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Economic policy uncertainties and business confidence in Japan

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Abstract

Although the literature on the determinants of business confidence and the literature addressing the effects of economic policy uncertainty are growing, some gaps still exist. This study analyzes the effects of economic policy uncertainties on business confidence in an important developed country and one of the main Asian economies, Japan. In addition to economic policy uncertainty, the study is the first to examine whether monetary policy uncertainty and fiscal policy uncertainty have different effects on business confidence in Japan. The data runs from March 1987 to February 2022. All relationships are analyzed considering three samples: one related to the total period, one that disregards the Covid-19 pandemic, and another that goes until the subprime crisis. The results are based on different econometric methods. The findings reveal that Economic policy uncertainty adversely affect business confidence in Japan. The results also reveal that fiscal and monetary policy uncertainties deteriorate business confidence. In addition, estimates obtained from quantile regression suggest economic policy uncertainties affect business confidence more when businessmen are less confident than when they are more confident.

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1. Introduction

Despite the advances, the literature on the determinants of business confidence continues to grow. Although most studies analyze the effects of macroeconomic variables, some studies investigate the effects of other variables able to produce uncertainties among entrepreneurs, such as monetary policy credibility (de Mendonça and Almeida, 2019), corruption (Montes and Almeida, 2017), and economic policy uncertainty based on media news (Montes and Nogueira, 2022). These studies indicate that high levels of corruption and economic policy uncertainty as well as low credibility reduce business confidence due to the uncertainties created.

Uncertain economic scenarios created by economic policy uncertainty undermine expectations, and consequently affect business decisions, postponing investment as well as employment decisions (Bloom et al., 2018; Montes and Nogueira, 2022). Since the work of Bloom (2009), and due to existing controversies in the literature, some studies seek to understand the effects of uncertainty shocks on different economic variables (e.g., Baker et al., 2016; Bachmann et al., 2013; Colombo, 2013; Nodari, 2014; Donadelli, 2015; Moore, 2017; Istiak and Serletis, 2018; Bahmani-Oskooee and Nayeri, 2018; Bahmani-Oskooee et al., 2018; Mumtaz and Surico, 2018; Gholipour, 2019; Greenland et al., 2019; Istiak and Alam, 2019 and 2020; Tajaddini and Gholipour, 2020; Montes and Nogueira, 2022). The evidence indicates that macroeconomic variables such as GDP, investment and employment are adversely affected by increased economic policy uncertainty.

Although the literature on the determinants of business confidence as well as the literature addressing the effects of economic policy uncertainty are growing, some gaps still exist. For instance: what is the effect of economic policy uncertainty on business confidence? Montes and Nogueira (2022) sought to answer this question for an important developing country. They analyzed the impacts of economic policy uncertainty on business confidence in Brazil, and their findings suggest economic policy uncertainty reduces entrepreneurs' optimism about the future of the economy and their business.

The present study also addresses the effects of economic policy uncertainty on business confidence. But, different from Montes and Nogueira (2022), this study brings at least four different contributions to the literature. First, the analysis concerns an important developed country and one of the main Asian economies, Japan. Second, in addition to economic policy uncertainty, the study also examines whether monetary policy uncertainty and fiscal policy uncertainty have different effects on business confidence in Japan. Third, using the method of quantile regression, the paper investigates the effects of economic policies uncertainties on business confidence considering different levels of confidence; the idea is to verify the existence of asymmetries in the relationships. Fourth, since the data used in this study cover the period from March 1987 to February 2022, we analyze all relationships for the total period, as well as for two other time intervals, one that disregards the Covid-19 pandemic (until December 2019), and another that goes until the subprime crisis (i.e., until December 2007).

Japan is an interesting case study for the following reasons. After the bubble burst in the 1990s, public debt increased and deflation set in, triggering a sharp deterioration in business confidence. Several economists pointed out that Japan's debt was unsustainable (debt was around 230% of GDP) and that the Bank of Japan (BoJ) should do more to increase inflation. In 2013, Japanese policies were based on three pillars: aggressive monetary policy, flexible fiscal policy, and growth strategy. However, the behavior of the economy proved that continuing with such policies was indeed challenging. The unsustainable fiscal path accompanied by monetary policy restrictions increased uncertainties in the country, and from mid-2014 the economic policy uncertainty indicator rose again. Due to the fact that Japan is one of the most important developed economies in the world, with a strong influence on the

Asian market, the uncertainties that occur in that country have an influence not only in the country itself (such as on consumer and business confidence, for example, with consequences for the business cycle), but can also overflow for other economies in the world, and in particular for developing Asian countries. Regarding business confidence, besides being a leading gauge of economic growth, business confidence in Japan plays a key financial role once it influences stock prices and the currency rate, and, consequently, causes turbulence in Asian markets.

Another contribution of the study consists in the fact that we used different econometric techniques. The first results are obtained from ordinary least squares (OLS) and generalized method of moments (GMM). Then, we proceeded with estimates using quantile regression, and, finally, in order to understand the relationships dynamically, we analyzed the graphs of the impulse-response functions obtained from vector autoregression (VAR) models.

The findings reveal that increases in economic policy uncertainty reduce business confidence in Japan. The results also show that fiscal and monetary policy uncertainties deteriorate business confidence. Besides, estimates obtained from quantile regression suggest economic policy uncertainties affect business confidence more when businessmen are less confident (more pessimistic) than when they are more confident (more optimistic). The dynamic analysis reveals that a positive shock in the economic policy uncertainty (EPU) index implies a reduction in business confidence that lasts approximately 10 months. The results of the effects of fiscal and monetary policy uncertainties on business confidence are also negative and are detailed in the specific section.

2. Related literature

Since business confidence is important to economic decisions, some studies analyze the determinants of business confidence. Konstantinou and Tagkalakis (2011) found that fiscal policies affect consumer and business confidence. Montes and Bastos (2013) show that business confidence is influenced by macroeconomic variables. In addition to macroeconomic variables, other variables were also analyzed. For instance, de Mendonça and Almeida (2019) show that greater monetary policy credibility increases business confidence. In turn, Montes and Almeida (2017) show that corruption adversely affects business confidence.

Although the literature is growing, some gaps still exist. For instance: what are the effects of economic policy uncertainty on business confidence?

Bloom (2009) shows that increases in political and economic uncertainties affect investment and employment. Other studies point to the adverse effects of unexpected increases in uncertainty on output, employment, productivity, consumption, and investment (e.g., Colombo, 2013; Caggiano et al., 2014; Nodari, 2014; Leduc and Liu, 2016). Using the Economic Policy Uncertainty index (EPU) proposed by Baker et al. (2016), Nodari (2014) and Stockhammar and Österholm (2016) show that macroeconomic variables such as GDP and employment are negatively affected by increased economic policy uncertainty.

Regarding business and consumer confidence, few studies address the effects of economic policy uncertainty and political uncertainty. Donadelli (2015) finds that measures of economic policy uncertainty in the US affect consumer sentiment and other macroeconomic variables. Mumtaz and Surico (2018), also for the US economy, suggest that uncertainty affects the real economy as well as consumer and business confidence; their results indicate that uncertainty about public debt has a large and persistent effect on consumer and business confidence, and has negative effects on output, consumption, and investment. The study of de Mendonça and Almeida (2019) finds that political uncertainty affects business confidence in Brazil. Recently, Montes and Nogueira (2022) showed that increases in economic policy uncertainty reduce business confidence. The findings also revealed that business confidence acts as a transmission mechanism from uncertainties to investments.

3. Data and methodology

The data used in this study are monthly and cover the period from March 1987 to February 2022.[1] In addition to the estimates for the total period, the study also makes estimates considering two other time intervals, one that disregards the Covid-19 pandemic (until December 2019), and another until the subprime crisis (until December 2007).

The dependent variable of the study is the business confidence index for Japan (BCI), obtained from the Organization for Economic Co-operation and Development (OECD) website.[2] The BCI is an indicator calculated based on opinion polls, and provides information on the optimism or pessimism of entrepreneurs regarding the future of production, demand, and stock of goods in the industrial sector. When the indicator exceeds the value of 100, there is a situation of optimism regarding the near future and the performance of the sector, and when the value is less than 100, there is a situation of pessimism regarding the near future.

Regarding economic policy uncertainty indicators, we use the indices calculated from media news for Japan developed by Arbatli et al. (2022). Besides the overall economic policy uncertainty index (EPU) for Japan, we also use uncertainty indices for monetary policy and fiscal policy, i.e., we also analyze the effects of monetary policy uncertainty (MPU) and fiscal policy uncertainty (FPU) on business confidence. The indicators build by Arbatli et al. (2022) are based on the work by Baker et al. (2016). The indices, EPU, MPU and FPU, are collected directly from the 'Economic Policy Uncertainty' website.[3] The methodology is detailed in Arbatli et al. (2022) and can also be found on the 'Economic Policy Uncertainty' website. In brief, to calculate the EPU, the methodology consists of counting articles in four major Japanese newspapers (Yomiuri, Asahi, Mainichi and Nikkei) that contain at least one term in each of three categories: economic (E) policy (P) and uncertainty (U). Table 1 presents the terms used in each category to build the EPU. Higher values of the index mean greater uncertainty.

Table 1 Term set (in English) for the overall Japan EPU Index.

English terms
A. Economy terms (E)
"Economic" ou "Economy"
B. Uncertainty terms (U)
"uncertain" or "uncertainty"
"concern"
C. Policy terms (P)
"tax(es)"
"taxation"
"government spending" or "government expenditure"
"government revenue(s)"
"government budget"
"public debt"
"government debt"
"government deficit(s)"
"BOJ"
"Bank of Japan"
"central bank(s)"
"The Fed"
"Federal Reserve"
"regulation(s)", "regulatory", "regulate", "deregulation" or "deregulate"
"structural reform"
"legislation"
"upper house"
"lower house"
"Diet"
"Prime minister"
"Prime minister's office"

Note: table prepared by the authors.

[1] The period was defined by data availability at the time the research started.
[2] https://data.oecd.org/leadind/business-confidence-index-bci.htm
[3] https://www.policyuncertainty.com/japan_monthly.html

The FPU index is constructed based on the number of articles containing at least one term in each E (economy) term set, U (uncertainty) term set, P (policy) term set, and FP (fiscal policy) term set. For instance, terms related to fiscal policy include “government budget”, “taxation”, “government spending”, “government debt”, “Japanese government bonds”, and so on. The MPU index is constructed based on the number of articles containing at least one term in each E, U, P, and MP (monetary policy) term set. For instance, terms associated with monetary policy include “Bank of Japan”, “monetary easing”, “quantitative easing”, “negative interest rate”, “monetary tightening”, “policy rate”, and so on. Table 2 presents the terms used in each category to build the indicators. Again, higher values of the indexes mean greater uncertainty.

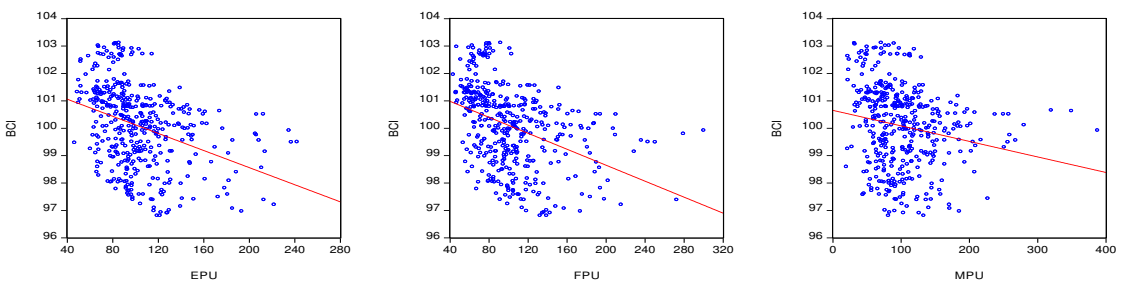
Table 2 Term set (in English) for policy category uncertainty indices (FPU and MPU)

Fiscal Policy	Monetary Policy
"government budget"	"monetary policy"
"supplementary budget" or "government budget" or "discretionary fiscal policy"	"Bank of Japan"
"General Account"	"BOJ"
"Special Account"	"monetary easing"
"government deficit"	"further easing"
"primary balance"	"quantitative easing"
"government revenue(s)	"quantitative and qualitative easing"
"tax(es)"	"monetary tightening"
"taxation"	"negative interest rate"
"government spending" or "government expenditure"	"policy rate"
"social security expenditures"	"official discount rate"
"pension expenditures"	"monetary operation(s)"
"pension insurance premium"	"market operation(s)"
"health insurance premium"	"inflation target"
"healthcare expenditures" or "medical care expenditures"	"price target"
"nursing care expenditures"	
"nursing care insurance premium"	
"public medical fee schedule"	
"salaries of government employees"	
"official development aid"	
"defense spending"	
"military spending"	
"Financial Investment and Loan"	
"FIL"	
"outstanding government debt"	
"public debt"	
"Japanese government bonds" (excluding purchase by the BOJ)	
"government debt"	
"local government debt"	

Note: table prepared by the authors.

Figure 1 shows the scatter plots of the explanatory variables of interest (EPU, FPU and MPU) with BCI. Figure 1 presents the contemporaneous relationship between uncertainty indices and BCI for the total period. As the explanatory variables of interest are measures of uncertainty, we observed a negative relationship between them and the BCI. The correlations with the BCI are -0.36 in the case of the EPU, -0.40 for the FPU and -0.19 for the MPU.

Figure 1 Scatter charts with correlation lines between the BCI and uncertainty indices



To verify the relationships between the uncertainty variables (EPU, MPU and FPU) and the BCI, three models were estimated for the three samples mentioned:

$$\ln \_BCI_t = \alpha_0 + \alpha_1 \ln \_BCI_{t-1} + \alpha_2 \ln \_EPU_{t-1} + \alpha_3 X_{t-1} + \alpha_4 S + \varepsilon_{1t} \quad (1)$$

$$\ln \_BCI_t = \gamma_0 + \gamma_1 \ln \_BCI_{t-1} + \gamma_2 \ln \_FPU_{t-1} + \gamma_3 X_{t-1} + \gamma_4 S + \varepsilon_{2t} \quad (2)$$

$$\ln \_BCI_t = \theta_0 + \theta_1 \ln \_BCI_{t-1} + \theta_2 \ln \_MPU_{t-1} + \theta_3 X_{t-1} + \theta_4 S + \varepsilon_{3t} \quad (3)$$

where, α_0, γ_0, and θ_0 are intercepts, and α_3, γ_3, and θ_3 are the vectors of parameters related to the control variables; ε_{it} are the error terms, S is a dummy variable representing the subprime crisis, and X_{t-1} is the set of control variables[4], which were chosen based on the literature. Regarding the dummy variable for the subprime crisis, it was used in the models to capture the instability generated by the 2008 global financial crisis, assuming a value equal to 1 from November 2007 to January 2009, and 0 otherwise. As the study considers different time intervals, the dummy variable for the subprime crisis will enter the samples that contain the subprime crisis period. The set of control variables is formed by: economic activity (ACTIVITY) measured by the Nikkei 225 index,[5] inflation rate (INFLATION) measured by the consumer price index (CPI) and exchange rate of the Japanese yen to the US dollar (EXCHANGE RATE).[6] Data were obtained from the website of the Federal Reserve Bank of St. Louis (FRED).[7]

All variables, except the inflation rate, are expressed in natural logarithm (ln). With the series in natural logarithm, the estimated coefficients can be directly interpreted. Descriptive statistics for all series are shown in Table A1 in the appendix.

To verify the presence of unit root in the series, the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests were used. The tests are reported in table A2 in the appendix. The ACTIVITY and EXCHANGE RATE series are I(1). Therefore, in the estimations, they are used with the first difference operator "D".

The results are based on estimates obtained by ordinary least squares (OLS) and generalized method of moments (GMM), both with Newey-West matrix (Newey e West, 1987). Following Wooldridge (2001) and Hall (2015), we use GMM to deal with endogeneity and identification problems. Besides, GMM presents robust estimators even in the presence of serial autocorrelation and heteroskedasticity of unknown form, or non-linearity (Hansen 1982). We follow Johnston (1984) to select the instruments on GMM estimation.[8]

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[4] Although it has been tested, the dummy referring to the Covid-19 pandemic was not incorporated into the model because its effect was not relevant to explain the BCI in the Japanese case.

[5] The stock market contains information about real economic activity and as such that the stock market is a leading indicator for economic growth. Finance theory and recent evidence (e.g., Ciner, 2020) suggest that equity valuations reflect future economic activity, which implies that the stock market can be considered as a leading indicator of economic activity.

[6] Due to the non-existence of variability in the monetary policy interest rate, especially after the mid-1990s, representing approximately 5% of the sample, we opted to remove the monetary policy interest rate from the model.

[7] Nikkei Stock Average, Nikkei 225 (NIKKEI225) | FRED | St. Louis Fed (stlouisfed.org); Consumer Price Index: Total All Items for Japan (CPALTT01JPM659N) | FRED | St. Louis Fed (stlouisfed.org); Japanese Yen to U.S. Dollar Spot Exchange Rate (EXJPUS) | FRED | St. Louis Fed (stlouisfed.org)

[8] Some variables were used only as instruments in the estimates by GMM, such as consumer confidence index (CCI), unemployment and VIX. Unemployment and VIX were obtained from the Federal Reserve Bank of St. Louis (FRED). Unemployment Rate - Aged 15-64: All Persons for Japan (LRUN64TTJPM156S) | FRED | St. Louis Fed (stlouisfed.org); CBOE Volatility Index: VIX (VIXCLS) | FRED | St. Louis Fed (stlouisfed.org). The CCI is obtained from the OECD website. The table with the instruments used in each GMM estimation can be made available upon request.

Aiming at observing the effects of uncertainties on the BCI, but at different levels of the BCI, and therefore verifying the existence of asymmetries in the relationships, the study also uses the quantile regression methodology. Proposed by Koenker and Basset (1978), the quantile regression method divides the distribution of the dependent variable into quantiles, allowing an analysis of the relationship between the variables of interest at any point in the distribution of the dependent variable. Thus, this method allows to obtain the effects of the explanatory variable on each quantile of the dependent variable, and not just the mean. In this sense, we can verify the existence of possible asymmetric effects of uncertainties on business confidence.

The study also seeks to verify the relationships dynamically. For this, we use the vector autoregressive method (VAR), and the results are analyzed through impulse-response functions to understand the relationships dynamically and give more robustness to the results. Conventional methods depend on the order of the variables in the VAR (Lutkenpohl, 1991). To solve this problem, generalized impulses are used considering the work of Koop et al. (1996) and Pesaran and Shin (1998).

Thus, we estimate three sets of VARs: the first is formed by *ln_BCI,* d(*ln_Activity*), *Inflation,* d(*Exchange rate*) and *ln_EPU*; the second is formed by *ln_BCI,* d(*ln_Activity*), *Inflation,* d(*Exchange rate*) and *ln_FPU*; and the third is formed by *ln_BCI,* d(*ln_Activity*), *Inflation,* d(*Exchange rate*) and *ln_MPU*. The VARs are estimated for the time intervals previously defined. To define the lag order of the VARs, the Schwarz Information Criterion (SIC) was used (table A3 in the Appendix).

4. Results

Tables 3, 4 and 5 show the results of both OLS and GMM regressions for EPU, FPU and MPU, respectively. All tables show the estimations for the following time samples: the first refers to the total period (from March 1987 to February 2022), the second comprises the beginning of the sample (March 1987) until before the subprime crisis (December 2007), and the third comprises the beginning of the sample, but disregards the period related to the Covid-19 pandemic (that is, until December 2019).

The results indicate, for all samples, that the higher the uncertainties, business confidence reduces, and Japanese businessmen become more pessimistic. EPU, FPU and MPU coefficients are all negative and statistically significant. The results reveal that economic policy uncertainty as well as fiscal and monetary policy uncertainties deteriorate business confidence. We observe that, on average, a 10% increase in the EPU reduces the BCI by 0.020% for the total period, 0.026% for the period before the subprime crisis and 0.019% for the period that disregards the Covid-19 pandemic. In turn, comparing the effects of monetary and fiscal policy uncertainties, we observe that the effect of fiscal policy uncertainty (FPU) is greater than the effect of monetary policy uncertainty (MPU). On average, a 10% increase in the FPU reduces the BCI by 0.013% for the total period, 0.019% for the period before the subprime crisis and 0.011% for the period that disregards the Covid-19 pandemic. Regarding the MPU, the results show that a 10% increase in the MPU, on average, reduces the BCI by 0.010% for the total period, 0.018% for the period before the subprime crisis, and 0.008% that disregards the Covid-19 pandemic. It is possible to observe that, in all cases, the estimates considering the period before the subprime crisis present the highest coefficients when compared to the other periods.

Regarding the control variables, the results indicate that economic activity affects business confidence positively. Inflation affects the BCI negatively for all periods, as well as the exchange rate. Furthermore, the dummy variable referring to Subprime also showed a negative and significant relationship for the periods and equations in which it was used.

Table 3 OLS and GMM estimates (EPU)

	total period		before the subprime crisis		disregarding the Covid-19 pandemic	
	OLS	GMM	OLS	GMM	OLS	GMM
C	0.0023	0.0650	0.0538	0.1558***	-0.0065	0.0538
	(0.0427)	(0.0396)	(0.0522)	(0.0525)	(0.0430)	(0.0379)
BCI(-1)	1.0013***	0.9882***	0.9907***	0.9691***	1.0031***	0.9907***
	(0.0091)	(0.0084)	(0.0110)	(0.0110)	(0.0092)	(0.0080)
D(ACTIVITY(-1))	0.0023*	0.0046*	0.0016	0.0048**	0.0019*	0.0064**
	(0.0011)	(0.0024)	(0.0013)	(0.0023)	(0.0011)	(0.0030)
INFLATION(-1)	-0.0005***	-0.0004***	-0.0003***	-0.0004***	-0.00048***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
D(EXCHANGE RATE(-1))	-4.67E-05*	-0.0001***	-5.48E-05*	-0.0002***	-4.80E-05*	-0.0001***
	(2.52E-05)	(6.74E-05)	(2.94E-05)	(5.89E-05)	(2.51E-05)	(5.96E-05)
EPU(-1))	-0.0018***	-0.0022***	-0.0023***	-0.0030***	-0.0016***	-0.0023***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0004)
SUBPRIME	-0.0013***	-0.0024**			-0.0014***	-0.0015*
	(0.0004)	(0.0012)			(0.0005)	(0.0009)
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99
F-statistic	9121.20		10481.01		10046.94	
Prob(F-statistic)	0.00		0.00		0.00	
J statistic		33.92		25.07		34.23
Prob(J statistic)		0.16		0.19		0.13
Obs	416	377	250	209	394	388
Instruments		34		26		33

Note: table prepared by the authors. Marginal significance levels: *** denotes p-value<0.01; ** denotes p-value <0.05; * denotes p-value <0.1. Robust (Newey-West) standard errors are in parentheses. EPU is *ln_EPU*.

Table 4 OLS and GMM estimates (FPU)

	total period		before the subprime crisis		disregarding the Covid-19 pandemic	
	OLS	GMM	OLS	GMM	OLS	GMM
C	-0.0067	0.0616	0.0261	0.1543***	-0.0179	0.0406
	(0.0439)	(0.0399)	(0.0559)	(0.0578)	(0.0445)	(0.0390)
BCI(-1)	1.0028***	0.9880***	0.9959***	0.9688***	1.0050***	0.9924***
	(0.0094)	(0.0085)	(0.0118)	(0.0121)	(0.0095)	(0.0083)
D(ACTIVITY(-1))	0.0026**	0.0043*	0.0021	0.0049**	0.0023**	0.0053*
	(0.0011)	(0.0022)	(0.0013)	(0.0023)	(0.0011)	(0.0027)
INFLATION(-1)	-0.0005***	-0.0004***	-0.0004***	-0.0005***	-0.0004***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
D(EXCHANGE RATE(-1))	-4.46E-05*	-0.0001***	-5.55E-05*	-0.0002***	-4.62E-05*	-0.0001*
	(2.63E-05)	(6.85E-05)	(3.10E-05)	(5.82E-05)	(2.62E-05)	(6.11E-05)
FPU(-1))	-0.0012***	-0.0014***	-0.0015***	-0.0024***	-0.0010***	-0.0012***
	(0.0003)	(0.0003)	(0.0005)	(0.0005)	(0.0003)	(0.0003)
SUBPRIME	-0.0015***	-0.0041***			-0.0016***	-0.0023**
	(0.0004)	(0.0014)			(0.0004)	(0.0011)
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99
F-statistic	8669.05		9440.08		9510.48	
Prob(F-statistic)	0.00		0.00		0.00	
J statistic		31.71		25.86		32.99
Prob(J statistic)		0.13		0.10		0.13
Obs	416	376	250	211	394	389
Instruments		31		24		32

Note: table prepared by the authors. Marginal significance levels: *** denotes p-value<0.01; ** denotes p-value <0.05; * denotes p-value <0.1. Robust (Newey-West) stanard errors are in parentheses. FPU is *ln_FPU*.

Table 5 OLS and GMM estimates (MPU)

	total period		before the subprime crisis		disregarding the Covid-19 pandemic	
	OLS	GMM	OLS	GMM	OLS	GMM
C	-0.0414	-0.0287	-0.0107	0.0881*	-0.0428	-0.0203
	(0.0432)	(0.0434)	(0.0427)	(0.0467)	(0.0446)	(0.0395)
BCI(-1)	1.0099***	1.0075***	1.0034***	0.9834***	1.0101***	1.0055***
	(0.0093)	(0.0093)	(0.0091)	(0.0099)	(0.0096)	(0.0085)
D(ACTIVITY(-1))	0.0026**	0.0049**	0.0016	0.0078**	0.0023**	0.0031*
	(0.0011)	(0.0022)	(0.0013)	(0.0030)	(0.0010)	(0.0018)
INFLATION(-1)	-0.0005***	-0.0006***	-0.0004***	-0.0005***	-0.0004***	-0.0007***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
D(EXCHANGE RATE(-1))	-4.90E-05*	-0.0001**	-6.72E-05**	-0.0003***	-4.99E-05*	-0.0001**
	(2.69E-05)	(6.89E-05)	(3.12E-05)	(9.06E-05)	(2.68E-05)	(5.27E-05)
MPU(-1))	-0.0008***	-0.0012***	-0.0010***	-0.0026***	-0.0007***	-0.0010***
	(0.0001)	(0.0002)	(0.0002)	(0.0004)	(0.0001)	(0.0002)
SUBPRIME	-0.0013**	-0.002705*			-0.0014**	-0.0020*
	(0.0006)	(0.0014)			(0.0006)	(0.0011)
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99
F-statistic	8590.01		9775.70		9550.98	
Prob(F-statistic)	0.00		0.00		0.00	
J statistic		34.33		18.36		32.78
Prob(J statistic)		0.12		0.36		0.24
Obs	416	375	250	211	394	352
Instruments		33		23		35

Note: table prepared by the authors. Marginal significance levels: *** denotes p-value<0.01; ** denotes p-value <0.05; * denotes p-value <0.1. Robust (Newey-West) standard errors are in parentheses. MPU is *ln_MPU*.

In order to verify the robustness of the results, we estimated specifications with lagged explanatory variables (i.e., at *t-1*) and without lagged explanatory variables (i.e., at *t*). In addition, we also used another proxy of economic activity, the index of business conditions (IBC) (by the Cabinet Office), and we estimated specifications with, and without, this variable. The idea was to show that regardless of the specification used, the results remain the same. We therefore put together a summary table comparing the results found for each specification. Thus, Table 6 reports only the estimated coefficients for EPU, FPU and MPU. As one can see, the results are maintained regardless of the specification. Besides, the results for the control variables were maintained and followed economic theory.[9]

Table 6 Summary table for the results found for EPU, FPU and MPU for each specification

Model specif.			total period		before the subprime crisis		disregarding the Covid-19 pandemic	
Lag	Activity (IBC)		OLS	GMM	OLS	GMM	OLS	GMM
t-1	No	EPU	-0.0018***	-0.0022***	-0.0023***	-0.0030***	-0.0016***	-0.0023***
			(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0004)
t-1	Yes	EPU	-0.0018***	-0.0024***	-0.0020***	-0.0025***	-0.0015***	-0.0030***
			(0.0004)	(0.0005)	(0.0005)	(0.0005)	(0.0004)	(0.0005)
t	No	EPU	-0.0020***	-0.0025***	-0.0025***	-0.0036***	-0.0017***	-0.0025***
			(0.0004)	(0.0005)	(0.0004)	(0.0008)	(0.0004)	(0.0004)
t	Yes	EPU	-0.0020***	-0.0024***	-0.0023***	-0.0038***	-0.0017***	-0.0035***
			(0.0004)	(0.0032)	(0.0005)	(0.0008)	(0.0004)	(0.0005)
Model specif.								
Lag	Activity (IBC)							
t-1	No	FPU	-0.0012***	-0.0014***	-0.0015***	-0.0024***	-0.0010***	-0.0012***
			(0.0003)	(0.0003)	(0.0005)	(0.0005)	(0.0003)	(0.0003)
t-1	Yes	FPU	-0.0012***	-0.0018***	-0.0014***	-0.0018***	-0.0009***	-0.0014***
			(0.0003)	(0.0004)	(0.0004)	(0.0006)	(0.0003)	(0.0003)
t	No	FPU	-0.0014***	-0.0017***	-0.0017***	-0.0030***	-0.0011***	-0.0015***
			0.000406	(0.0003)	(0.0005)	(0.0007)	(0.0003)	(0.0004)
t	Yes	FPU	-0.0014***	-0.0019***	-0.0017***	-0.0029***	-0.0011***	-0.0021***
			0.000421	(0.0004)	(0.0004)	(0.0007)	(0.0003)	(0.0005)
Model specif.								
Lag	Activity (IBC)							
t-1	No	MPU	-0.0008***	-0.0012***	-0.0010***	-0.0026***	-0.0007***	-0.0010***
			(0.0001)	(0.0002)	(0.0002)	(0.0004)	(0.0001)	(0.0002)
t-1	Yes	MPU	-0.0008***	-0.0018***	-0.0007***	-0.0025***	-0.0006***	-0.0011***
			(0.0002)	(0.0003)	(0.0002)	(0.0005)	(0.0002)	(0.0003)
t	No	MPU	-0.0008***	-0.0020***	-0.0011***	-0.0031***	-0.0007***	-0.0017***
			(0.0001)	(0.0004)	(0.0002)	(0.0007)	(0.0001)	(0.0004)
t	Yes	MPU	-0.0010***	-0.0026***	-0.0010***	-0.0034***	-0.0008***	-0.0021***
			(0.0002)	(0.0005)	(0.0002)	(0.0007)	(0.0002)	(0.0004)

Note: table prepared by the authors. Marginal significance levels: *** denotes p-value < 0.01; ** denotes p-value < 0.05; * denotes p-value < 0.1. Robust (Newey-West) standard errors are in parentheses. The EPU, FPU and MPU variables are in natural logarithm.

4.1 Results of estimations by quantile regression

Table 7 presents the results of quantile regressions. All the estimates obtained by quantile regression use the same models, and thus the same explanatory variables as those used previously. In addition, we estimated models with contemporaneous effects (i.e., explanatory variables at *t*) as well as with lagged effects (i.e., explanatory variables at *t-1*). Table 7 reports

[9] The results for the control variables can be made available upon request.

only the estimated coefficients for EPU, FPU and MPU. As before, we present the estimates for the three periods.

The results for the EPU reveal negative and statistically significant coefficients for all periods and quantiles – except for the coefficient obtained for EPU(-1) at the 0.9 quantile for the total period, which is not statistically significant. The results for the EPU show that for higher levels of the BCI, confidence will be less affected by economic policy uncertainty, and this is verified for all samples. Analyzing the estimates of the EPU for the total period, we observe that at quantile 0.1 (i.e., at low levels of confidence), a 10% increase in both EPU and EPU(-1) implies a 0.019% and 0.025% reduction of the BCI, respectively, and at quantile 0.9 (i.e., at high levels of confidence), a 10% increase in EPU causes a 0.007% reduction of the BCI – the coefficient for EPU(-1) at the 0.9 quantile for the total period is not statistically significant. In the sample comprising the period before the subprime crisis, at quantile 0.1, a 10% increase in EPU and EPU(-1) generates a 0.026% and 0.024% reduction of the BCI, respectively, and at quantile 0.9, a 10% increase in EPU and EPU(-1) generates a 0.013% and a 0.011% reduction of the BCI, respectively. Finally, for the period that disregards the Covid-19 pandemic, at quantile 0.1, a 10% increase in EPU and EPU(-1) causes an equal reduction of 0.018% of the BCI, and at quantile 0.9, a 10% increase in EPU and EPU(-1) causes a 0.007% and 0.006% reduction of the BCI, respectively. If the average of the first 4 quantiles is compared with the average of the last 4 quantiles, disregarding the median, this trend remains. In the total period, in the first half of the quantiles, a 10% increase in EPU and EPU(-1) generates an average reduction of 0.020% and 0.017%, respectively, and in the second half, the average reduction is 0.009%. Regarding the period until the subprime crisis, in the first half of the quantiles, the BCI shows an average reduction of 0.025% and 0.022% with the 10% increase in the EPU and EPU(-1), respectively, and a reduction of 0.019% and 0.016% in the second half of the quantiles. For the period that disregards the covid-19 pandemic, in the first half, a 10% increase in EPU and EPU(-1) causes an average reduction of 0.016% and 0.015% in BCI, respectively, and in the second half an average reduction of 0.012%. and 0.009%.

Analyzing the results for both FPU and MPU, the coefficients are negative and, in most cases, significant. However, for some high quantiles (where confidence is high), the coefficients are not statistically significant. Both FPU and MPU are not significant for quantile 0.9 in the total period and in the period disregarding the Covid-19 pandemic, in the latter period, the coefficients for the 0.8 quantile are also not significant. The pattern of lower quantiles (which have lower levels of business confidence) showing more intense effects of FPU and MPU on the BCI is maintained. For all analyzed periods, the effects of both FPU and MPU on the BCI are greater at the lowest quantiles than at the highest quantiles. Taking the lowest quantile (0.1) to be analyzed (where business confidence is extremely low), it can be seen for all periods that the effects of fiscal policy uncertainties are stronger than monetary policy uncertainties. This pattern is repeated in the highest quantiles (i.e., quantiles 0.7 and 0.8, where there are statistically significant coefficients, and business confidence is higher): it can be seen, for all periods, that the effects of fiscal policy uncertainties are stronger than those of monetary policy uncertainties.

Again, the results for the control variables were maintained and are in line with economic theory.[10]

Overall, the results suggest economic policy uncertainties affect business confidence more when businessmen are less confident (more pessimistic) than when they are more confident (more optimistic). Besides, fiscal policy uncertainties have stronger effects than monetary policy uncertainties.

[10] The results for the control variables can be made available upon request.

Table 7 Quantile regression (estimated coefficients for EPU, FPU and MPU)

total period									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
EPU(-1)	-0.0025***	-0.0016***	-0.0014***	-0.0014***	-0.0016***	-0.0015***	-0.0013***	-0.0008**	-0.0003
EPU	-0.0019***	-0.0023***	-0.0020***	-0.0017***	-0.0018***	-0.0020***	-0.0015***	-0.0010***	-0.0007*
before the subprime crisis									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
EPU(-1)	-0.0024***	-0.0023***	-0.0021***	-0.0020***	-0.0017***	-0.0020***	-0.0017***	-0.0016***	-0.0011**
EPU	-0.0026***	-0.0024***	-0.0027***	-0.0025***	-0.0022***	-0.0022***	-0.0019***	-0.0021***	-0.0013*
disregarding the Covid-19 pandemic									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
EPU(-1)	-0.0018***	-0.0014***	-0.0012***	-0.0014***	-0.0014***	-0.0013***	-0.0012***	-0.0007**	-0.0006*
EPU	-0.0018***	-0.0015***	-0.0016***	-0.0016***	-0.0018***	-0.0018***	-0.0015***	-0.0009**	-0.0007*

total period									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
FPU(-1)	-0.0016***	-0.0010***	-0.0010***	-0.0010***	-0.0010***	-0.0009***	-0.0008***	-0.0005*	-0.0002
FPU	-0.0014***	-0.0012***	-0.0011***	-0.0011***	-0.0014***	-0.0011***	-0.0011***	-0.0006*	-0.0004
before the subprime crisis									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
FPU(-1)	-0.0021***	-0.0014***	-0.0015***	-0.0015***	-0.0011***	-0.0012**	-0.0011**	-0.0008*	-0.0004
FPU	-0.0022***	-0.0019***	-0.0019***	-0.0017***	-0.0015***	-0.0017***	-0.0013***	-0.0008**	-0.0009*
disregarding the Covid-19 pandemic									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
FPU(-1)	-0.0009**	-0.0008***	-0.0008***	-0.0009***	-0.0009***	-0.0008***	-0.0007***	-0.0004	-0.0002
FPU	-0.0013***	-0.0009***	-0.0010***	-0.0010***	-0.0011***	-0.0010***	-0.0010***	-0.0005	-0.0004

total period									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
MPU(-1)	-0.0012***	-0.0010***	-0.0009***	-0.0007***	-0.0007***	-0.0006***	-0.0004***	-0.0002	-7.58E-06
MPU	-0.0011***	-0.0011***	-0.0009***	-0.0010***	-0.0010***	-0.0009***	-0.0006***	-0.0003*	-8.84E-05
before the subprime crisis									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
MPU(-1)	-0.0010***	-0.0010***	-0.0010***	-0.0008***	-0.0008***	-0.0007***	-0.0006***	-0.0004**	-0.0002
MPU	-0.0012***	-0.0014***	-0.0012***	-0.0011***	-0.0009***	-0.0008***	-0.0005**	-0.0007**	-0.0005
disregarding the Covid-19 pandemic									
Quantile	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
MPU(-1)	-0.0009***	-0.0009***	-0.0008***	-0.0007***	-0.0006***	-0.0005***	-0.0004***	-0.0002	-0.0001
MPU	-0.0010**	-0.0010***	-0.0009***	-0.0008***	-0.0008***	-0.0006***	-0.0005***	-0.0002	-0.0001

Note: table prepared by the authors. Marginal significance levels: *** denotes p-value<0.01; ** denotes p-value <0.05; * denotes p-value <0.1. Standard errors are in parentheses.

4.2 Results of impulse-response functions: VAR analysis

Figures 2, 3 and 4 show the results of the generalized impulse-response functions for the models with EPU, FPU and MPU, respectively, for each of the three samples.

Regarding EPU, we observe that a positive shock in EPU implies a statistically significant reduction in the BCI. For the total period, the statistically significant effect lasts approximately 9 months, for the period until before the subprime crisis, the statistically significant effect lasts approximately 8 months, and for the period disregarding the Covid-19 pandemic the statistically significant effect lasts approximately 11 months.

Analyzing the effects of fiscal policy uncertainty (FPU), we observe that a positive shock to this indicator results in a lasting statistically significant reduction in the BCI for the total period and for the period disregarding the Covid-19 pandemic. In turn, for the period until before the subprime crisis, the adverse effect was statistically significant just for a short period of time (the effects last approximately 2 months). For the total period, the statistically

significant effect lasts approximately 9 months, and for the period disregarding the Covid-19 pandemic the statistically significant effect lasts approximately 12 months.

Regarding the effects of monetary policy uncertainty (MPU), a positive shock to monetary policy uncertainty also generates a statistically significant reduction in the BCI for all analyzed samples. The duration of the shocks is quite similar in each of the analyzed samples. For the sample comprising the total period and for the sample disregarding the Covid-19 pandemic, we observe that a positive shock causes a statistically significant reduction in the BCI for approximately 9 months. For the period until before the subprime crisis, a positive shock causes a statistically significant reduction for approximately 10 months.

Regarding the control variables, economic activity is the variable that most affects the BCI, with lasting effects in all models and periods analyzed. On the other hand, inflation shows negative effects.

Figure 2 Impulse-response functions (EPU)

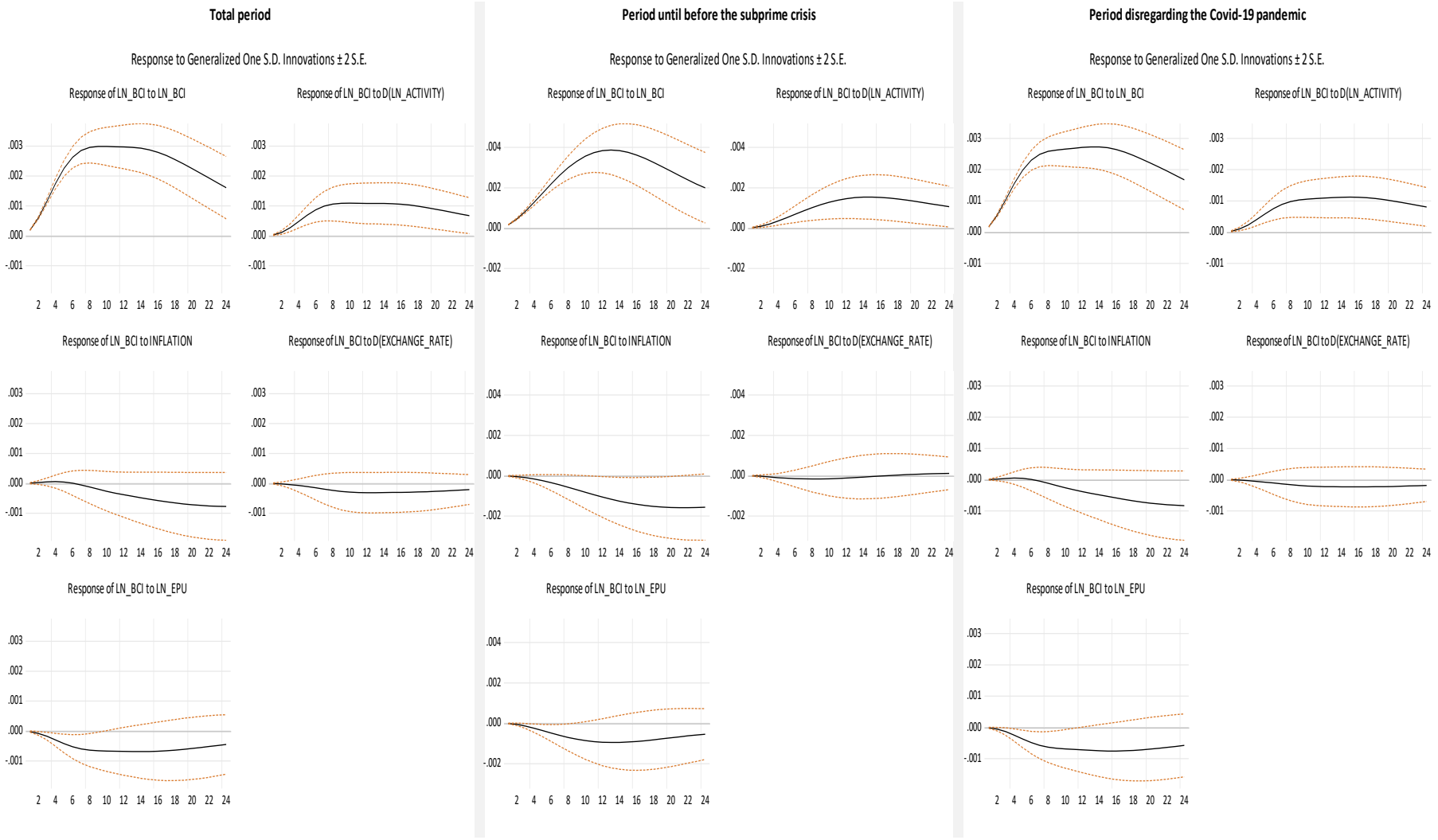


Figure 3 Impulse-response functions (FPU)

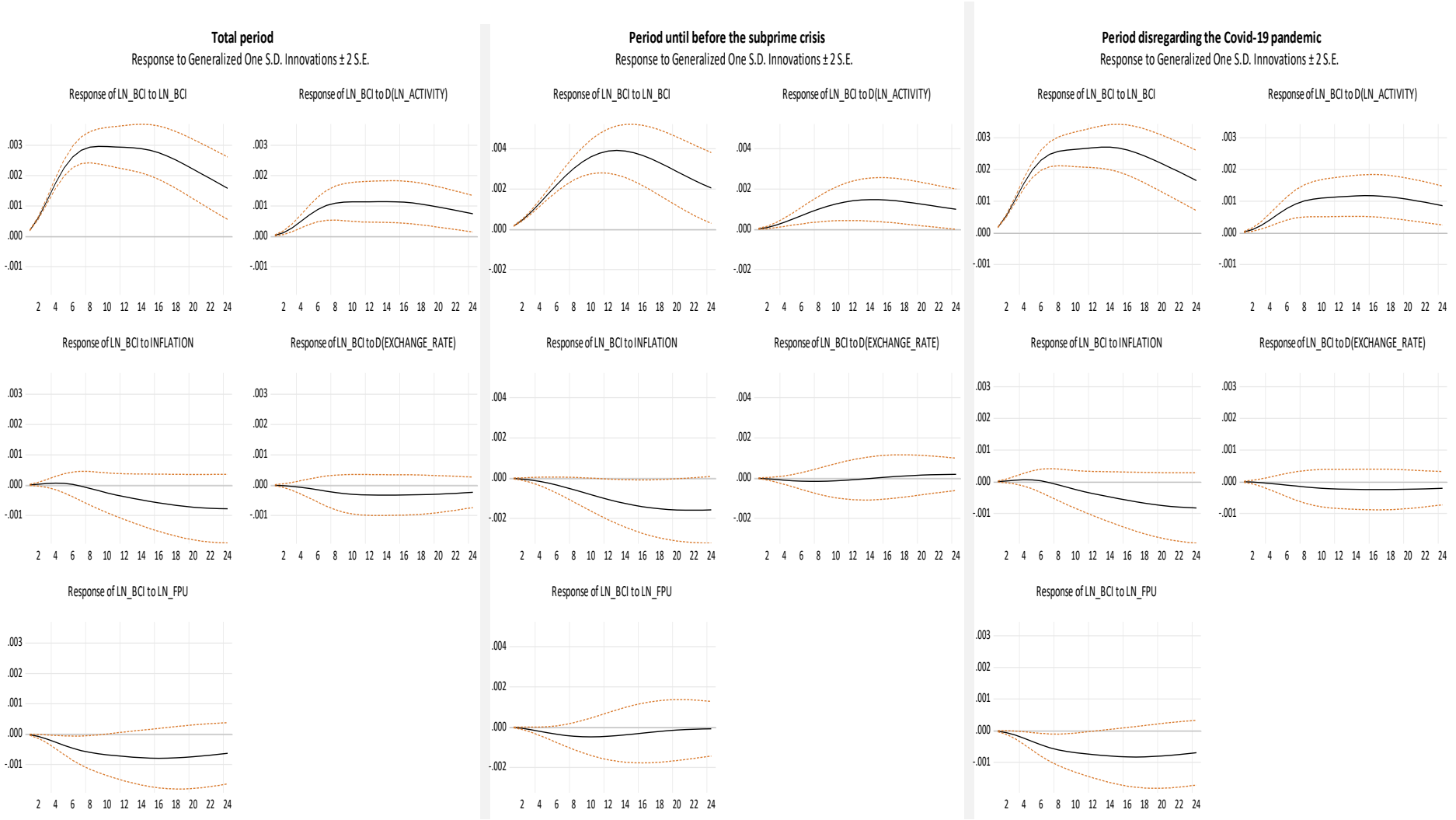
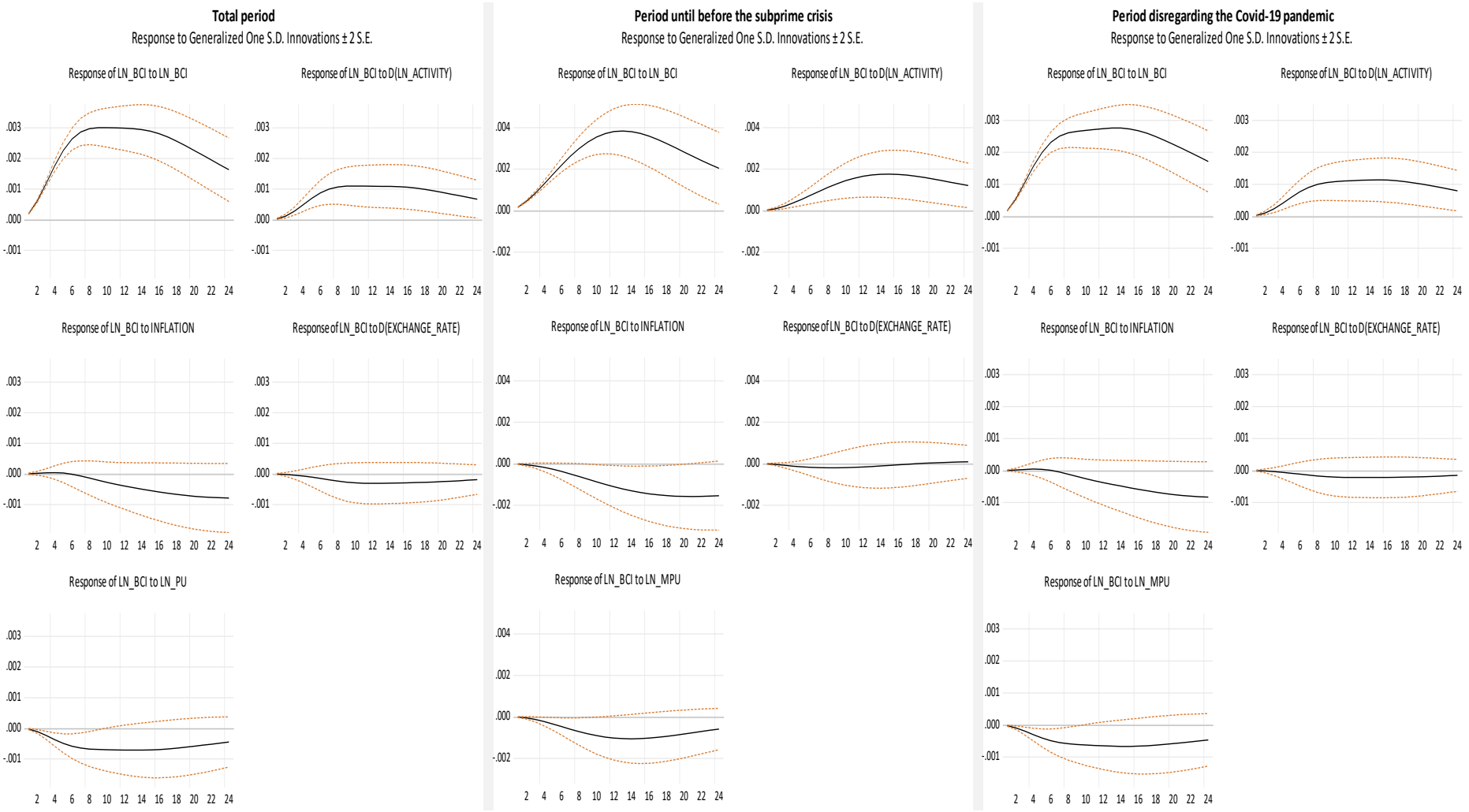


Figure 4 Impulse-response functions (MPU)



We also estimate structural VARs for more parsimonious models containing only the following variables: D(Activity), PU and BCI. In this case, PU represents policy uncertainty, which can be EPU, FPU or MPU. Thus, we estimate three models for the total period. The models were controlled using dummy variables for SUBPRIME and COVID. We provide information about the estimation of the structural VARs in Appendix B. The impulse-response graphs are also reported in Appendix B. The results corroborate those already found.

5. Conclusion

This study presented evidence that business confidence in Japan is negatively affected by economic policy uncertainties, and specifically by fiscal and monetary policy uncertainties. The results were persistent and verified for all samples and by different econometric techniques. Therefore, uncertainties related to economic policies reported in the Japanese media have an influence on business confidence in Japan.

Analyzing the results of estimations by quantile regression, we observe that when entrepreneurs have higher levels of confidence, the effect of uncertainties is smaller compared to lower levels of confidence. Therefore, when businessmen are optimistic (and confidence is high), they are less influenced by uncertainties generated by the media than when they are pessimistic about the economy.

Regarding the dynamic analysis through VAR, the results converge with those described above. The shocks of increases in uncertainty are generally reflected in persistent and lasting reductions in business confidence. In turn, if, on the one hand, shocks to inflation also implied reductions in business confidence, on the other hand, business confidence increased with shocks to economic activity, which is a relevant variable in the formation of business expectations.

The results recommend that policymakers should adopt measures that minimize the uncertainties generated (such as, increases in transparency and clarity in the adoption of economic policies), given that uncertainties influence expectations of entrepreneurs and consequently their decision-making. In addition, in line with Arbatli et al. (2022) recommendations, we also suggest that credible policy plans and strong policy frameworks can favorably influence business confidence by, in part, reducing economic policy uncertainty.

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Appendix A

Table A1 Descriptive statistics

Variables	Mean	Median	Max	Min	Std Dev
BCI	100.071	100.178	103.123	96.811	1.476
EPU	103.211	95.447	241.929	46.374	34.023
FPU	102.251	95.219	300.003	43.290	40.484
MPU	102.435	92.919	387.696	19.784	50.551
ACTIVITY	17784.310	17389.430	38915.870	7568.420	6414.019
INFLATION	0.489	0.200	4.200	-2.500	1.218
EXCHANGE RATE	112.791	111.345	158.606	76.654	16.199

Note: table prepared by the authors.

Table A2 Unit root tests

Series	ADF				PP				KPSS			
	Eq	Lag	test-stat	10%	Eq	Band	test-stat	10%	Eq	Band	test-stat	1%
BCI	I	4	-3.409	-2.570	I	14	-2.940	-2.570	I	16	0.183	0.739
EPU	I/T	0	-7.380	-3.132	I/T	3	-7.064	-3.132	I/T	14	0.070	0.216
MPU	I/T	0	-10.418	-3.133	I/T	9	-11.153	-3.133	I/T	13	0.097	0.216
FPU	I/T	0	-7.491	-3.133	I/T	2	-7.244	-3.133	I/T	14	0.085	0.216
ACTIVITY	I	0	-1.514	-2.570	I	6	-1.584	-2.570	I	16	0.664	0.739
D(ACTIVITY)	none	0	-19.708	-1.616	none	5	-19.616	-1.616				
INFLATION	none	12	-2.374	-1.616	none	1	-2.991	-1.616	I/T	16	0.217	0.216
EXCHANGE RATE	none	1	-0.907	-1.616	I	8	-2.908	-2.570	I	16	0.984	0.739
D(EXCHANGE RTE)	none	0	-15.186	-1.616	none	15	-14.858	-1.616	I	9	0.151	0.739

Note: table prepared by the authors. ADF: the final choice of lag was made based on Schwarz information criterion. PP and KPSS: Band is the bandwidth truncation chosen for the Bartlett kernel. "I" denotes intercept, and "I/T" denotes intercept and trend. "D" is the first difference operator.

Table A3 Schwarz information criterion

Lag	Total period			Before subprime			Before Covid-19		
	EPU	FPU	MPU	EPU	FPU	MPU	EPU	FPU	MPU
0	-0.18	0.13	0.84	0.14	0.39	1.40	-0.08	0.23	0.96
1	-8.08	-7.63	-6.59	-8.01	-7.48	-6.31	-8.14	-7.66	-6.63
2	-10.21	-9.80	-8.80	-10.39	-9.97	-8.75	-10.38	-9.95	-8.93
3	-10.96	-10.55	-9.57	-11.02*	-10.60*	-9.38*	-11.05	-10.62	-9.62
4	-11.05*	-10.63*	-9.65*	-10.95	-10.52	-9.29	-11.16*	-10.73*	-9.72*
5	-10.87	-10.46	-9.48	-10.67	-10.26	-9.03	-10.97	-10.55	-9.54
6	-10.59	-10.17	-9.20	-10.23	-9.79	-8.58	-10.69	-10.26	-9.26
7	-10.28	-9.89	-8.90	-9.77	-9.36	-8.16	-10.37	-9.97	-8.96
8	-9.95	-9.56	-8.58	-9.29	-8.88	-7.67	-10.03	-9.62	-8.62

Note: table prepared by the authors.

Appendix B Structural VAR

The structural VAR (SVAR) model is:

$$AY_t = \beta + \gamma Y_{t-p} + \varepsilon_t$$

SVAR identification is about imposing restrictions on matrix *A* (the matrix of contemporaneous effects). The procedures adopted were as follows: 1) the lag order (*p*) of the VAR was defined by the Schwarz information criterion (SIC); 2) the VAR in its reduced form was estimated; 3) we impose restrictions on matrix *A* (contemporaneous relations); 4) we

estimate the structural VAR, and; 5) we carry out the impulse-response analysis. Below we present the structure of the models in terms of restrictions imposed.[11]

In this model, the vector Y_t is formed by:

$$Y_t = \begin{bmatrix} PU \\ d(Activity) \\ BCI \end{bmatrix}$$

Where *PU* represents policy uncertainty (which can be *EPU*, *FPU* or *MPU*). In this case, BCI and *d*(Activity) do not affect PU contemporaneously and BCI does not affect *d*(*Activity*) contemporaneously.[12] Thus, with these restrictions, matrix *A* is defined as follows:

$$A = \begin{bmatrix} 1 & 0 & 0 \\ a_{21} & 1 & 0 \\ a_{31} & a_{32} & 1 \end{bmatrix}$$

Figures B1, B2 and B3 show the results for EPU, FPU and MPU, respectively. We observe that positive shocks in EPU, FPU and MPU imply statistically significant reductions in the BCI. Again, the effects of both EPU and FPU on BCI last approximately 9 months. In turn, the effect of MPU on BCI last approximately 8 months. The results corroborate previously reported findings.

Figure B1 Impulse-response functions (EPU) – total period. Lag order based on SIC ($p = 4$)

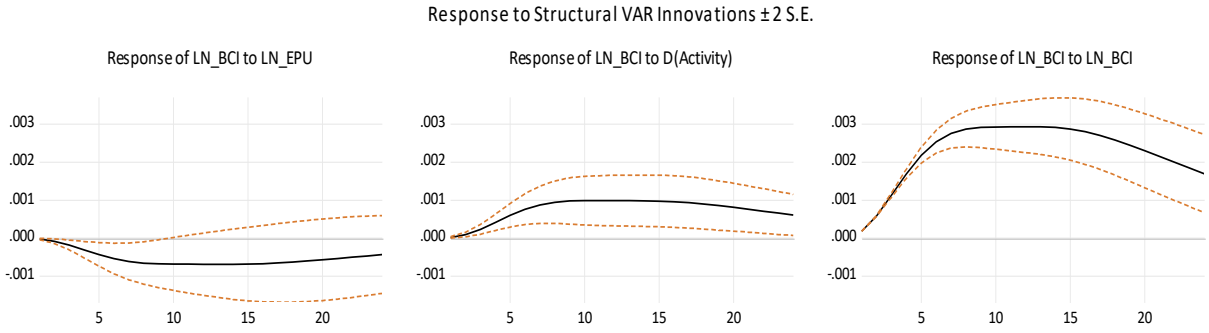
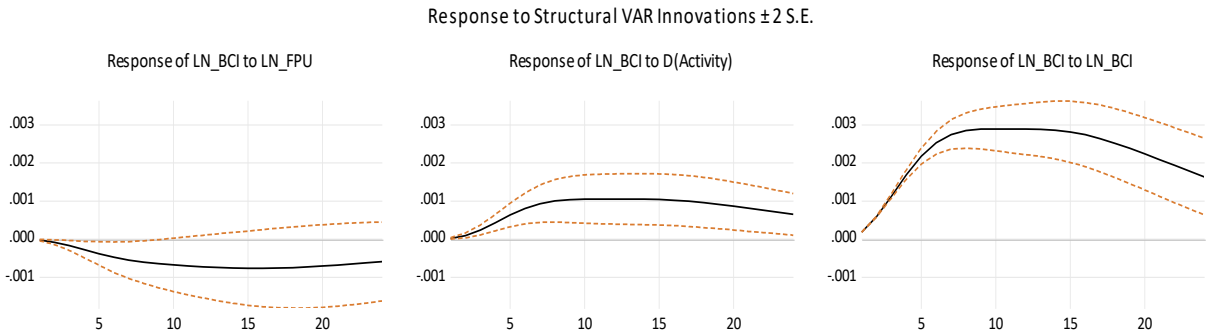


Figure B2 Impulse-response functions (FPU) – total period. Lag order based on SIC ($p = 4$)



[11] All models include an intercept and, as exogenous variables, are controlled with the dummy variables Subprime and Covid.

[12] We also tested another restriction on matrix *A* – in which BCI and d(Activity) do not affect PU contemporaneously and d(Activity) does not affect BCI contemporaneously – and we could see that the results are exactly the same.

Figure B3 Impulse-response functions (MPU) – total period. Lag order based on SIC ($p = 4$)