.94	60.04	5.01
EPUB	0.68	12.58	26.41	54.09	6.24
POLU	17.64	6.39	12.68	59.11	4.18

Crisis Sample

	Uncertainty index	r	ASE	I	GDP
EPU	19.45	52.73	2.25	19.49	6.07
EPUD	56.25	21.06	1.90	11.70	9.09
EPUC	38.97	38.66	1.12	12.85	8.40
EPUB	22.74	50.81	1.34	19.04	6.06
POLU	8.94	57.62	4.90	21.83	6.72

Panel C: Household Deposits (HD)

Full Sample

	Uncertainty index	HD	r	E	IP	INFL	ESI
EPU	24.38	26.68	2.78	1.44	43.07	1.21	0.45
EPUD	10.77	37.35	4.27	1.02	44.03	1.39	1.16
EPUC	19.35	28.19	2.02	1.43	47.97	0.62	0.43
EPUB	17.03	33.12	3.74	1.24	42.84	1.46	0.57
POLU	22.50	22.57	2.65	1.40	48.88	1.31	0.70

Pre-crisis Sample

	Uncertainty index	HD	r	E	IP	INFL	ESI
EPU	14.14	46.72	5.10	6.44	2.22	13.88	11.50
EPUD	2.45	51.39	4.14	7.26	2.51	15.86	16.38
EPUC	4.42	52.38	3.34	9.67	2.96	13.11	14.12
EPUB	4.93	50.07	6.18	6.74	2.83	14.32	14.93
POLU	16.63	41.12	5.38	7.15	2.59	13.27	13.86

Crisis Sample

	Uncertainty index	HD	r	E	IP	INFL	ESI
EPU	28.88	38.53	11.77	1.38	11.65	0.98	6.82
EPUD	5.44	61.19	15.48	1.42	11.46	1.26	3.76
EPUC	27.14	36.39	10.36	1.64	14.62	0.95	8.90
EPUB	18.95	49.48	13.89	1.02	11.42	1.19	4.05
POLU	38.95	29.39	9.49	1.11	12.59	1.20	7.27

Panel D: Bond Yield (r)

Full Sample

	Uncertainty index	r	ASE	E	IP	INFL	ESI
EPU	12.30	54.46	0.79	1.73	22.04	6.20	2.48
EPUD	6.66	60.74	0.31	1.83	20.68	7.03	2.76
EPUC	13.96	52.07	0.80	1.75	24.13	4.86	2.43
EPUB	7.79	58.86	0.41	1.80	21.14	6.74	3.27
POLU	11.49	52.78	0.21	1.82	24.24	6.23	3.23

Pre-crisis Sample

	Uncertainty index	r	ASE	E	IP	INFL	ESI
EPU	1.81	36.07	40.33	3.77	7.76	3.99	6.27
EPUD	5.32	33.40	37.32	2.73	8.82	4.42	8.00
EPUC	13.50	35.83	30.94	1.31	8.69	2.94	6.79
EPUB	0.71	36.76	39.05	3.84	9.54	3.37	6.72
POLU	1.70	36.95	37.99	3.97	8.97	3.36	7.06

Crisis Sample

	Uncertainty index	r	ASE	E	IP	INFL	ESI
EPU	17.53	40.14	0.74	2.02	22.32	14.07	3.18
EPUD	11.35	50.25	0.82	2.75	16.03	15.50	3.30
EPUC	14.39	38.70	1.02	2.57	27.59	11.82	3.91
EPUB	10.36	45.93	0.79	1.97	21.30	16.33	3.31
POLU	17.83	37.19	0.74	1.78	24.12	14.88	3.46

Notes:

a) Table 11 includes four panels. Each panel presents the forecast variance decomposition 3 years ahead of one the following variables: GDP in Panel A, Investment in Panel B, Household Deposits in Panel C, and 10-year bond yield in Panel D. Variable definitions are in Table 6. The forecasts are based on the original Cholesky decompositions of the VAR models of Tables 8 and 10.

b) The numbers presented in Table 11 are percentages. Their sum in each row is 100%.

c) In each panel and in each sample period, each row is denoted by its own uncertainty index. That specific uncertainty index together with the remaining variables at the top row, are the variables of the VAR model for that row.

d) In Panels A and B, for dependent variables GDP and I, the VAR model (quarterly frequency) has the following ordering: log(uncertainty index), r, log(ASE), log(I) and log(GDP).

e) In Panel C, for dependent variable HD, the VAR model (monthly frequency) has the following ordering: log(uncertainty index), log(HD), r, log(E), log(IP) and log(ESI).

f) In Panel D, for dependent variables r the VAR model (monthly frequency) has the following ordering: log(uncertainty index), r, log(ASE), log(E), log(IP) and log(ESI).

g) For results for the full sample are from VAR fitted in the full sample, the results for the pre-crisis sample are from VAR fitted in the data of the period 1/1998 – 7/2007 for the monthly frequency and 1Q-1998 – 2Q2007 for the quarterly frequency and the results for the crisis sample are from VAR fitted in the data of the period 8/2007 – 12/2017 for the monthly frequency and 3Q-2007 – 4Q-2017 for the quarterly frequency.

Figures of the main text

Figure 1: Greek EPU Index
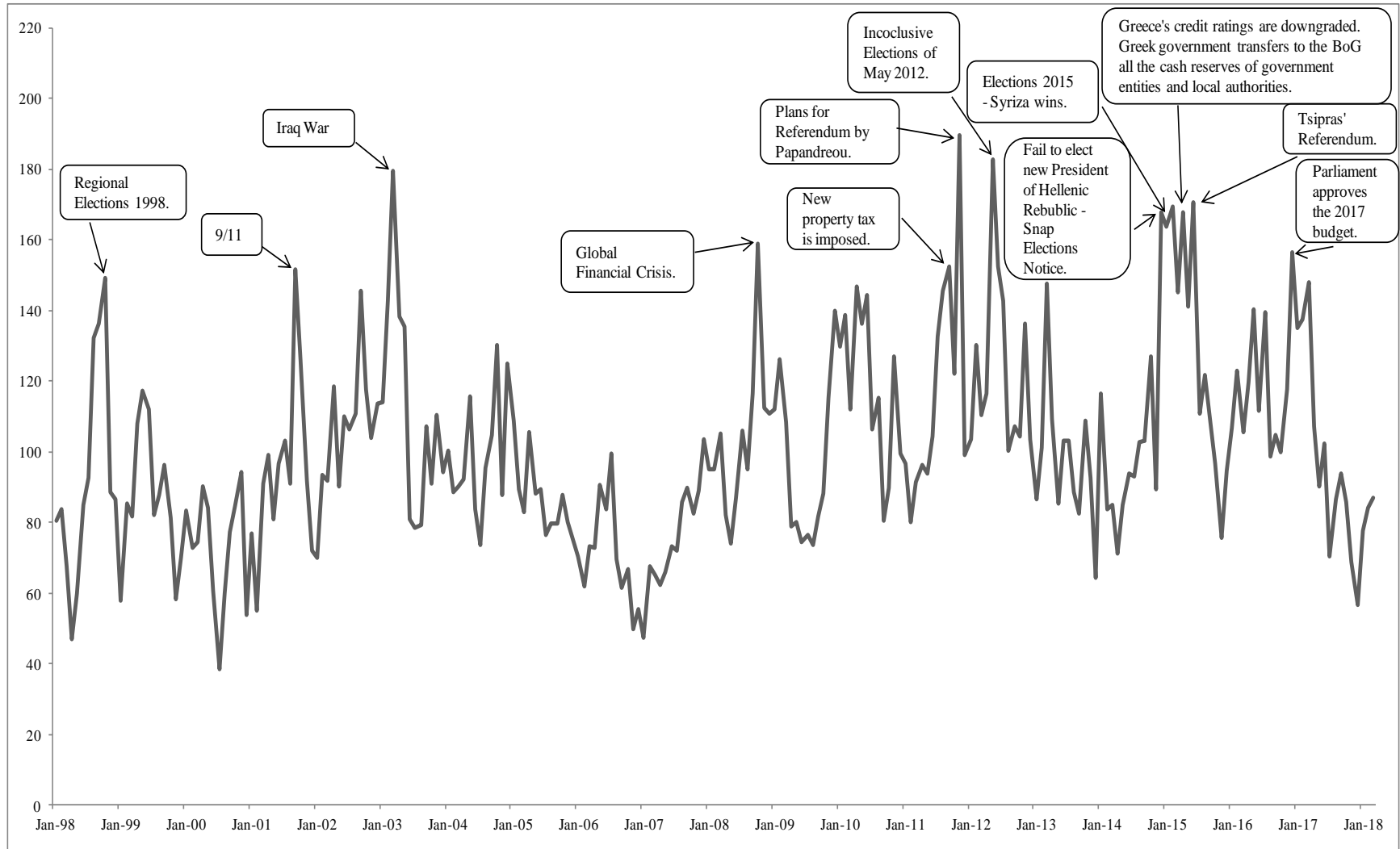
Figure 2: EU and sub-indices

Economic Uncertainty Index (EU)

Fiscal Policy Uncertainty Index (EPUF)

Debt Uncertainty Index (EPUD)
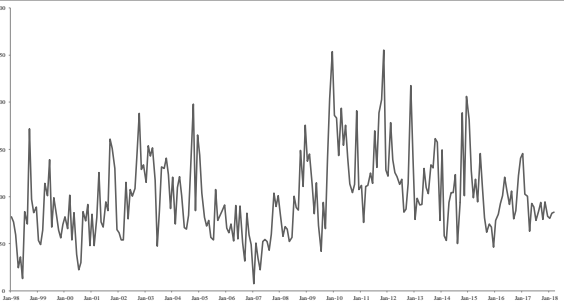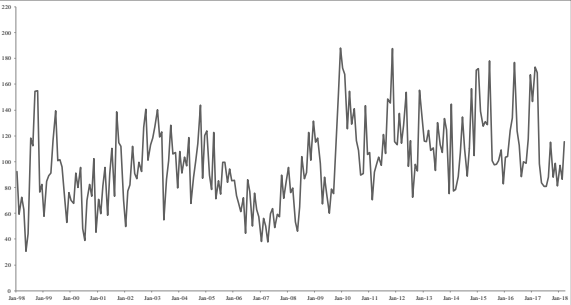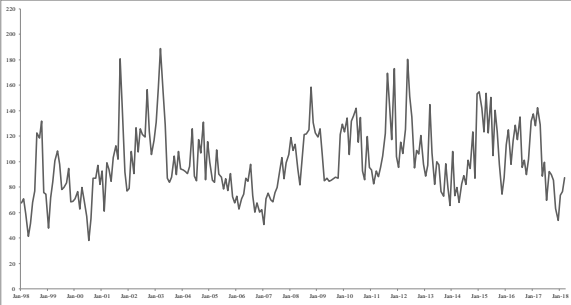
Tax Uncertainty Index (EPUT)

Monetary Policy Uncertainty Index (EPUM)

Currency Uncertainty Index (EPUC)
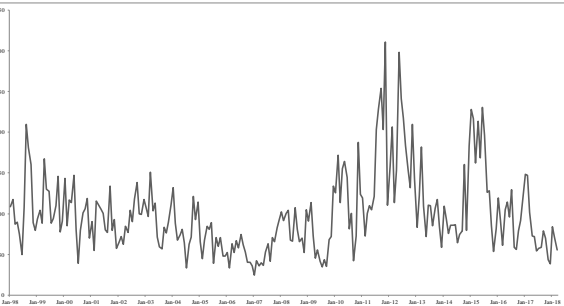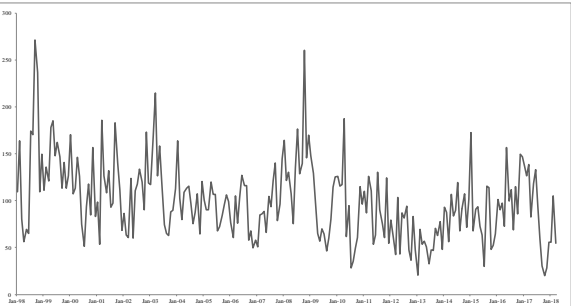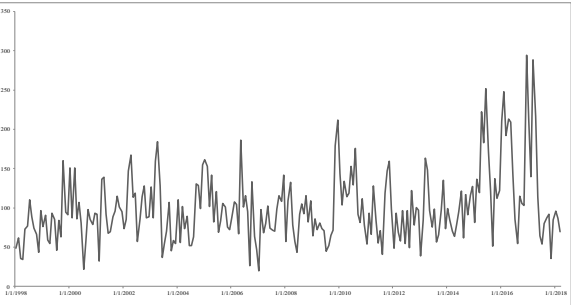

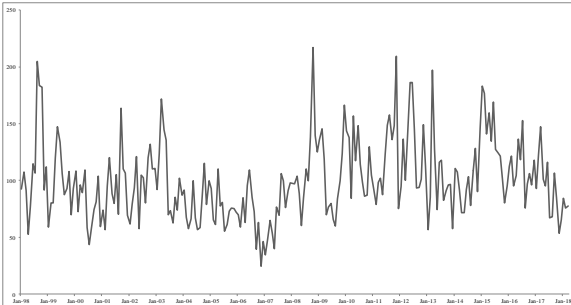### Banking Uncertainty Index (EPUB)

Pension Uncertainty Index (EPUP)
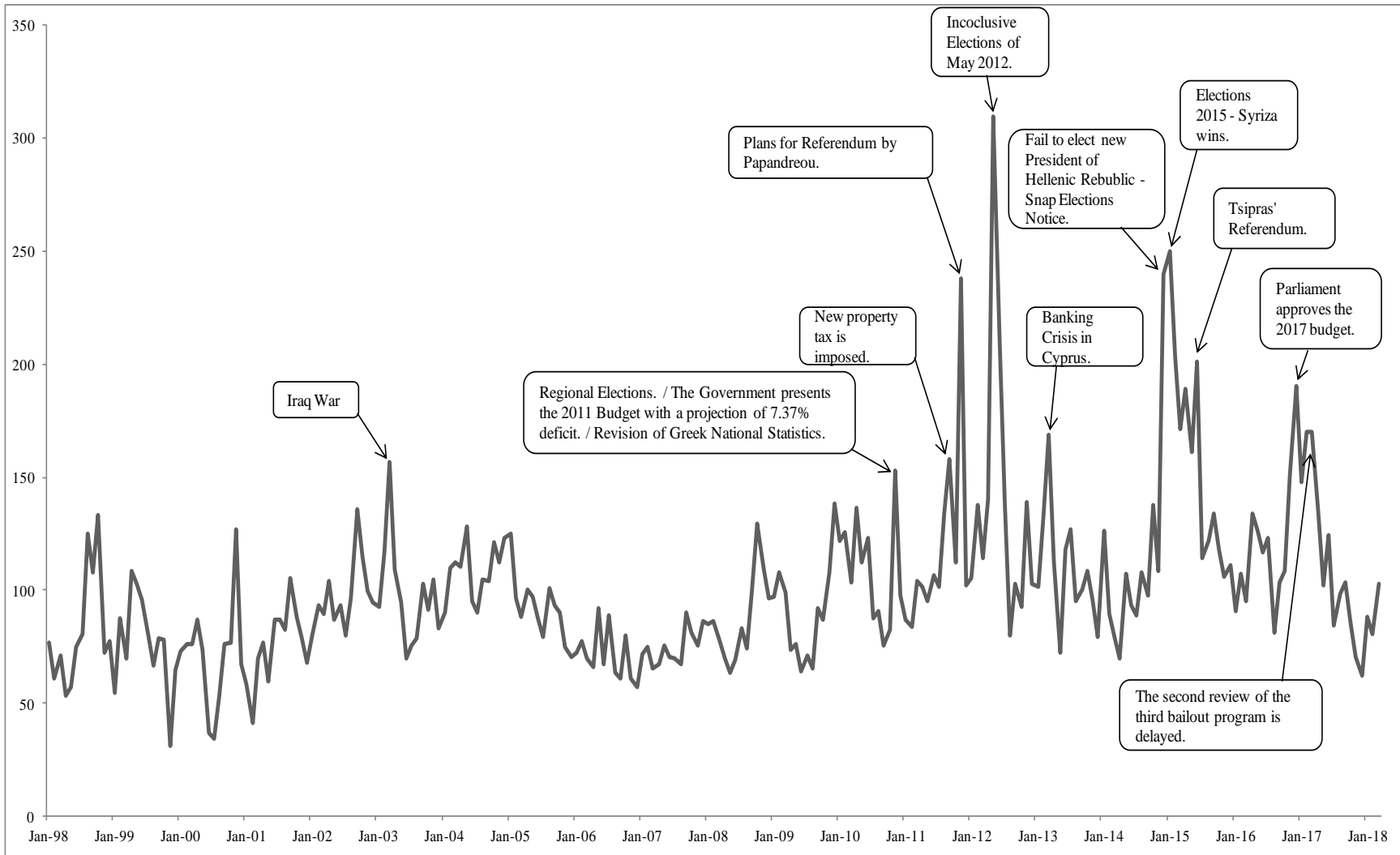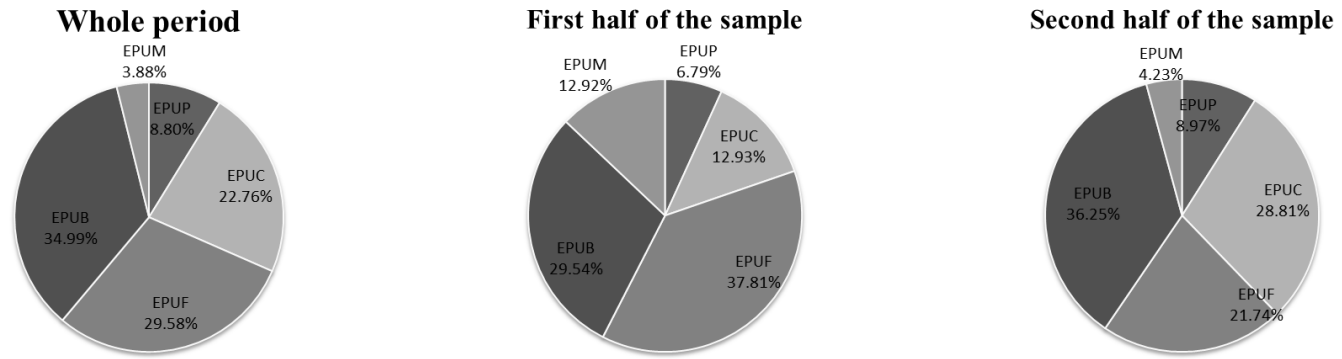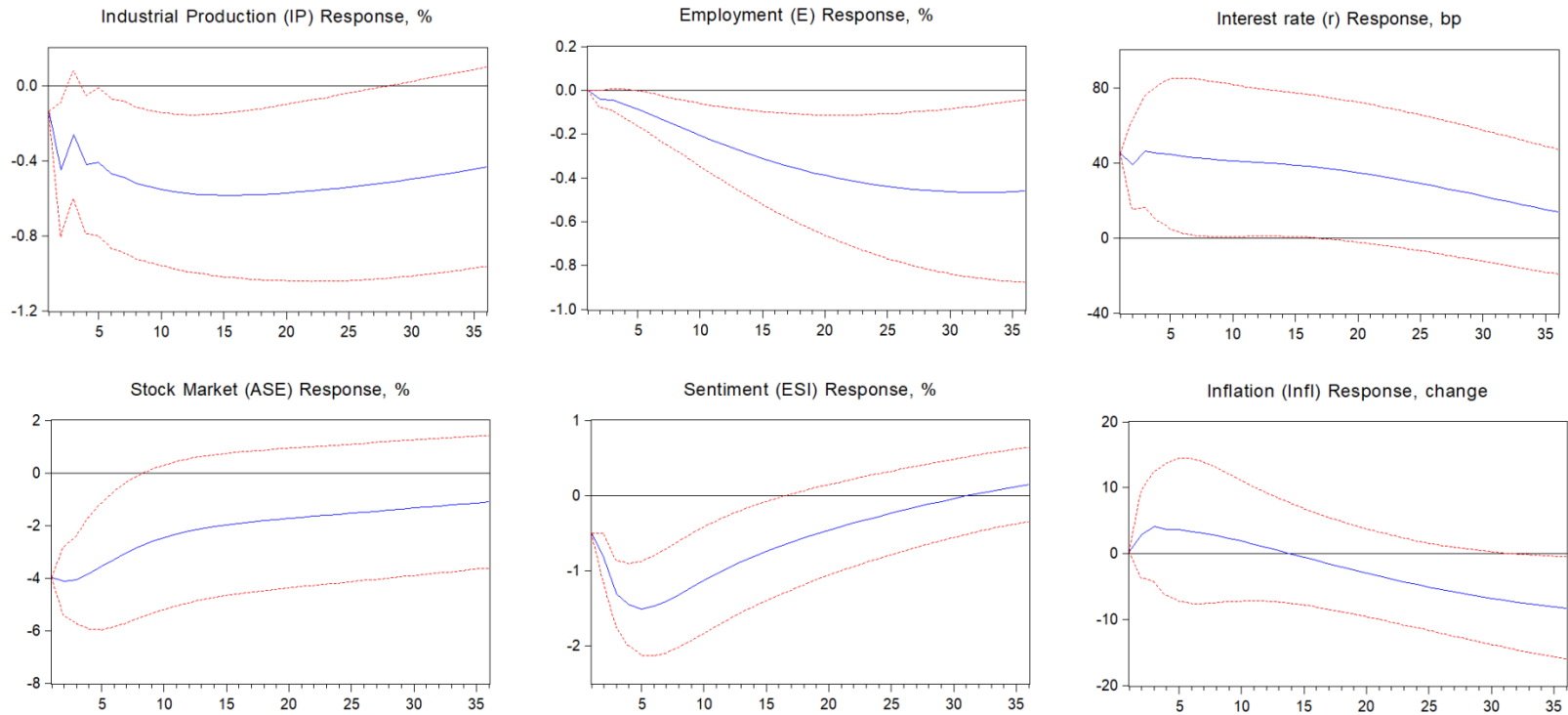
Figure 3: Political Uncertainty Index (POLU)

Figure 4: The contribution of each category-specific EPU index on EPU

Whole period	First half of the sample	Second half of the sample
EPUM 3.88%	EPUM 12.92%	EPUM 4.23%
EPUP 8.80%	EPUP 6.79%	EPUP 8.97%
EPUC 22.76%	EPUC 12.93%	EPUC 28.81%
EPUB 34.99%	EPUB 29.54%	EPUB 36.25%
EPUF 29.58%	EPUF 37.81%	EPUF 21.74%

Notes: The charts use the Lindeman, Merenda and Gold (1980) methodology to estimate the contribution of each category-specific uncertainty (among EPUB, EPUF, EPUC, EPUP, and EPUM) to the variability of EPU. In each sample period, the five percentages sum to 100%.

60

Figure 5:
Responses to a 22% EPU Shock
VAR(2) model, Monthly Data (1998:1-2017:12)

Industrial Production (IP) Response, %

Employment (E) Response, %

Interest rate (r) Response, bp

Stock Market (ASE) Response, %

Sentiment (ESI) Response, %

Inflation (Infl) Response, change

Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(EPU), r, log(ASE), log(E), log(IP), Infl, log(ESI). The blue solid line shows the estimated response. The red dashed lines represent the 95% confidence interval. The responses are measured in percentage changes or changes of the level of the dependent variable.

Figure 6: Response to a 22% EPU Shock, VAR(2), Monthly Data, 1998:1 – 2017:12
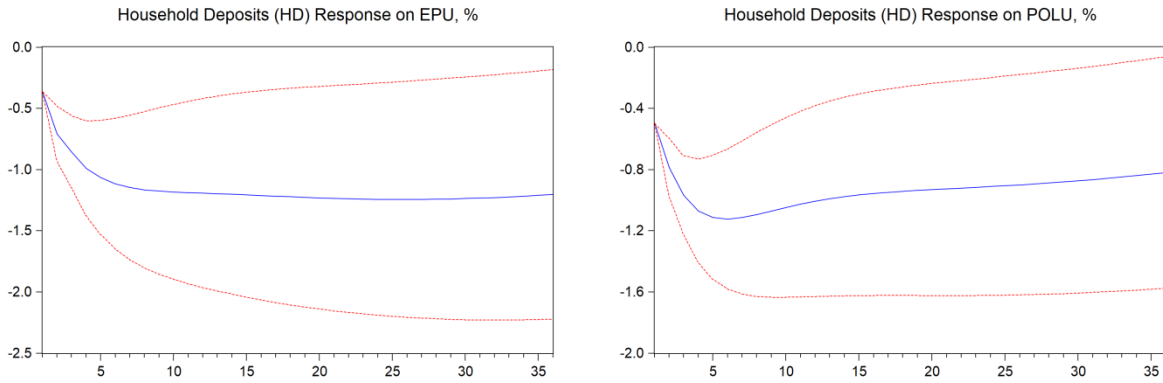
Notes: Definitions of variables are in Table 6. A VAR model with 2 lags and 7 variables, and a Choleski decomposition ordering: log(EPU), log of household deposits (HD), r, log(E), log(IP), Infl and log(ESI). The blue solid line shows the estimated response. The red dashed lines represent the 95% confidence interval. The responses are measured in percentage changes of the level of the dependent variable.

Figure 7: Responses to a 22% EPU Shock, VAR(2), Quarterly Data 1998:1-2017:4
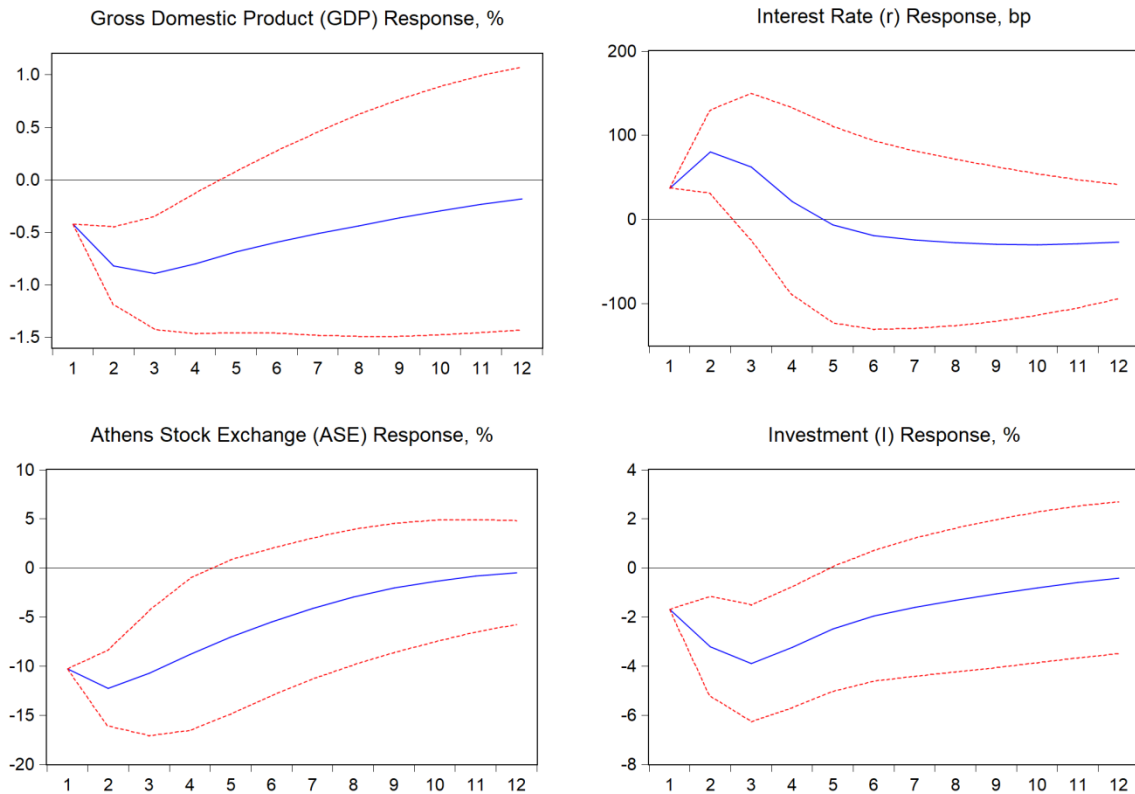
Notes: Definitions of variables are in Table 6. A VAR model with 2 lags and 5 variables, and a Choleski decomposition ordering of: log(EPU), r, log(ASE), log(I) where I represent real Investment, and log(GDP). The blue solid line shows the estimated response. The red dashed lines represent the 95% confidence interval. The responses are measured in percentage changes or changes of the level of the dependent variable.

Appendix

Table A1: Calendar

Year	Month	Description	Category	EPU	Δ(EPU Index) & Δ(EPU Index)%
1998	February	Legislation introduced that required labour regulations in loss-making public enterprises to be made more flexible.	Labour, Reform	63.95	-6.05 (-8.64%)
		Moody's places Greece's credit rating on watch for a possible downgrade.	Fiscal, Debt		
		The Kosovo war started and lasted until 11 June 1999.	International, Geopolitical		
1998	March	Entry of the drachma into the European exchange mechanism (ERM). The central rate is fixed at 357 drachma per ECU (a 12.3% devaluation against the latest market rate). Following the entry of the drachma into the ERM, the Government announced a number of accompanying measures aimed at containing inflation, strengthening fiscal adjustment, and accelerating structural reform.	Currency, Monetary, Fiscal, Reform	46.77	-17.18 (-26.87%)
1998	April	Bank of Greece issues its first monetary policy report following independence and announces a move towards inflation targeting.	Monetary	45.33	-1.43 (-3.06%)
1998	May	Social partners reached a two-year collective agreement, including, in particular, minimum wage increases for 1999 and 2000	Labour	58.12	12.79 (28.22%)
		Approval of a restructuring plan for the air carrier Olympic Airways (OA)	Fiscal, Reform		
		The Greek government issued first 15-year fixed-rate bonds.	Fiscal, Debt		
1998	June	The Greek government presented a labour bill aimed at increasing flexibility of the labour market.	Labour	72.84	14.71 (25.32%)
1998	July	Further opening of the Greek air traffic market to competition, including the removal of any constraints on charter services and full access to the Greek islands, as well as the elimination of Olympic Airway's monopoly on ground handling.	Regulatory, Reform	84.10	11.26 (15.46%)
		Sale of 97% of the shares of the Bank of Crete by the Greek State to the privately-owned Eurobank for Dr 93 billion.	Fiscal, Privatization		
		Public offering for 23 % of Hellenic	Fiscal,		

		Petroleum's share capital, which raised Dr 90 billion.	Privatization		
		Approval of a restructuring programme for the Greek Post (ELTA).	Fiscal, Reform		
1998	August	Russian Crisis: Russia devalues the Ruble and default on its debt.	International	153.92	69.82 (83.02%)
1998	September	The EU economy and Finance Minister Council has approved Greece's application for including the drachma into the ERM-2 as of January1, 1999.	Currency	141.03	-12.89 (-8.37%)
1998	October	The Greek government announced a tax cut on heating oil and on gasoline.	Fiscal, Tax	98.02	-43.02 (-30.50%)
		Approval of a restructuring plan for the rail transport company (OSE).	Fiscal, Reform		
		The regional elections of 1998 in Greece were the second since the regions were established as elected Local Authorities.	Political, Local Elections		
1998	November	Standard and Poor's upgrades Greece's credit rating from BBB- to BBB.	Fiscal, Debt	53.26	-44.75 (-45.66%)
		The Greek Government presents to the Parliament the 1999 Budget, which projects a general government deficit of 1.76% of GDP.	Fiscal, Debt Budget		
1998	December	The Greek Parliament approves the 1999 Budget.	Fiscal, Debt Budget	57.76	4.49 (8.44%)
1999	January	Deutsche Bank is authorised to acquire 10% of the share capital of Eurobank. The Bank of Piraeus is authorised to acquire 43.8% of the share capital of Xiosbank.	Bank	63.00	5.25 (9.08%)
		Establishment by the Bank of Greece of a general framework of minimum quantitative criteria for assessing the adequacy of provisions made by credit institutions for claims arising from lending.	Bank, Regulatory		
1999	February	Prime Minister Simitis reshuffles his cabinet.	Political	101.68	38.68 (61.40%)
		Moody's places Greece's credit rating on a positive outlook	Fiscal, Debt		
1999	April	The Bank of Greece establishes, on a monthly basis, competitive interest rate tenders for the acceptance of three-month deposits.	Monetary, Bank	117.62	39.22 (50.02%)
		Introduction by the Bank of Greece of credit restrictions in the form of non-remunerated deposits, if credit grows above specific limits.	Bank, Regulatory		
1999	June	European Parliament elections are held. New Democracy (ND) wins the elections.	Political, EU Elections	103.14	4.96 (5.05%)
1999	July	Sale of a fourth tranche, 14%, of the Hellenic Telecommunications Organisation	Fiscal, Privatization	89.63	-13.52 (-13.11%)

		(OTE).			
		Tightening of credit restrictions for consumer credit.	Bank, Regulatory		
		Moody's upgrades Greece's credit rating from Baa1 to A2.	Fiscal, Debt		
1999	August	Fitch places Greece's credit rating on watch for a possible upgrade.	Fiscal, Debt	73.01	-16.62 (-18.54%)
1999	September	A strong earthquake strikes in Athens. Around 150 people lose their lives, thousands of people are injured, hundreds of buildings collapse and thousands of buildings have to be demolished in the aftermath of the earthquake.	Special: Natural Disaster	65.67	-7.33 (-10.05%)
		The Athens Stock Exchange General Index falls by 12.7% on September 23. It's the start of a long way down for the following years. From the start of 1999 until September 17, the General Index had increased by 118%.	Stock market		
1999	October	Fitch upgrades Greece's credit rating from BBB to BBB+.	Fiscal, Debt	77.39	11.72 (17.85%)
1999	November	The Greek Government presents to the Parliament the 2000 Budget, which projects a general government deficit of 0.79% of GDP.	Fiscal, Debt Budget	82.13	4.73 (6.11%)
		The Greek Parliament approves the 2000 Budget.	Fiscal, Debt Budget		
		Standard and Poor's upgrades Greece's credit rating from BBB to A-.	Fiscal, Debt		
2000	January	Revaluation of the central rate of the drachma by 3%.	Currency, Monetary	77.06	18.30 (31.15%)
2000	February	Greece meets the last criterion for EMU membership, that on inflation.	Monetary	101.48	24.42 (31.68%)
2000	March	Fitch places Greece's credit rating on watch for possible upgrade.	Fiscal, Debt	65.17	-36.31 (-35.78%)
2000	April	Expiration of the credit restraining measures. In April 1999, the Bank of Greece introduced temporary reserve requirements in the form of non-remunerated deposits equivalent to the growth of credit above specified rates to mop up liquidity and delay cuts in bank lending rates	Bank, Regulatory	74.10	8.94 (13.71%)
		National elections are held, PASOK wins with 43.79% (158 of 300 seats) and Kostas Simitis is sworn in as the new Prime Minister.	Political, National Elections		
2000	May	A public dispute outbursts over the issue of the reporting of the religion of citizens in their national ID cards.	Political	72.15	-1.95 (-2.64%)

2000	June	The European Council accepts Greece as a member in the EMU from January 2001.	Currency	52.51	-19.64 (-27.23%)
		Senior British diplomat Brigadier Stephen Saunders shot dead in Athens by left-wing guerrilla group November 17.	Special: Terrorism		
2000	July	The Bank of Greece reduces the minimum reserve requirement for commercial banks from 12% to 2% (the level mandated by the ECB).	Monetary, Bank	42.65	-9.86 (-18.78%)
		Fitch upgrades Greece's credit rating from BBB+ to A-.	Fiscal, Debt		
2000	September	Floating of 15% of Cosmote on the Athens Stock Exchange.	Fiscal, Privatization	116.08	37.91 (48.50%)
2000	November	George W. Bush wins the US Presidential elections	International	155.75	51.59 (49.54%)
		The Greek Government presents to the Parliament the 2001 Budget, which projects a general government surplus of 0.48% of GDP.	Fiscal, Debt Budget		
2000	December	The Greek Parliament approves the 2001 Budget.	Fiscal, Debt Budget	63.70	-92.05 (-59.10%)
		The Bank of Greece aligns its key interest rates with perspective rates of the European Central Bank (ECB), in view of Greece's entry into the Euro area as from 1 January 2001.	Monetary		
2001	January	Greece becomes member of the European Economic and Monetary Union with a fixed conversion rate of 340.75 drachmas per Euro. The adoption of euro is set to be done one year later.	Currency, Monetary	101.72	38.03 (59.70%)
		The telecommunication sector is being liberalised, following the fixed-voice telephony market.	Regulatory, Reform		
2001	March	The European Commission approves the targets of the Greek government's 2000 Stability and Growth Programme for the 2000-04 period.	Fiscal, Reform	115.23	54.55 (89.89%)
		Standard and Poor's upgrades Greece's credit rating from A- to A.	Fiscal, Debt		
		The Greek government initiates a new health care reform programme with an implementation horizon of 6 years.	Fiscal, Reform		
2001	April	The 2000 legislation for labour markets (Law 2874/2000) comes into force. It provides for new "making-work-pay" measures to encourage part-time employment; reduced ceilings for the weekly overtime at the employers' discretion; increased premia for overtime;	Labour, Reform	136.65	21.42 (18.59%)

		and a 2% reduction of the employers' social security contributions for low-wage workers.			
2001	June	A new one-year collective agreement for the banking sector is being concluded which increases basic pay and allowances by 4.2%.	Bank, Labour	146.56	52.18 (55.29%)
		Fitch upgrades Greece's credit rating from A- to A.	Fiscal, Debt		
2001	July	The Bank of Greece approves the participation of two major credit institutions in the development of an e-money scheme, which is planned to be implemented gradually on a nation-wide basis, using the technology of major European e-money schemes.	Bank, Regulatory, Reform	144.25	-2.31 (-1.58%)
2001	September	September 11 terrorist attacks.	International, Terrorism	166.45	47.39 (39.81%)
2001	October	The Afghanistan war started, following the September 11 attacks in 2001.	International, Geopolitical	149.17	-17.27 (-10.38%)
		The acquisition of the Hellenic Bank for Industrial Development (ETBA) by the Bank of Piraeus implies the privatisation of the ETBA.	Fiscal, Bank, Privatization		
		Prime Minister Simitis reshuffles his cabinet.	Political		
2001	November	The Greek Government presents to the Parliament the 2002 Budget, which projects a general government surplus of 0.83% of GDP.	Fiscal, Debt Budget	107.79	-41.38 (-27.74%)
2001	December	The Greek Parliament approves the 2002 Budget.	Fiscal, Debt Budget	70.79	-37.01 (-34.33%)
		The Greek government submits to the European Commission the 2001 Hellenic Updated Stability and Growth Programme for 2001-04, revised in the light of the adverse international developments.	Fiscal, Reform		
2002	January	A package of tax measures comes into effect which may entail budgetary costs of around 0.5 % of GDP. The measures comprise of tax relief for wage earners and businesses and elements which aim at the promotion of employment. The package also addresses the problems of the uneven taxation of capital income and the high cost of tax administration.	Fiscal, Tax	68.11	-2.68 (-3.78%)
		Euro banknotes and coins are introduced in Greece.	Monetary, Currency		
2002	March	Greek, Turkish governments agree to build gas pipeline through which Turkey will	Geopolitical, Energy	93.28	-4.79 (-4.88%)

		supply Greece with gas.			
2002	April	The National General Collective Agreement for the period 2002-03 is being concluded, which provides for pay increases of 5.4% in 2002 and 3.9% in 2003, along with a variety of amendments to employment and social conditions.	Labour	127.21	33.92 (36.37%)
2002	July	Suspected leader and members of November 17 terror group arrested after one of them is injured, allegedly by his own bomb, and provides information to police.	Special: Terrorism	87.04	5.97 (7.37%)
2002	September	US government initiates an international discussion about a military action against Iraq.	International, Geopolitical	155.71	47.13 (43.41%)
2002	October	Regional elections are held.	Political, Regional Elections	141.28	-14.43 (-9.27%)
2002	November	Moody's upgrades Greece's credit rating from A2 to A1.	Fiscal, Debt	103.02	-38.25 (-27.08%)
		The Greek Government presents to the Parliament the 2003 Budget, which projects a general government deficit of 0.91% of GDP.	Fiscal, Debt, Budget		
2002	December	The Greek Parliament approves the 2003 Budget.	Fiscal, Debt, Budget	95.74	-7.29 (-7.07%)
2003	March	The Iraq war started in 2003 with the invasion of Iraq by a United States-led coalition that overthrew the government of Saddam Hussein.	International, Geopolitical	188.74	66.15 (53.96%)
2003	June	Standard and Poor's upgrades Greece's credit rating from A to A+.	Fiscal, Debt	81.53	-30.82 (-27.43%)
2003	July	Prime Minister Simitis reshuffles his cabinet.	Political	71.17	-10.36 (-12.71%)
2003	October	Fitch upgrades Greece's credit rating from A to A+/	Fiscal, Debt	79.49	-14.28 (-15.23%)
2003	November	The Greek Government presents to the Parliament the 2004 Budget, which projects a general government deficit of 1.24% of GDP.	Fiscal, Debt Budget	91.67	12.18 (15.33%)
2003	December	The Greek Parliament approves the 2004 Budget.	Fiscal, Debt Budget	81.24	-10.42 (-11.37%)
		Trial of November 17 suspects ends with their conviction. Head of group and its main hitman jailed for life.	Special: Terrorism		
2004	February	Kostas Simitis calls March elections and stands down as Pasok leader.	Political	61.39	-18.87 (-23.51%)
2004	March	National elections are held, New Democracy (ND) wins with 45.36 % (165 of 300 seats) and Kostas Karamanlis is	Political, National Elections	88.09	26.70 (43.49%)

		sworn in as the new Prime Minister.			
2004	April	A referendum regarding the approval of U.N. secretary Annan's plan about a solution in the Cyprus dispute is held in Cyprus. Greek Cypriots reject the plan.	International, Geopolitical, Political	87.75	-0.34 (-0.38%)
2004	May	Cyprus enters into the European Union.	International, Geopolitical, Political	107.14	19.39 (22.10%)
2004	June	New Democracy (ND) wins the European Parliament elections.	Political, EU Elections	87.56	-19.58 (-18.27%)
2004	August	Athens hosts Olympic Games.	Special: Olympic Games	89.26	10.15 (12.83%)
2004	September	Fitch and Standard and Poor's places Greece's credit rating on a watch for downgrade.	Fiscal, Debt	99.83	10.57 (11.84%)
2004	November	Greek government officials admit that the country's public deficit breached the European Union cap between 2000 and 2003, as the cost of hosting the 2004 summer Olympics reached €7 billion.	Fiscal, Debt	77.40	-19.54 (-20.16%)
		The Greek Government presents to the Parliament the 2005 Budget, which projects a general government deficit of 2.84% of GDP.	Fiscal, Debt Budget		
		George W. Bush wins the US Presidential elections	International		
		Standard and Poor's downgrades Greece's credit rating from A+ to A.	Fiscal, Debt		
2004	December	The Greek Parliament approves the 2005 Budget.	Fiscal, Debt Budget	100.99	23.59 (30.48%)
		European Commission issues formal warning after Greece found to have falsified budget deficit data in run-up to joining eurozone.	Fiscal, Debt		
		Fitch downgrades Greece's credit rating from A+ to A.	Fiscal, Debt		
2005	March	Widespread surveillance of the cell phones of members of the Greek government is revealed.	Political, Special: National Security	71.94	-16.36 (-18.52%)
2005	April	Parliament ratifies EU constitution.	International, Geopolitical, Political	91.53	19.59 (27.23%)
2005	June	New legislation about the pension system of the banking sector's employees.	Bank, Pension	93.38	20.48 (28.10%)
2005	November	The Greek Government presents to the Parliament the 2006 Budget, which projects a general government deficit of 2.59% of GDP.	Fiscal, Debt Budget	72.56	-0.18 (-0.24%)

2005	December	The Greek Parliament approves the 2006 Budget.	Fiscal, Debt Budget	69.05	-3.52 (-4.85%)
		Amid protest strikes by transport workers, parliament approves changes to labour laws, including an end to jobs for life in the public sector. The plans sparked industrial action in June.	Labour, Reforms		
2006	February	Prime Minister Karamanlis reshuffles his cabinet.	Political	50.99	2.25 (4.61%)
2006	March	Greece's public sector deficit rises to 6.1% of GDP, well above the eurozone's permitted ceiling of 3%. The government announces €3.5 billion of public spending cuts.	Fiscal, Debt	69.73	18.74 (36.75%)
2006	May	Greek and Turkish fighter planes crash into the Aegean after colliding in mid-air.	Geopolitical, Special: National Security	74.71	-6.57 (-8.08%)
2006	June	The European Commission announces that the Greek economy would no longer need 'monitoring' because Athens had succeeded in cutting its budget deficit, from 6.6% to the permissible level of 3%.	Fiscal, Debt	54.72	-19.98 (-26.75%)
2006	July	The Israel – Lebanon war started. It was a 34-day military conflict in Lebanon, Northern Israel and the Golan Heights.	International, Geopolitical	82.97	28.24 (51.61%)
2006	September	Greece, Russia and Bulgaria back a long-awaited deal to build an oil pipeline which will carry Russian oil to Europe via Alexandropoulis in Greece.	Geopolitical, Energy	60.92	14.16 (30.27%)
2006	October	Regional elections are held	Political, Regional Elections	49.98	-10.95 (-17.97%)
2006	November	The Greek Government presents to the Parliament the 2007 Budget, which projects a general government deficit of 2.44% of GDP.	Fiscal, Debt Budget	39.19	-10.79 (-21.59%)
2006	December	The Greek Parliament approves the 2007 Budget.	Fiscal, Debt Budget	41.91	2.72 (6.95%)
2007	January	Moody's places Greece's credit rating on a watch for a possible upgrade.	Fiscal, Debt	39.50	-2.41 (-5.75%)
2007	February	The ND government survives a no-confidence vote and promises to forge ahead with reforms.	Political	58.92	19.42 (49.16%)
		Fitch places Greece's credit rating on a watch for a possible upgrade.	Fiscal, Debt		
2007	March	A public dispute outbursts regarding the investment practices of some Greek pension funds that buy structured bonds.	Pension, Fiscal, Political	61.71	2.79 (4.74%)
2007	August	Government, seeking a fresh mandate for	Political	60.23	5.14

		its reforms, sets date for early elections at 16 September.			(9.33%)
		Wildfires sweep through tinder-dry forests across the mainland and islands, killing dozens of people.	Special: Natural Disaster		
2007	September	National elections are held, ND wins with 41.84% (152 of 300 seats) and Kostas Karamanlis is sworn in as the new Prime Minister.	Political, National Elections	74.24	14.01 (23.25%)
2007	November	The Greek Government presents to the Parliament the 2008 Budget, which projects a general government deficit of 1.64% of GDP.	Fiscal, Debt Budget	72.00	0.54 (0.75%)
2007	December	The Greek Parliament approves the 2008 Budget.	Fiscal, Debt Budget	85.21	13.22 (18.36%)
2008	January	Cyprus enters to the Euro zone.	International, Currency, Monetary	84.73	-0.49 (-0.57%)
2008	March	Greece blocks Macedonia's bid to join Nato because of unresolved dispute over former Yugoslav republic's name.	Geopolitical	86.68	7.56 (9.56%)
		Parliament narrowly passes government's controversial pension reform bill in face of general public sector strike and mass protests.	Pension, Reform		
2008	September	Public dispute outbursts regarding some transactions between Greek state and a Greek-Orthodox monastery ("Moni Vatopediou"). Members of the Government of Nea Dimokratia are involved.	Political	122.33	57.43 (88.49%)
2008	November	Barack Obama wins the US Presidential elections.	International	111.78	-60.65 (-35.17%)
		The Greek Government presents to the Parliament the 2009 Budget, which projects a general government deficit of 2.02% of GDP.	Fiscal, Debt Budget		
2008	December	The Greek Parliament approves the 2009 Budget.	Fiscal, Debt Budget	110.83	-0.95 (-0.85%)
		Students and young people take to city streets in nationwide protests and riots over the police killing of a 15-year-old boy in Athens. Major public-sector strikes coincide to increase pressure on the government over its economic policies.	Special: Generalized Riots		
2009	January	Prime Minister Karamanlis reshuffles his cabinet.	Political	114.92	4.09 (3.69%)
		Standard and Poor's downgrades Greece's credit rating from A to A-.	Fiscal, Debt		
2009	February	Terrorist attack to the Greek Headquarters	Special:	125.92	11.00

		of Citibank.	Terrorism, Bank		(9.58%)
2009	May	Fitch places Greece's credit rating on a watch for possible downgrade.	Fiscal, Debt	76.37	-2.51 (-3.18%)
2009	June	PASOK wins the European Parliament elections.	Political, EU Elections	66.01	-10.36 (-13.56%)
2009	October	National elections are, PASOK wins with 43.92 % (160 of 300 seats) and George Panandreou is sworn in as the new Prime Minister.	Political, National Elections	75.93	-6.59 (-7.98%)
		Greece's budget deficit is expected to reach approximately 12.5% of GDP, according to disclosure by George Papaconstantinou, finance minister in Greece's new PASOK government (Cabinet of George Papandreou). This deficit exceeds a threshold of 3% of GDP which was set in the Stability and Growth Pact for all eurozone member states.	Fiscal, Debt		
		Fitch downgrades Greece's rating from A to A-.	Fiscal, Debt		
2009	November	The Greek Government presents to the Parliament the 2010 Budget, which projects a general government deficit of 9.08% of GDP.	Fiscal, Debt Budget	115.60	39.67 (52.24%)
2009	December	The Greek Parliament approves the 2010 Budget.	Fiscal, Debt Budget	143.46	27.87 (24.11%)
		Greece's credit rating is downgraded by Fitch (from A- to BBB+), Moody's (from A1 to A2) and Standard and Poor's from (A- to BBB+) .	Fiscal, Debt		
2010	January	The Greek/German 10-year debt yield spread surpasses 300 basis points.	Fiscal, Debt	124.05	-19.42 (-13.53%)
2010	February	The First austerity package is passed by the Greek parliament. Measures include: a freeze in the salaries of all government employees, a 10% cut in bonuses, and cuts in overtime workers.	Fiscal, Labour	140.07	16.02 (12.91%)
2010	March	The Second austerity package is passed by the Greek parliament. Measures include: a freeze in pensions; an increase in VAT from 19% to 21%; rises in taxes on fuel, cigarettes, and alcohol; rises in taxes on luxury goods; and cuts in public sector.	Fiscal, Taxes, Pensions	117.18	-22.89 (-16.34%)
		EU Leaders Summit: Member States agree to set up a support mechanism for Greece.	Fiscal, Debt		
2010	April	Greece's credit rating is downgraded by Fitch (from BBB+ to BBB-, Moody's (from A2 to A3) and Standard and Poor's (from BBB+ to BB+).	Fiscal, Debt	186.89	69.72 (59.50%)

		Prime Minister George Papandreou formally requests an international bailout for Greece. The European Union (EU), the European Central Bank (ECB) and the International Monetary Fund (IMF) agree to participate in the bailout.	Fiscal, Debt		
		The Greek/German 10-year debt yield spread surpasses 1000 basis points.	Fiscal, Debt		
2010	May	The IMF, Greek Prime Minister Papandreou, and other eurozone leaders agree to the First bailout package for €110 billion ($143 billion) over 3 years. The Third austerity package is announced by the Greek government.	Fiscal	131.71	-55.18 (-29.53%)
		EU Leaders Summit: Member States agree on the creation of the European Stability Mechanism and the European Financial Stability Facility.	Fiscal, Debt		
		Greece-wide riots and popular revolt break out as Greece turns violent. There is a 48-hour nationwide strike and demonstrations in two major cities. Three people are killed when a group of masked people throw petrol bombs in a Marfin Egnatia Bank branch on Stadiou street.	Special: Generalized Riots		
		The Third austerity package is passed by the Greek parliament.	Fiscal		
2010	June	Moody's downgrades Greece's credit rating from A3 to Ba1.	Fiscal, Debt	121.46	-10.25 (-7.78%)
2010	July	Eurogroup: The European Commision (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF) make a joint statement that the macroeconomic state in Greece is compatible with the scenario supported by the bailout program.	Fiscal, Debt	81.96	-39.51 (-32.53%)
		The Greek parliament passes pension reform, a key requirement of the EU and IMF. Measures include: increasing retirement age from 60 to 65 for women. The reforms cut prospective payments from 25% of GDP by 2050. Additional pension reforms come in November 2012.	Pension, Reform		
2010	September	Prime Minister Papandreou reshuffles his cabinet.	Political	84.96	-13.97 (-14.12%)
2010	November	Regional elections are held.	Political, Regional Elections	127.17	46.26 (57.17%)
		The Greek Government presents to the Parliament the 2011 Budget, which	Fiscal, Debt Budget		

Year	Month	Event	Category	Value	Change
		projects a general government deficit of 7.37% of GDP.			
		The Greek National Statistics are revised.	Fiscal, Debt		
2010	December	The Greek Parliament approves the 2011 Budget.	Fiscal, Debt Budget	100.32	-26.86 (-21.12%)
		The Arab Spring was a revolutionary wave of both violent and non-violent demonstrations, protests, riots, coups and civil wars in North Africa and the Middle East that began on 17 December 2010 in Tunisia with the Tunisian Revolution.	International, Geopolitical		
		Greece's credit rating is placed on watch for possible downgrade, by Fitch, Moody's and Standard and Poor's.	Fiscal, Debt		
		The Greek parliament passes a new law regarding state-owned companies. The law sets a cap on monthly wages and introduces 10% cuts on salaries above €1,800.	Fiscal, Labour, Reforms,		
2011	January	Fitch downgrades Greece's credit rating from BBB− to BB+.	Fiscal, Debt	95.83	-4.48 (-4.47%)
		(Arab Spring) Tunisian government overthrown on 14 January.	International, Geopolitical		
2011	February	(Arab Spring) Egyptian government overthrown on February.	International, Geopolitical	84.17	-11.66 (-12.17%)
2011	March	Greece's credit rating is downgraded by Moody's (from Ba1 to B1) and Standard and Poor's (from BB+ to BB-).	Fiscal, Debt	91.06	6.89 (8.18%)
		EU Leaders Summit: Agreement on better lending conditions for Greece (lower lending rate and longer repayment horizon).	Fiscal, Debt		
2011	May	Greece's credit rating is downgraded by Fitch (from BB+ to B+) and Standard and Poor's (from BB- to B).	Fiscal, Debt	103.59	-1.01 (-0.96%)
		Eurogroup: Greek government is urged to undertake more austerity measures.	Fiscal, Debt		
		The Greek Indignant Citizens Movement (also known as the Square Movement) starts daily protests. It is inspired by a similar movement in Spain.	Special: Generalized Protests		
2011	June	Greece's credit rating is downgraded by Moody's (from B1 to Caa1) and Standard and Poor's (from B to CCC).	Fiscal, Debt	115.74	12.15 (11.73%)
		Prime Minister Papandreou reshuffles his cabinet.	Political		
		The Fourth austerity package is passed by the Greek parliament despite protests outside the parliament building. The two-day demonstrations against the bill turn	Fiscal, Labour, Tax, Special: Generalized riots		

		violent as protesters clash with police in front of the Greek parliament and other areas of central Athens. The measures in the austerity package include new taxes and new cuts of workers' wages.			
2011	July	EU summit reaches an agreement for a new loan of €158 billion.	Fiscal, Debt	113.59	-2.15 (-1.86%)
		Greece's credit rating is downgraded by Fitch (from B+ to CCC), Moody's (from Caa1 to Ca) and Standard and Poor's (from CCC to CC).	Fiscal, Debt		
		(Arab Spring) Civil uprising in Syria, which transformed into Syrian Civil war.	International, Geopolitical		
2011	August	(Arab Spring) Libya's government overthrown August 23.	International, Geopolitical	130.54	16.95 (14.92%)
2011	September	The Greek parliament imposes a new property tax to be collected through the electricity bill.	Fiscal, Tax	151.56	21.02 (16.10%)
2011	October	The Fifth austerity package is passed by the Greek parliament, amid protests and violent rioting outside the parliament building.	Fiscal	120.47	-31.09 (-20.51%)
		An agreement has been reached in EU summit for a 50% "haircut" in the Greek sovereign debt. Investors agree to a "haircut" of 50% in converting their existing bonds into new loans.	Fiscal, Debt		
		Proton Bank is nationalized after it becomes evident that it needs a capital injection from the Financial Stability Fund (FSF).	Fiscal, Banking		
		Greek Prime Minister Papandreou calls for a confidence vote and a referendum to approve the EU summit deal from the previous week regarding the Greek debt haircut. (31st of October)	Political, Referendum		
2011	November	Prime Minister Papandreou wins the confidence vote 153–145, and resigns.	Political	180.13	59.66 (49.52%)
		Lucas Papademos becomes the new Greek Prime Minister, as the leader of a coalition government consisting of the PASOK, New Democracy, and LAOS parties.	Political		
		The Greek Government presents to the Parliament the 2012 Budget, which projects a general government deficit of 5.38% of GDP.	Fiscal, Debt Budget		
2011	December	The Greek Parliament approves the 2012 Budget.	Fiscal, Debt Budget	97.83	-82.29 (-45.69%)
2012	February	Greece's credit rating is downgraded by Fitch (from CCC to C) and Standard and	Fiscal, Debt	126.13	29.02 (29.88%)

		Poor's (from CC to SD).			
		The Sixth austerity package is passed by the Greek parliament amid violent protests. Many buildings in the centre of Athens are burned during the riots.	Fiscal, Special: Generalized Riots		
		The Second bailout package is finalized. It brings the total amount of Eurozone and IMF bailouts to €246 billion by 2016, which is 135% of Greece's GDP in 2013. A restructuring deal for the Greek sovereign debt is finalized, affecting around 206€ of bonds.	Fiscal		
		(Arab Spring) Yemen's government overthrown on February.	International, Geopolitical		
2012	March	Completion of the restructuring of Greek sovereign debt (PSI). The participation of the private sector reaches the 95.7%.	Fiscal, Debt	94.64	-31.49 (-24.97%)
		Greece's credit rating is downgraded by Fitch (from C to RD) and Moody's (from Ca to C).	Fiscal, Debt		
		Fitch upgrades Greece's credit rating from RD to B-.	Fiscal, Debt		
		Greek 10-year bond yields reach a peak of 44.21% on the eve of debt restructuring. 83.5% of Greek bondholders are in the private sector.	Fiscal, Debt		
2012	May	National elections are held, ND wins with 18.85% (108 of 300 seats). The former governing PASOK party collapses, while more votes go to the left wing parties (Syriza, KKE, and DIMAR) and right wing parties (ANEL, XA). No party wins the majority of the parliament seats.	Political	179.92	51.76 (40.39%)
		Standard and Poor's upgrades Greece's credit rating from SD to CCC.	Fiscal, Debt		
		No coalition government is able to be formed, so Panagiotis Pikramenos assumes the position of caretaker Prime Minister. An early election is called for 17 June.	Political		
		Fitch downgrades Greece's credit rating from B- to CCC.	Fiscal, Debt		
2012	June	Early national elections are held, ND wins with 29.66% (129 of 300 seats), but doesn't win a majority of seats in parliament. Four days later, a coalition government is formed between ND, PASOK with 12.28% (33/300) and DIMAR with 6.26% (17/300). Antonis Samaras, the president of ND, is sworn as the new Prime Minister.	Political	171.36	-8.56 (-4.76%)
2012	July	ECB President Mario Draghi's statement	Monetary	136.01	-35.34

					(-20.63%)
		Piraeus Bank acquires the so-called 'good' Agricultural Bank (selected assets and liabilities).	Bank		
2012	August	Standard and Poor's places Greece's credit rating on a watch for possible downgrade.	Fiscal, Debt	81.04	-54.97 (-40.42%)
2012	November	The Seventh austerity package is adopted by the Greek parliament. The austerity measures are required for Greece to receive the next installment, of the second economic bailout, worth €31.5 billion. Protests occurs outside the parliament. Austerity measures include: public pension cuts on average between 5% and 15% through the removal of two seasonal bonuses; an increase of the retirement age from 65 to 67; additional wage cuts for civil servants up to 20%; and public salary wage cuts up to 30%.	Fiscal, Labour, Pension, Reforms	134.90	36.48 (37.06%)
		Barack Obama wins the US Presidential elections.	International		
		The Greek Government presents to the Parliament the 2013 Budget, which projects a general government deficit of 5.16% of GDP.	Fiscal, Debt Budget		
2012	December	The Greek Parliament approves the 2013 Budget.	Fiscal, Debt Budget	126.98	-7.92 (-5.87%)
		Standard and Poor's downgrades Greece's credit rating from CCC to SD.	Fiscal, Debt		
		Standard and Poor's upgrades Greece's credit rating from SD to B-.	Fiscal, Debt		
		Piraeus Bank acquires Societe Generale's Geniki Bank.	Bank		
2013	January	Eurogroup: Agreement on funding (€7.2 billion) for Greek banks recapitalization.	Fiscal, Debt, Bank	98.36	-28.62 (-22.54%)
2013	March	The Cypriot government and the European creditors reach an agreement for a €10 billion bailout deal. The deal safeguards small savers, inflicts heavy losses on uninsured depositors, including wealthy Russians, and keeps the country in the eurozone.	International, Bank	144.95	45.69 (46.03%)
		Piraeus Bank takes over the Greek branches of Bank of Cyprus, Hellenic Bank and Cyprus Popular Bank.	Bank		
2013	April	The Greek parliament approves a reform bill: it abolishes 15,000 state jobs by the end of 2014, including 4,000 in 2013;	Fiscal, Labour, Tax, Reforms	117.71	-27.24 (-18.79%)

		makes it easier to fire civil servants; increases the working hours of teachers; and cuts a property tax by 15%			
2013	May	Sale of 33% of the shares of OPAP (leading gaming company in Greece) to Emma Delta for €700 million.	Fiscal, Privatization	91.96	-25.75 (-21.88%)
		Fitch upgrades Greece's credit rating from CCC to B-.	Fiscal, Debt		
2013	June	The Greek parliament shuts down the country's Public Broadcasting Service ERT.	Fiscal, Labour, Reform	119.63	27.67 (30.09%)
		The Democratic Left party withdraws from the Greek coalition government, which retains a razor-thin majority in parliament.	Political		
		Prime Minister Samaras reshuffles his cabinet.	Political		
		Alpha Bank acquires the Greek department of Emporiki Bank from Credit Agricole.	Bank		
		Piraeus Bank takes over Millenium Bank.	Bank		
2013	July	A new reform bill is passed by the Greek parliament. Measures include a contentious plan for thousands of layoffs and wage cuts for civil service workers.	Fiscal, Reform	96.39	-23.25 (-19.43%)
2013	October	US Government shutdown due to disagreement between Democrats and Republicans about debt issues.	International, Debt	106.45	10.36 (10.79%)
2013	November	Moody's upgrades Greece's credit rating from C to Caa3.	Fiscal, Debt	104.38	-2.08 (-1.95%)
		The Greek Government presents to the Parliament the 2014 Budget, which projects a general government deficit of 2.3% of GDP.	Fiscal, Debt Budget		
2013	December	The Greek Parliament approves the 2014 Budget.	Fiscal, Debt Budget	63.20	-41.18 (-39.45%)
		A bill on the Single Property Tax and the auction of houses is approved by a majority of 152 parliament members in the 300-seat parliament.	Fiscal, Tax		
2014	January	Greece posts a primary budget surplus of 1.5% of GDP for the 2013 financial year (€691 million).	Fiscal, Debt	109.99	46.79 (74.04%)
2014	March	The Greek parliament passes a new multi-bill which is needed for Greece to receive its next bailout payment.	Fiscal, Reform, Political	66.12	-16.54 (-20.01%)
2014	April	Greece returns to financial markets with the issue of €3 billion bonds at a yield below 6%.	Fiscal, Debt	66.02	-0.10 (-0.15%)
2014	May	The Greek Parliament approves the Medium-term Fiscal Strategy plan 2015-2018.	Fiscal	92.13	26.11 (39.55%)

		Regional elections and European Parliament elections are held. Syriza wins the European Parliament elections.	Political, Regional Elections, EU Elections		
		Fitch upgrades Greece's credit rating from B− to B.	Fiscal, Debt		
2014	June	Prime minister Samaras reshuffles his cabinet.	Political	92.36	0.23 (0.25%)
		Alpha Bank takes over Citibank's Greek retail banking operations.	Bank		
2014	August	Moody's upgrades Greece's credit rating from Caa3 to Caa1.	Fiscal, Debt	105.98	22.44 (26.85%)
2014	November	The Greek Government presents to the Parliament the 2015 Budget, which projects a general government deficit of 0.2% of GDP.	Fiscal, Debt Budget	109.61	-36.16 (-24.81%)
2014	December	The Greek Parliament approves the 2015 Budget.	Fiscal, Debt Budget	224.74	115.13 (105.04%)
		Standard and Poor's upgrades Greece's credit rating from B- to B.	Fiscal, Debt		
		Parliament begins attempts to elect a new Hellenic Republic president to replace outgoing Karolos Papoulias, whose five-year presidential term was due to end in February.	Political		
		The government's candidate for the Hellenic Republic presidency, Stavros Dimas, fails to win majority support from parliament, and the government falls. This leads to snap parliamentary elections, which are set to be held on 25 January 2015.	Political		
2015	January	National elections are held, Syriza wins with 36.34% (149 of 300 seats). Syriza and the Independent Greeks (ANEL) with 4.75% (13/300) join to form a new coalition government. Alexis Tsipras is sworn in as the new Prime Minister.	Political	213.01	-11.72 (-5.22%)
		Greece's credit rating is placed on watch for possible downgrade, by Fitch and Standard and Poor's.	Fiscal, Debt		
		ECB President Mario Draghi announces an expanded asset purchase program by ECB, beginning in March 2015 (and for a minimum period of 18 months) with a total QE of at least €1.1 trillion.	Monetary		
2015	February	Eurogroup: Agreement for a four-month loan extension for Greece.	Fiscal	187.25	-25.76 (-12.10%)
		Standard and Poor's downgrades Greece's credit rating from B to B-.	Fiscal, Debt		

		Moody's places Greece's credit rating on a watch for a possible downgrade.	Fiscal, Debt		
2015	March	Fitch downgrades Greece's credit rating from B to CCC.	Fiscal, Debt	156.47	-30.78 (-16.44%)
2015	April	Greece's credit rating is downgraded by Moody's (from Caa1 to Caa2) and Standard and Poor's (from B- to CCC+).	Fiscal, Debt	197.99	41.52 (26.53%)
		The government, with an act of legislative content, transfers to the Bank of Greece all the cash reserves of government entities and local authorities.	Fiscal		
2015	June	Greece asks the IMF to postpone the instalment due on 5 June until the end of the same month.	Fiscal, Debt	191.53	35.11 (22.44%)
		Prime Minister Tsipras announces a referendum on a bailout agreement, to be held on 5 July 2015.	Political, Referendum		
		Tsipras announces that Greek banks will remain closed for a while; he also announces the imposition of capital controls (€60/day withdrawal limit; most foreign transfers banned).	Bank		
		The Greek parliament approves the referendum, with 178 votes for and 120 against.	Political		
		Greece misses a payment on an IMF loan and falls into arrears. (Missed payments to the IMF are not considered formal defaults by the major credit rating agencies).	Fiscal, Debt		
		Greece's credit rating is downgraded by Fitch (from CCC to CC) and Standard and Poor's (from CCC+ to CCC and then to CCC-).	Fiscal, Debt		
2015	July	The Greek bailout referendum is held. Over 61% vote against the proposed measures by the European Commission, the ECB and the IMF. Antonis Samaras resigns as leader of New Democracy and is succeeded by acting leader Vangelis Meimarakis.	Political	138.57	-52.96 (-27.65%)
		Greece extends its bank holiday and capital controls through 8 July.	Bank		
		Moody's downgrades Greece's credit rating from Caa2 to Caa3.	Fiscal, Debt		
		The Greek parliament approves the government proposal about bailout plan. 251 MPs vote for the proposal but 17 MPs of government coalition do not support.	Fiscal, Political		
		EU Leaders Summit: Greece and Europeans creditors strike deal for €86	Fiscal, Debt		

		billion bailout over three years, though it must be approved by the parliaments of all of the Eurozone member states.			
		The Greek Parliament approves the first round of measures ("prior actions") required by the creditors, including changes to pensions and taxes, by 229 to 64 despite 21% of Syriza MPs voting against, and some violent protests. German parliament approves the start of negotiations for the third bailout programme for Greece.	Fiscal, Tax, Pensions, Reform, Political		
		Prime Minister Tsipras reshuffles his cabinet.	Political		
		The Greek parliament approves the second set of bailout measures.	Fiscal		
		Standard and Poor's upgrades Greece's credit rating from CCC- to CCC+.	Fiscal, Debt		
2015	August	Prime minister Alexis Tsipras resigns and proclaims elections for 20 September.	Political	123.81	-14.76 (-10.65%)
		Fitch upgrades Greece's credit rating from CC to CCC.	Fiscal, Debt		
2015	September	National elections are held, Syriza wins with 35.46% (145 of 300 seats). Syriza and ANEL with 3.69% (10/300) join to form a new coalition government. Alexis Tsipras is sworn in as the new Prime Minister.	Political, National Elections	109.34	-14.47 (-11.68%)
2015	November	The government passes a new austerity package. Two deputies of the government's coalition vote against the measures and they were expelled. The new majority consists of 153 deputies.	Fiscal, Political	97.11	-8.39 (-7.95%)
		The Greek Government presents to the Parliament the 2016 Budget, which projects a general government deficit of 2.1% of GDP.	Fiscal, Debt Budget		
2015	December	The Greek Parliament approves the 2016 Budget.	Fiscal, Debt Budget	83.87	-13.24 (-13.64%)
2016	January	Standard and Poor's upgrades Greece's credit rating from CCC+ to B-.	Fiscal, Debt	107.50	23.63 (28.17%)
2016	February	A new legislation that introduces broad changes in the Greek pension system, is proposed.	Fiscal, Pension	131.57	24.08 (22.40%)
2016	March	Talks about non-performing loans' management, between the Minister of Economy, Development and Tourism and the so-called Institutions (European Commission, ECB, IMF) reach a dead end.	Bank, Reform	134.10	2.53 (1.92%)
		ECB increases its monthly bond purchases (due to its QE program) from €60 billion to	Monetary		

		€80 billion.			
2016	April	The government is asked by the European creditors and the IMF to vote for additional measures, in order for the talks about the debt relief to start at the Eurogroup of May 7th.	Fiscal, Debt, Reform,	109.74	-24.36 (-18.17%)
2016	May	A new austerity package (the thirteenth one) to the tune of €5.4 billion is passed by the Greek parliament.	Fiscal	132.69	22.96 (20.92%)
		The additional taxes measures is passed by 153 for and 145 against. Syriza MPs Katrivanou resigns, following her vote against two of the articles.	Fiscal, Tax, Political		
2016	June	Brexit (23rd of June).	International, Geopolitical	124.23	-8.46 (-6.38%)
2016	July	Coup d'état attempt in Turkey.	International, Geopolitical	155.74	31.51 (25.36%)
2016	November	Donald Trump wins the US Presidential elections.	International	123.82	36.22 (41.36%)
		The Greek Government presents to the Parliament the 2017 Budget, which projects a general government deficit of 0.8% of GDP.	Fiscal, Debt Budget		
2016	December	The Greek Parliament approves the 2017 Budget.	Fiscal, Debt Budget	160.21	36.40 (29.40%)
2017	January	ESM and EFSF approve short-term debt relief measures for Greece.	Fiscal, Debt	134.69	-25.52 (-15.93%)
		Railway company "TrainOSE" is agreed to be acquired by the the Italian railway company "Ferrovie dello Stato", for €45 million.	Fiscal, Privatization		
2017	March	Talks between the Greek government and the creditors regarding the second review of the third bailout programme are delayed, raising concerns about uprising fiscal costs.	Fiscal, Debt,	193.14	35.38 (22.43%)
		ECB raises ELA threshold after request by Bank of Greece.	Bank, Debt		
2017	April	Eurostat announces that the tax revenue for 2016 has outperformed the target (set by the third bailout programme), with a primary surplus of 4.2% of GDP.	Fiscal	109.34	-83.80 (-43.39%)
2017	May	The Medium-term Fiscal Strategy Framework 2018–2021, introducing amendments of the provisions of the thirteenth austerity package, is passed by the Greek parliament.	Fiscal	105.53	-3.81 (-3.48%)
2017	June	Moodys's upgrades Greece's credit rating from Caa3 to Caa2.	Fiscal, Debt	119.01	13.47 (12.77%)

2017	July	ESM approves €8.5 billion loan tranche to Greece.	Fiscal, Debt	82.97	-36.03 (-30.28%)
		IMF approves in principle €1.6 billion stand-by arrangement for Greece.			
		Greece returns to financial markets with the issue of €5 billion bond at a yield below 5%.			
2017	August	Fitch upgrades Greece's credit rating from CCC to B-.	Fiscal, Debt	99.84	16.86 (20.32%)
2017	September	Eurogroup gets updated on the state of play of Greece's ongoing economic adjustment programme.	Fiscal, Debt	105.43	5.59 (5.60%)
2017	October	ESM approves €0.8 billion disbursement to Greece for arrears clearance.	Fiscal, Debt	105.40	-0.04 (-0.03%)
		National Bank of Greece issues a €750 million bond, highlighting the Greek banks' return to financial markets after 2014.	Bank, Debt		
2017	December	The Greek Government presents to the Parliament the 2018 Budget, which projects a general government surplus of 0.6% of GDP.	Fiscal, Debt, Budget	76.63	-16.15 (-17.40%)
		The Greek Parliament approves the 2018 Budget.			

Notes:

1) The sample from January 1998 to December 2017 contains 240 months and in 170 of those months (or around 71%) at least one event occurred. There are 300 events, thus the average number of events per month is 1.25, while the average number of events during those months when that at least one event occurred is 1.78, which is evidence of "event clustering."

2) There are 14 special domestic events, which include the organization of the Olympic Games in Athens at 2004, natural disasters, national security events, terrorism events, as well as major riots. The international events include the US presidential elections, the 9/11 terrorist attack, the Brexit, the wars in the regions of Balkan peninsula and the broader Middle-East, the Arab spring, the attempt of a military coup d'état in Turkey and a number of significant events related to Cyprus - due to its special connection with Greece.

3) For ease of comparison, the table also includes the EPU index of the month when an event took place, together with the change in its value relative to the one month earlier. On the table each event is assigned to a specific category among the following: fiscal, monetary, currency, budget, debt, tax, labor, pension, political, reform, privatization, regulation, bank, stock market, geopolitical and international (including war events). Certain events are related to more than one category.

A.1. More on the construction of the indices

We search the available digital archives of four major and widely circulated Greek newspapers, namely "To Vima," "Ta Nea," "Naftemporiki" and "Kathimerini" from January 1998 to December 2017. Naftemporiki, specializes on reporting economic issues. The other three were perceived as leaning towards the political center (To Vima), the political center-left (Ta Nea) and the political center-right (Kathimerini). All four newspapers have a long history and are well established. Yet web page data availability is restricted: From January 1998 for "To Vima" and "Ta Nea," June 2000 for Naftemporiki and June 2001 for Kathimerini. The algorithm filters for articles within the "Economics" or "Politics" categories, obtained from the internet web pages of the aforementioned newspapers. Please note that the digital archive is not exactly the same as the printed version.

Following Baker, Bloom and Davis (2016), we obtain a monthly count of articles per newspaper that contain at least one term from each of three categories of terms tabulated in Table 1. Our algorithm ignores differences in letter case when searching for terms. The total number of articles searched until the end of 2017 is over half a million: 512,973. For purposes of compatibility and comparability with similar indices in other countries, the words in each category are chosen to conform to earlier work on the US and other countries by Baker, Bloom and Davis (2016). To mitigate the effect of the difference in the relevance of words between the Greek and the US newspapers, we replace the term "regulation" with the terms "structural changes" and "reforms", which are used more commonly in a policy relevant framework. We also drop the terms "debt" and "deficit" and use them in the fiscal-related policy categories. The results are not affected by the inclusion/exclusion of the aforementioned terms. The resulting index is comparable to the one developed under the exact Baker, Bloom and Davis (2016) group of words, with a 97.8% correlation between them.

To mitigate the effect of the varying volumes of articles across newspapers and time, we scale the raw counts by the total number of articles in the same newspaper and month as in Baker, Bloom and Davies (2016). We thus obtain a percentage of articles of interest over the total number of articles, for each month and each newspaper. We then standardize each newspaper's monthly scaled series, by dividing it by the standard deviation of the series over the full sample from 1998 to 2017. Subsequently, we average the scaled and standardized series across the four newspapers, creating a single monthly time series. Finally, we normalize the time series to have a mean of 100 over the full sample from 1998 to 2017.

Political Uncertainty (POLU) is a lot smoother and less volatile than EPU, mainly in the first half of the sample. Politics was volatile during the crisis and political polarization was eminent. Different political parties proposed fundamentally different policies on key economic issues, political parties in opposition usually held extreme views, and the official lenders (EMU members through the European Commission and the IMF) ended up micro-managing the passage and implementation of domestic laws. The duration of a government in Greece can reach up to four years as defined by the Greek Constitution. For a government to pass legislation or decide on a referendum, it has to have the support of at least 151 members of the Parliament out of the

total 300 MPs. Political parties can form coalitions in order to establish a government. During the crisis, the average duration of national governments was reduced to approximately two years and since November 2011 the governments in power are based on coalitions.

A.2   Is there multicollinearity among the EPU sub-indices?

Table 3 in the main text showed that most EPU sub-indices are contemporaneously highly correlated with each other. Hence the problem of multicollinearity comes immediately to mind when regression equations include all these variables together. This was the case for the regressions of Table 4. There we regressed the economic policy uncertainty index EPU on all its sub-indices EPUF, EPUD, EPUT, EPUM, EPUC, EPUB, and EPUP.

To check whether or not multicollinearity is detrimental to the results we follow the methodology of O'Brien (2007) and calculate the variance inflation factors (VIF) for all the explanatory variables. A VIF value above 5 would indicate the presence of multicollinearity. The values of VIF are reported in Table A2 below. The results indicate that there is no multicollinearity. This finding is reinforced also by the results of the main text, since changes in the estimated regression coefficients among the different regressions reported in Table 4 are small.

Table A2
Variance Inflation Factor values for EPU sub-indices as explanatory variables

Variable	VIF	
log(EPUF)	2.19	-
log(EPUD)	-	1.98
log(EPUT)	-	1.78
log(EPUM)	1.21	1.20
log(EPUC)	2.42	2.42
log(EPUB)	3.24	3.16
log(EPUP)	1.37	1.41

Notes: The Variance Inflation Factor $VIF = \frac{1}{1-R_j^2}$, where R_j^2 is the coefficient of determination of a regression of explanatory variable j on all the other explanatory variables. A value larger than 5 indicates a multicollinearity problem. The analysis is done twice. The second time we substitute log(EPUF) with its two sub-indices, log(EPUT) and log(EPUD).

A.3 The contribution of each category-specific EPU index to EPU

When regressors are uncorrelated, each regressor's relative importance is easy to find: It is simply the R^2 from a univariate regression divided by the sum of R^2s, which is the R^2 of the model that includes all regressors. In cases where regressors are correlated, various methods have been proposed in the literature. We choose the lmg methodology proposed by Lindeman, Merenda and Gold (1980, p. 119 ff.).

For this methodology, the relative contributions of each dimension of EPU to the explained variability of EPU sum up to 100% and indicate the contribution of each individual regressor to the adjusted R^2 of the model that includes all regressors. The approach taken by the lmg metric is based on sequential R^2s, with the additional feature of taking simple averages over orderings in order to take care of the dependence of rankings upon orderings. More concretely, let the order of the regressors in any model be a permutation of the available regressors $x_1, \ldots, x_n$, denoted by the tuple of indices $r = (r_1, \ldots, r_n)$. Let $S_k(r)$ denote the set of regressors entered into the model before regressor x_k in the order r. Then the portion of R^2 allocated to regressor x_k in the order r can be written as $R^2 (\{x_k\}/S_k(r)) = R^2 (\{x_k\} \cup S_k(r)) - R^2 (S_k(r))$. The metric lmg can be written as $lmg(x_k) = \frac{1}{n!} \sum_{r \, permutation} R^2 \left(\{x_k\} | S_k(r) \right)$.

Figure A3: Greek EPU and International EPU Indices
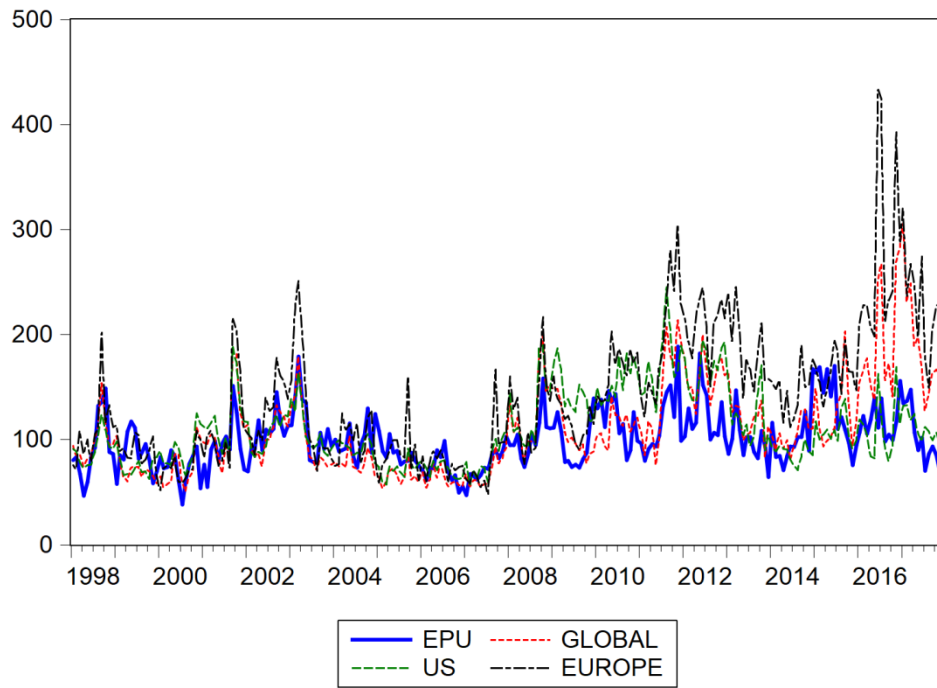
Notes: Definitions of variables are in Table 6.

Figure A4: EPU Index and Stock Return Volatility
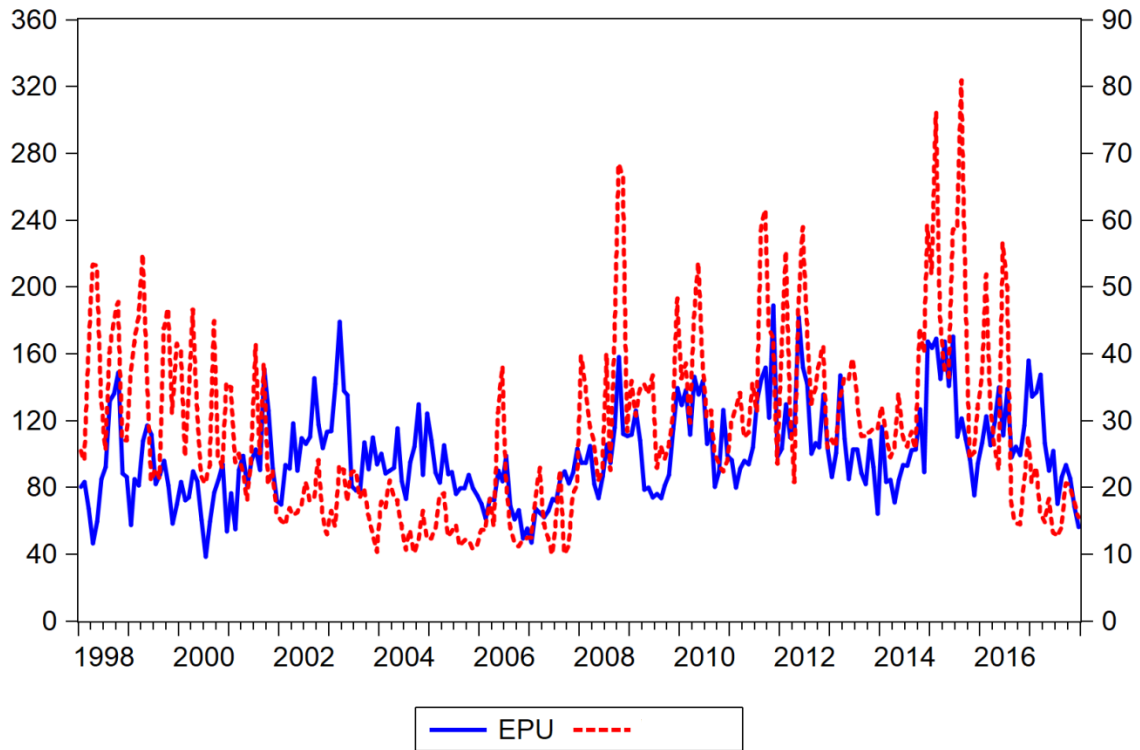
Notes: Stock return volatility σ_m is the realized standard deviation of daily stock returns over the corresponding month.

**Figure A5: The Spread of the Greek 10-year Sovereign bond
over the German 10-year Sovereign bond in basis points**
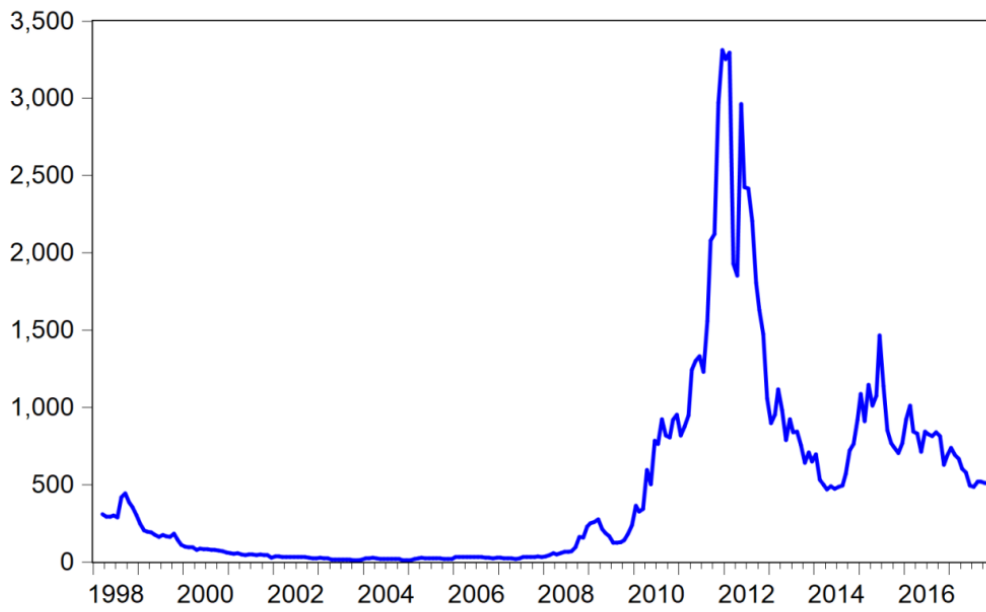
Notes: Definitions of variables are in Table 6.

Figure A6: Responses to a 22% EPU Shock, VAR(2), Quarterly Data 1998:1-2017:4
## Alternative impulse responses based on the Jordà technique
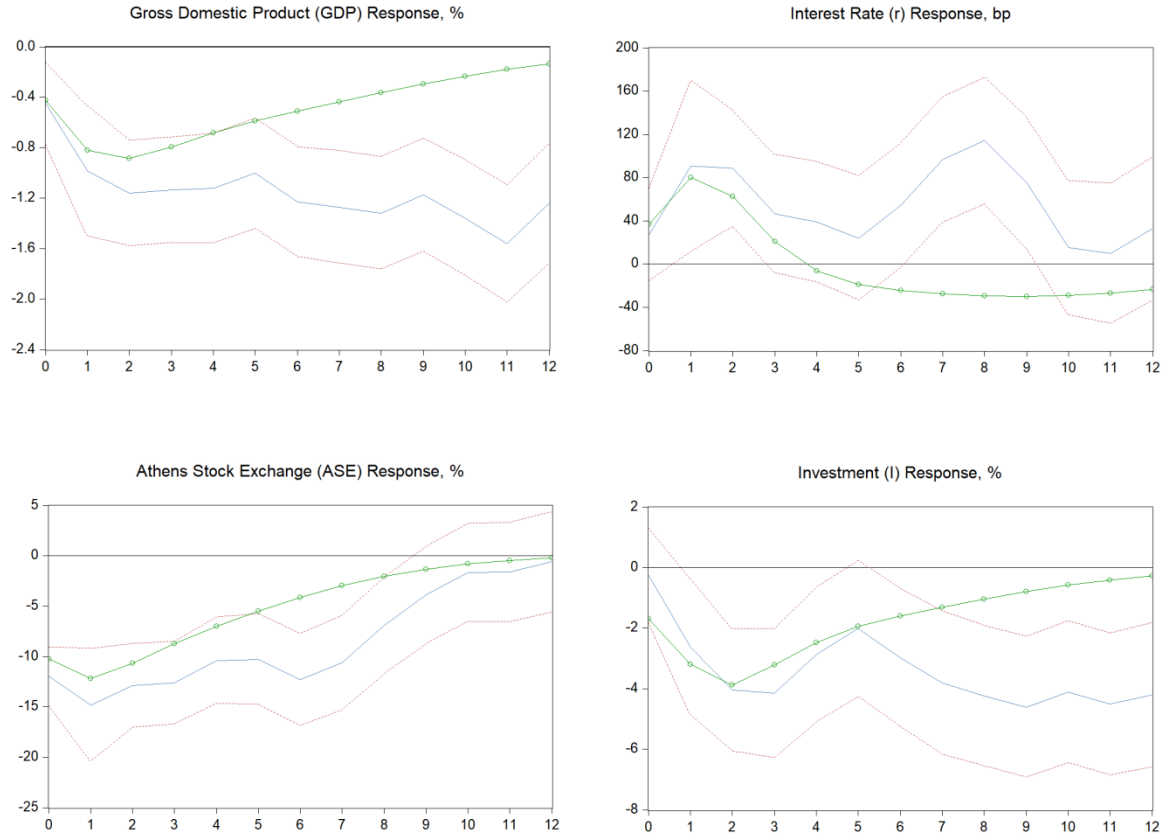
Notes:

a) Definitions of variables are in Table 6.

b) A VAR model with 2 lags and 5 variables, and a Choleski decomposition ordering of: log(EPU), r, log(ASE), log(I) where I represent real Investment, and log(GDP). The green line with the circles shows the regular impulse responses while the blue solid line represents the local projection impulse response. The red dashed lines represent the associated 95% conditional error bands. The responses are measured in percentage changes of the level of the dependent variable.

c) The Jordà (2005) technique is used in generating the impulse response functions. To deal with the problem of serial correlation among the impulse response coefficient estimates, we use conditional error bands which remove the variability caused by the serial correlation and give a better sense about the significance of individual responses.

Figure A7: Response of IP to 22% uncertainty shock, Robustness Checks, VAR Fit to Monthly Data
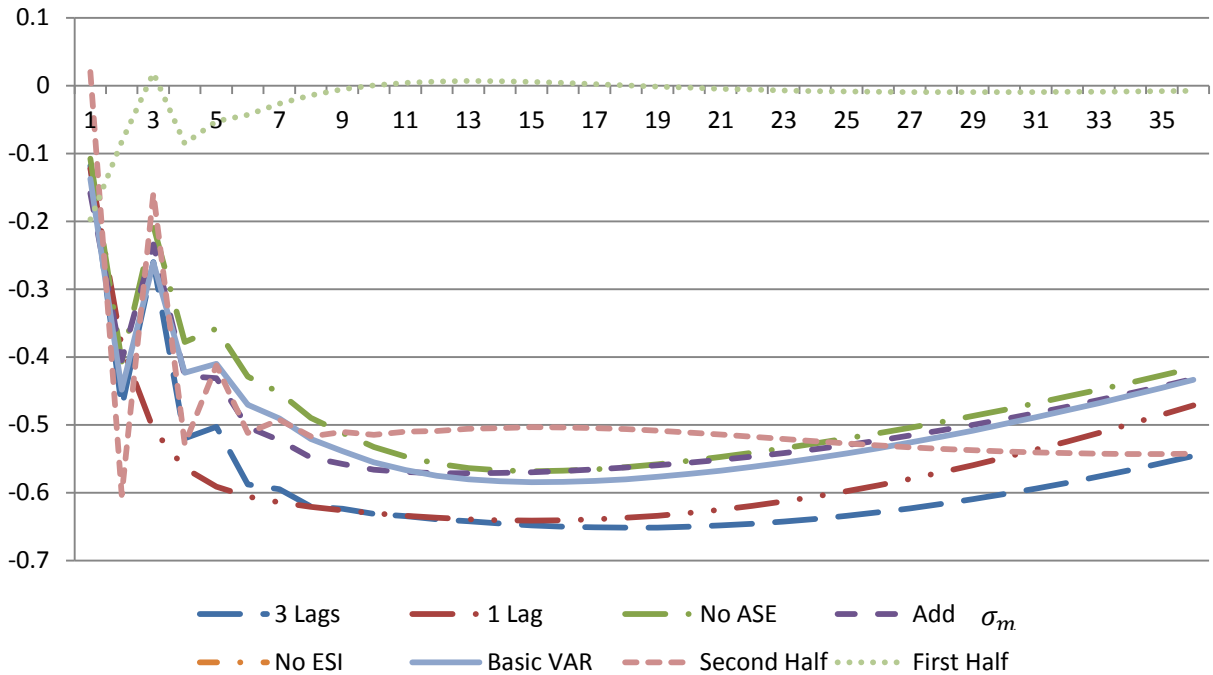
Notes: Impulse responses of IP for several modifications: one and three lags instead of two in the basic VAR, including stock return volatility σ_m (after EPU), dropping ASE, dropping ESI and using the two halves of the sample, the first running from 1/1998 to 12/2007 while the second from 1/2008 to 12/2017. The basic VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(EPU), r, log(ASE), log (E), log(IP), Infl, log(ESI). The responses are measured in percentage changes.

Figure A8: Responses to a 22% Greek EPU Shock, Monthly VAR including Global
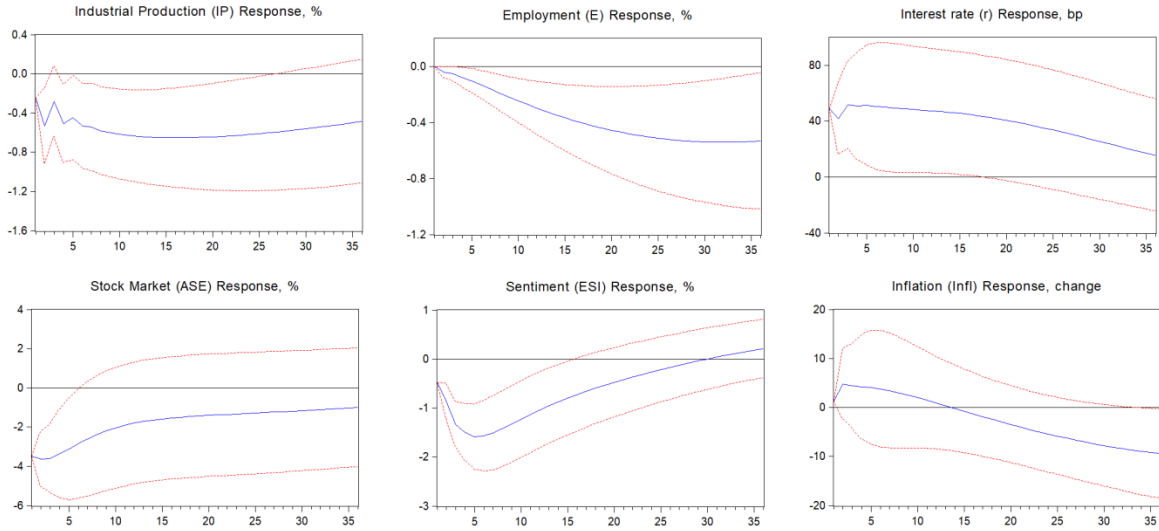
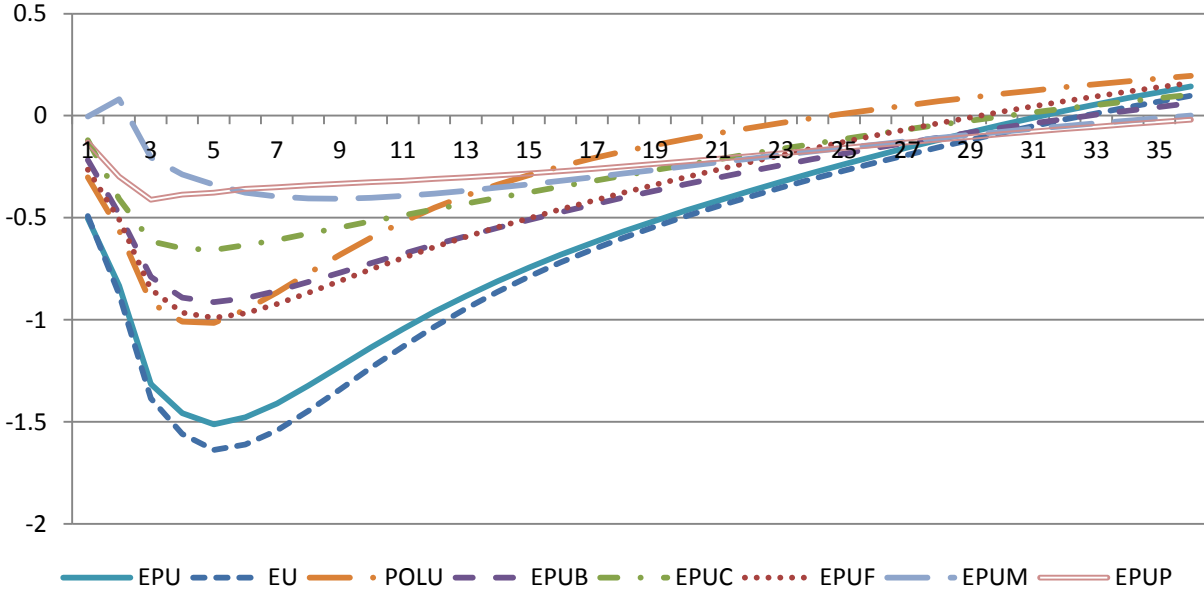

Notes: Definitions of variables are in Table 6. The VAR model has two lags and eight variables and a Choleski decomposition ordering as follows: log(Global), log(EPU), r, log(ASE), log(E), log(IP), Infl, log(ESI). The blue solid line shows the estimated response. The red dashed lines represent the 95% confidence interval. The responses are measured in percentage changes or changes of the level of the dependent variable.

Figure A9: Response of ASE to a 22% uncertainty shock, VAR Fit to Monthly Data
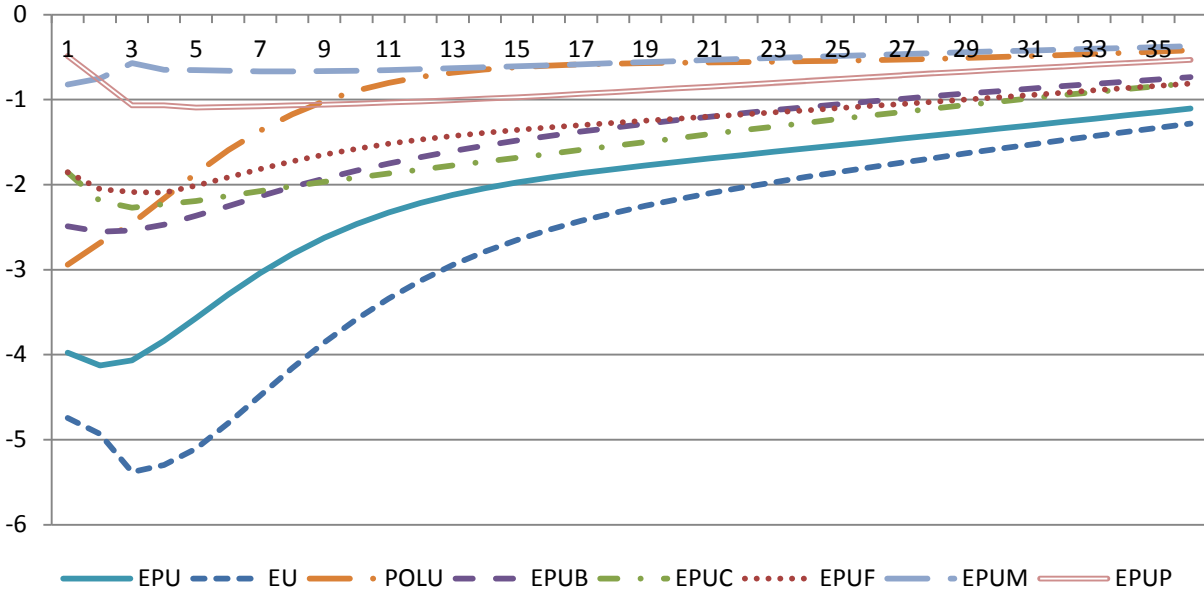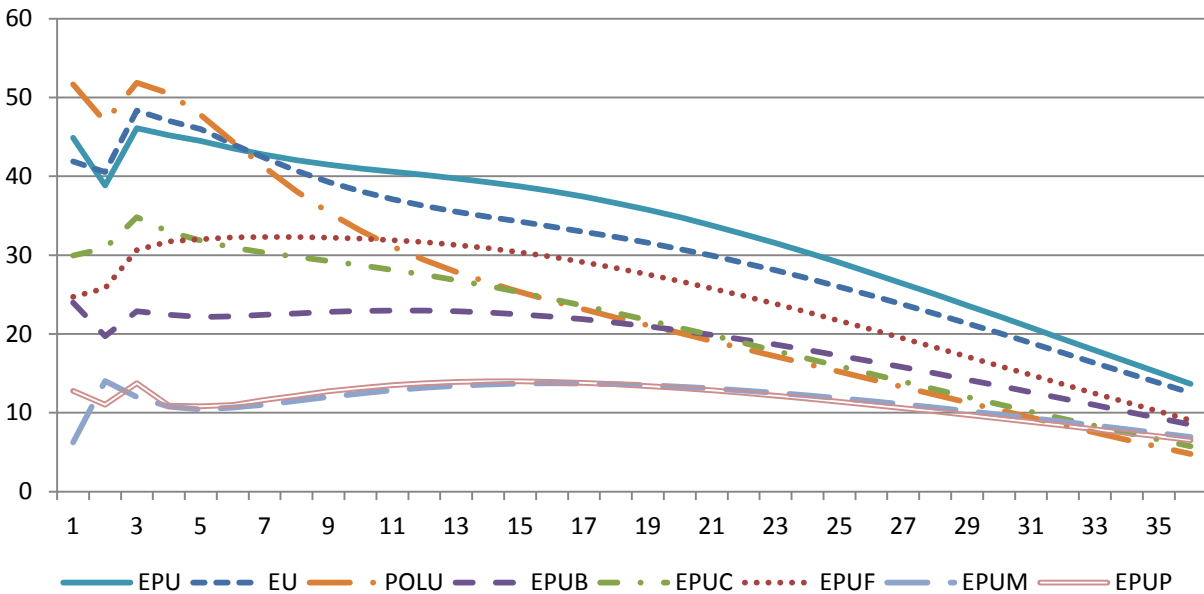

Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), r, log(ASE), log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

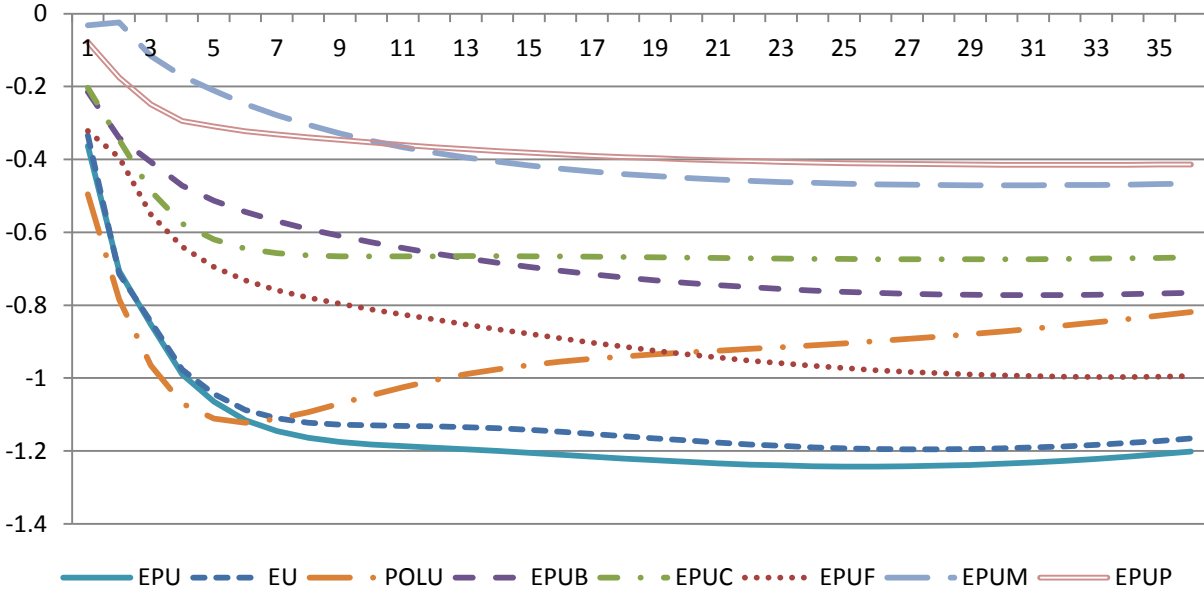**Figure A10: Response of E to a 22% uncertainty shock, VAR Fit to Monthly Data**
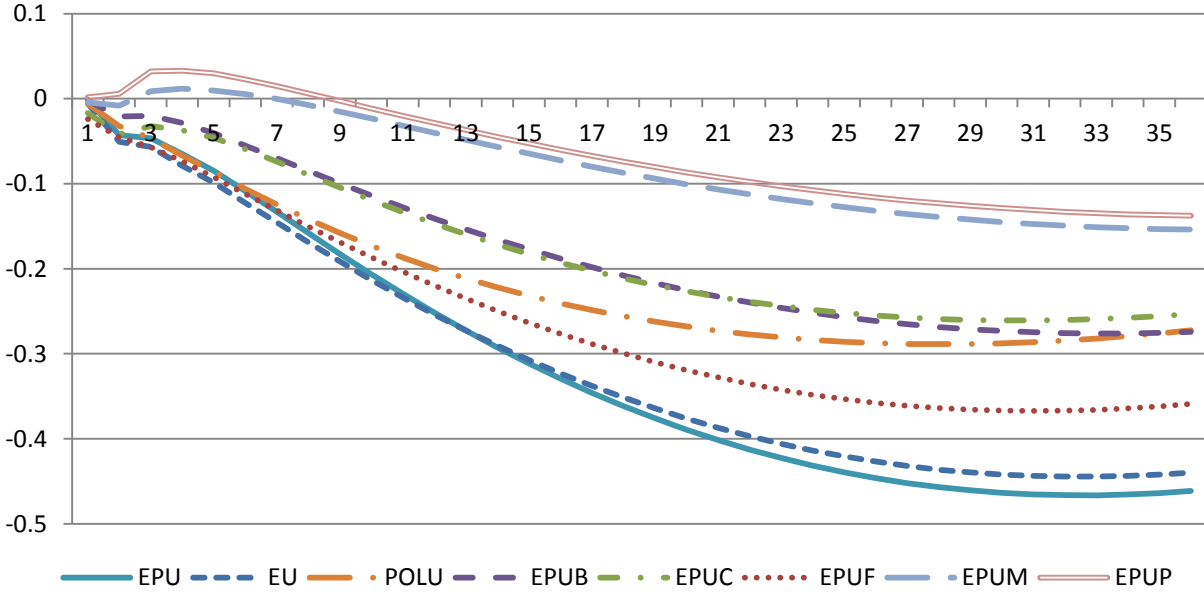
Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), r, log(ASE), log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

Figure A11: Response of IP to a 22% uncertainty shock, VAR Fit to Monthly Data
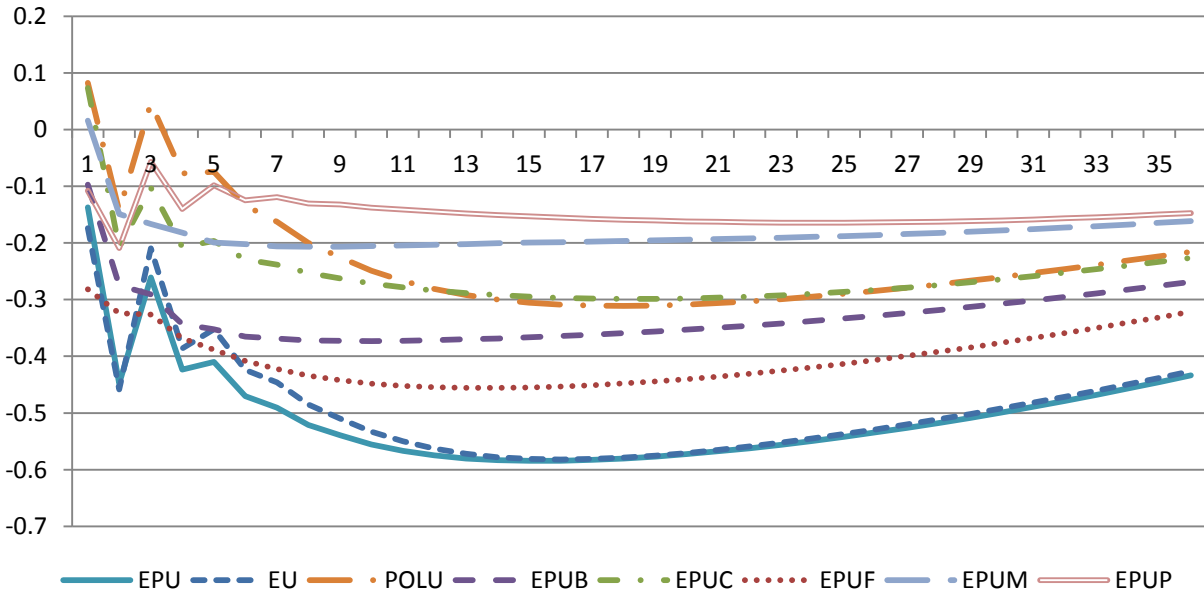
Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), r, log(ASE), log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

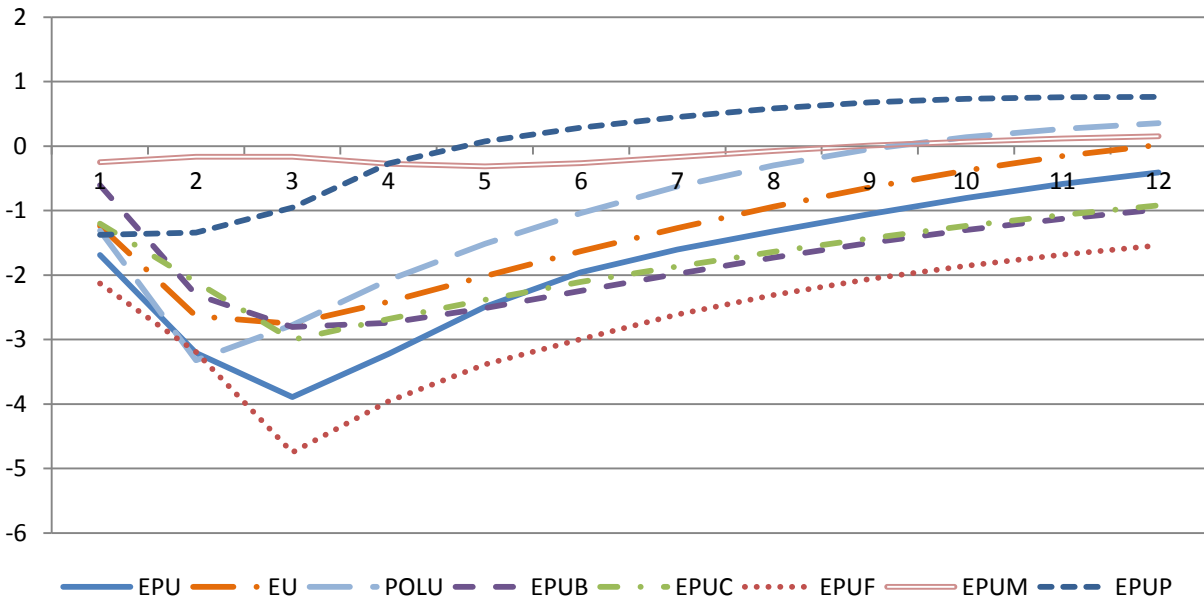**Figure A12: Response of ESI to a 22% uncertainty shock, VAR Fit to Monthly Data**

Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), r, log(ASE), log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

Figure A13: Response of r to a 22% uncertainty shock, VAR Fit to Monthly Data

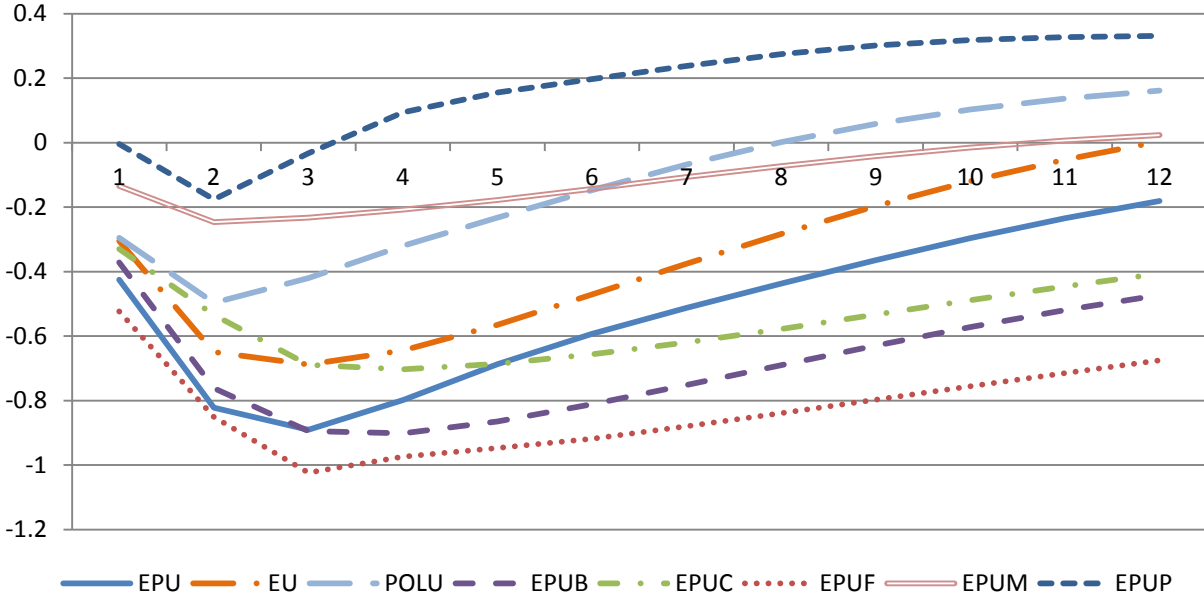Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), r, log(ASE), log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in bp.

Figure A14: Response of HD to a 22% uncertainty shock, VAR Fit to Monthly Data

Notes: Definitions of variables are in Table 6. The VAR model has two lags and seven variables and a Choleski decomposition ordering as follows: log(x), log(HD, r, log(E), log(IP), Infl, log(ESI), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

Figure A15: Response of I to a 22% uncertainty shock, VAR Fit to Quarterly Data

Notes: Definitions of variables are in Table 6. A VAR model with 2 lags and 5 variables, and a Choleski decomposition ordering of: log(x), r, log(ASE), log(I) where I represent real Investment, and log(GDP), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.

Figure A16: Response of GDP to a 22% uncertainty shock, VAR Fit to Quarterly Data

Notes: Definitions of variables are in Table 6. A VAR model with 2 lags and 5 variables, and a Choleski decomposition ordering of: log(x), r, log(ASE), log(I) where I represent real Investment, and log(GDP), where x denotes EPU, EU, POLU, EPUB, EPUC, EPUF, EPUM and EPUP, respectively. The responses are measured in percentage changes.