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Economic Policy Uncertainty and Banks' Interest Income: Empirical Evidence from an International Panel Dataset

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Abstract

In this paper, we provide the first cross-country empirical evidence on the relationship between economic policy uncertainty (EPU) and banks' interest income activities (measured using the net interest income). Using bank-level panel data of 3,252 banks in 16 economies over the period 2009-2018, we show that EPU has a negative and statistically significant effect on banks' net interest income (NII). Specifically, we find that banks' NII decreases as the level of EPU increases. We also show that this reduction is due to the reduction in other interest income which is only partially offset by the reduction in other interest expense. Finally, our results show that the reduction in banks' net interest income (associated with an increase in EPU) is stronger for banks located in countries where negative interest rates are in place.

1. Introduction

The last two decades have witnessed a lot of uncertainty and as a consequence, renewed research interest in the economic implications of uncertainty (see, Baker et al. 2013; Baker et al. 2016; Ahir et al. 2018). Since the 2008 global financial crisis, several empirical studies have examined the impact of economic policy uncertainty (EPU) with much emphasis on the macroeconomic effects (Bloom, 2009; Balcilar et al. 2016; Barrero et al. 2017; Ghirelli et al. 2019). Another strand of empirical studies has examined the transmission channels through which EPU can affect the real economy. Central to this discussion is the role of banks in transmitting the effects of EPU via the lending channel (see, Bordo et al. 2016; Chi and Li, 2017; Ashraf and Shen, 2019; Alessandri and Bottero, 2020)[1]. Despite being profoundly important, the effect of EPU on banks income-generating activities remains relatively unknown. The present study seeks to understand how banks adjust their income-generating activities amidst rising economic policy uncertainty.

Theoretically, economic policy uncertainty can impact banks' interest income via three main channels. First, heightened EPU could impair the effectiveness of banks intermediation process as banks and economic agents adopt precautionary behaviors. Empirical studies have shown that banks and depositors prefer to hold cash in times of high economic policy uncertainty (Barrero et al. 2017; Berger et al. 2020). Consequently, limiting credit growth and its associated interest income (Bordo et al. 2016; Chi and Li, 2017; Ashraf and Shen, 2019; Alessandri and Bottero, 2020).

Second, increased uncertainty could impact banks' investments such as debt securities, trading book items, short-term funds, and investment securities. Indeed, the increase in EPU could negatively affect banks as securities held by banks (among others, bonds, and other traded financial instruments) lose value (Pastor and Veronesi, 2013). Banks are therefore reluctant to invest in financial products in the face of uncertainty (Gulen and Ion, 2015). Third, EPU could impact banks' interest income by impairing the effective transmission of monetary policy. Aastveit et al. (2017), for example, find that heightened economic policy uncertainty dampens the effect of monetary policy shocks. Studies have also shown that low and negative interest rates adversely affect banks' profits and interest margins (Molyneux et al. 2019; Boungou and Mawusi, 2021). By extension, one would expect the effect of EPU in a negative interest rate environment to be more problematic as banks are reluctant to charge negative interest rates on their customers' deposits, and economic agents are reluctant to take risks when uncertainty is high. In this context banks may resort to fee-based revenues and cost-effective strategies such as digitalization (see, Molyneux et al. 2019; Lopez et al. 2020).

Against this backdrop, this paper examines whether and how EPU affects banks' income-generating activities. We structure our analysis as follows: (i) we analyze how a high EPU environment affects the net interest income (NII) of banks; (ii) we decompose NII into gross interest income and gross interest expenses to better identify how an increase in EPU affects banks' interest income; (iii) how negative interest rates affects the relationship between EPU and the net interest income of banks. In doing so, we use the novel economic policy uncertainty index of Baker et al. (2016) to proxy EPU, with

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[1] See Al-Thaqeb and Algharabali (2019) for a review of the literature on the impact of economic policy uncertainty on businesses and economies around the world.

data from 3,252 banks operating in 16 countries over the period 2009-2018. Figure 1 shows the evolution of global uncertainty.

Figure 1. Evolution of the global uncertainty
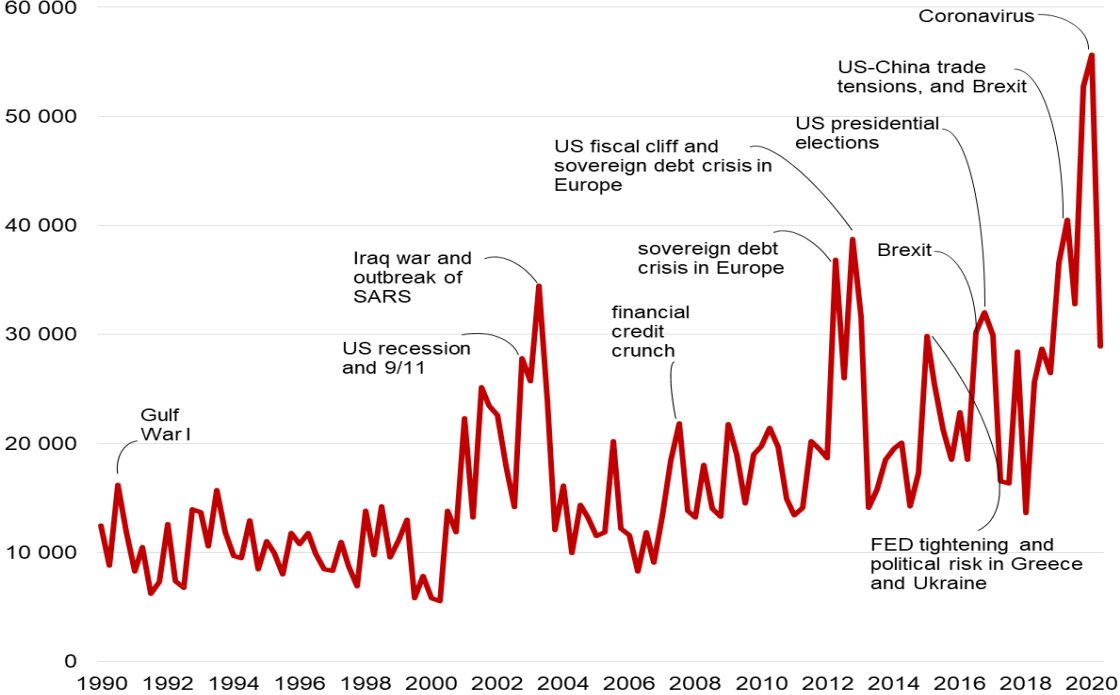
Source: Ahir et al. (2018)

This paper differs from the existing literature in three respects. First, we provide the first cross-country empirical evidence of the effects of EPU on banks' interest income activities. We find that increases in EPU lead to a reduction in the banks' net interest income. Second, we provide an alternative channel (Bank channel) via which EPU can impact the real economy. Indeed, our findings suggest that the reduction in net interest income due to EPU comes from the reduction in other interest income (such as debt securities, trading book items, short-term funds, and investment securities), which is partially offset by the reduction in other interest expenses (such as repurchase agreements, commercial paper). Third, we provide further analysis of the relationship between EPU and bank net interest income by comparing countries that have adopted negative interest rates with those that have not. Our results highlight that the reduction in banks' net interest income (associated with an increase in EPU) is stronger for banks located in countries where negative interest rates are in place. Finally, by using a large panel of data covering 3,252 banks in 16 countries over the period 2009-2018, we complement existing studies that typically focus on the macroeconomic effects of EPU (Bloom, 2009; Pastor and Veronesi, 2013; Balcilar et al. 2016; Barrero et al. 2017; Ghirelli et al. 2019), and focus primarily on a single country in a domestic context (among others, Bordo et al. 2016; Chi and Li, 2017; Ghirelli et al. 2019; Alessandri and Bottero, 2020; Tran et al. 2020).

The remainder of the paper is organized as follows. Section 2 describes our data and empirical specification. Section 3 reports and discusses our empirical findings. Section 4 concludes.

2. Data and empirical specification

In this paper, we analyze the effect of economic policy uncertainty (EPU) on banks' interest income activities. We collect bank data from the Fitch Connect database and macroeconomic data from the IMF and Datastream. Our database consists of 3,252 banks located in 16 economies (i.e. Australia, Canada, France, Germany, Greece, Ireland, Italy, Japan, Korea, Mexico, Netherlands, Singapore, Spain, Sweden, the United Kingdom, and the United States) over the period 2009-2018. The overall data comprises 22,290 observations. To mitigate against potential outliers, we winsorized the bank-level data at the 1st and 99th percentile levels.

We proxy economic policy uncertainty using the EPU index developed by Baker et al. (2016), which is widely used in the recent literature (see, Al-Thaqeb et al. 2019)[2]. We measure banks' interest income activities using net interest income decomposed into gross interest income and gross interest expenses[3]. To better explore how EPU impacts banks' interest income, we decompose the gross interest income into interest income on loans, and other interest income (such as debt securities, trading book items, short-term funds, and investment securities). We also break down the gross interest expenses into interest expenses on customer deposits and other interest expenses (such as repurchase agreements and commercial paper). All the interest income flows are scaled by total assets.

To obtain more robust results, we include both bank-specific and country-specific controls (related to the banks' balance sheets and the environment in which they operate) that are likely to affect the banks' ability to generate interest income. Based on the literature on bank performance, we consider in our estimates five standard bank-specific controls. As bank-specific controls, we include the natural logarithm of banks' total assets, liquid asset to total asset ratio, equity to asset ratio, customer deposits to total asset, and gross loans to customer deposits. Since our study period is often associated with a change in monetary policy regime in many currency areas (e.g. from pure inflation targeting to quantitative easing), and with a zero lower bound environment for interest rates (sometimes even with the implementation of negative interest rates by some central banks), we also include in our estimates country-specific controls. These country-specific variables will allow us to control for these different developments that could also have an impact on banks' ability to generate interest income. For country-specific controls, we include the Herfindahl-Hirschman index, inflation rate, real GDP growth rate, fiscal policy[4], unemployment rate, and real interest rate.

Based on previous work on economic policy uncertainty and banks' behavior (including Bordo et al. 2016; Alessandri and Bottero, 2020; Berger et al. 2020), we use a standard OLS model with fixed effects. Therefore, we design the following regression model to assess the impact of EPU on banks' interest income activities:

$$Banks\_Income_{i,k,t} = c + \alpha_1 EPU_{k,t} + \alpha_2 X_{i,k,t} + \alpha_3 Y_{k,t} + \theta_t + \lambda_i + \varepsilon_{i,k,t} \quad (1)$$

where $Banks\_Income_{i,k,t}$ denotes net interest income (and its decomposition) of the bank i located in country k in year t. $EPU_{k,t}$ is the economic policy uncertainty index

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[2] Visit this website for the details on constructing the EPU index: thttp://www.policyuncertainty.com

[3] Net interest income is the difference between gross interest income and gross interest expense.

[4] General government structural balance as a percentage of potential GDP.

for country k in year t. While $X_{i,k,t}$ refers to bank-specific controls, $Y_{k,t}$ denotes to country-specific controls. θ_t, λ_i, $\varepsilon_{i,k,t}$ denote the time fixed-effects, bank fixed-effects, and idiosyncratic error, respectively. Standard errors are robust and clustered at the bank level. To mitigate the problems of endogeneity, we lag the EPU index and bank-specific variables (Chi and Li, 2017; Berger et al. 2020; Wu et al. 2020b)[5].

3. Empirical Findings

3.1. Baseline results

The results on the relationship between EPU and banks' interest income activities are presented in Tables 1-3, with Table 1 showing the results for net interest income. Tables 2 and 3 present the results based on the decomposition of net interest income into gross interest income (Table 2) and gross interest expense (Table 3), respectively.

Table 1 presents the results when net interest income is used as the dependent variable. Considering only bank-specific controls (Column I) or country-specific controls (Column II) or including all controls (Column III), the results show a negative and significant relationship between EPU and banks' net interest income. The findings reveal that an increase in economic policy uncertainty of 1 percentage point (pp) induces a reduction in banks' net interest income of 0.089 pp (see Column III). This is consistent with the idea that banks struggle to generate interest income (especially from their financial intermediation activity) when the level of economic policy uncertainty increases (Bordo et al. 2016; Alessandri and Bottero, 2020). Besides, our finding is consistent with the results of the literature on EPU and bank lending behavior (see Bordo et al. 2016; Chi and Li, 2017; Alessandri and Bottero, 2020), which suggests that EPU reduce banks' incentives to lend[6]. Indeed, faced with a high level of EPU, banks may prefer to hoard rather than finance projects (Berger et al. 2020). Besides, banks may apply high-interest rates on gross loans (Ashraf and Shen, 2019). The lack of reliable opportunities would thus reduce banks' interest income. To further determine how EPU affects bank income, we decompose net interest income into gross interest income (Table 2) and gross interest expense (Table 3).

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[5] Following the previous literature on EPU (among others, Bilgin et al. 2020; Canh et al. 2020) our results remain unchanged even when using two-step System GMM estimator (results not reported but available on request).

[6] Ashraf and Shen (2019) also find that EPU is associated with higher average interest rates on bank gross loans.

Table 1. EPU and bank net interest income

	Net interest income		
	(I)	(II)	(III)
EPU_t-1	-0.103**	-0.109**	-0.089*
	[0.00]	[0.05]	[0.04]
R2(within)	0.042	0.040	0.044
Bank controls_t-1	Yes	No	Yes
Country controls	No	Yes	Yes
Observations	22290	22290	22290
Number of banks	3252	3252	3252

Note: EPU_t1 refers to Economic Policy Uncertainty index lagged by one year. All estimates include bank fixed-effects and year fixed-effects. The controls include both bank-specific controls (natural logarithm of total assets, liquid assets to total assets ratio, equity to assets ratio, customer deposits to total assets, gross loans to customer deposits) and country-specific controls (Herfindahl-Hirschman index, inflation rate, real GDP growth rate, fiscal policy, unemployment rate, real interest rate). ***, ** and * indicate statistical significance a the 1%, 5%, and 10% levels respectively.

Tables 2 present the results of the estimates on the relationship between EPU and banks' gross interest income (Column I), which are broken down into interest income on loans (Column II) and other interest income (Column III). We find a negative and statistically significant relationship between EPU and bank gross interest income. Our findings suggest that increasing EPU by 1 pp leads to a reduction in gross interest income by 0.214 pp. This reduction in gross interest income comes mainly from the reduction in other interest income (such as debt securities, trading book items, short-term funds, and investment securities) by 0.167 pp. This result emphasizes that the reduction in net interest income is due to a reduction in other interest income rather than a reduction in interest income on loans. This finding also suggests that the increase in EPU leads to a reduction in income from non-intermediation activities of banks, such as income from financial assets. This is also consistent with the work of Pastor and Veronesi (2013) who show that in the face of increasing uncertainty incomes in financial markets are lower.

Table 2. EPU and bank interest income

	Gross interest income	Interest income on loans	Other interest income
	(I)	(II)	(III)
EPU_t-1	-0.214**	-0.047	-0.167***
	[0.10]	[0.10]	[0.06]
R2(within)	0.164	0.086	0.066
Controls	Yes	Yes	Yes
Observations	22290	22290	22290
Number of banks	3252	3252	3252

Note: EPU_t1 refers to Economic Policy Uncertainty index lagged by one year. All estimates include bank fixed-effects and year fixed-effects. The controls include both bank-specific controls (natural logarithm of total assets, liquid assets to total assets ratio, equity to assets ratio, customer deposits to total assets, gross loans to customer deposits) and country-specific controls (Herfindahl-Hirschman index, inflation rate, real GDP growth rate, fiscal policy, unemployment rate, real interest rate). ***, ** and * indicate statistical significance a the 1%, 5%, and 10% levels respectively.

Finally, we study how banks' interest expenses evolve in a high EPU environment, which affects banks' interest income. Table 3 reports the results of the effects of EPU on

bank interest expense. The results show a negative relationship between EPU and gross interest expense (although not statistically significant). This reduction in gross interest expense due to high EPU comes from a reduction in other interest expense of 0.140 pp. Indeed, the increase in EPU, by impacting the investment decisions of households, would reduce the cost of bank participation in market activities (Bloom, 2009; Gulen and Ion, 2015; Barrero et al. 2017; Al-Thaqeb and Algharabali, 2020).

Overall, we show that high economic policy uncertainty reduces banks' net interest income. This reduction in net interest income (-0.089 pp) stems mostly from the reduction in other interest income (-0.167 pp), which is partially compensated for by a reduction in other interest expense (-0.140 pp). Moreover, we recognize that other factors such as historically low-interest rates since the 2008 crisis and changes in the banking industry (e.g., fintech innovations) may also impact banks' ability to generate interest income. Therefore, in the following section we re-estimate the baseline results taking into account these different contexts by (i) adding other banking variables related to developments in the banking sector; (ii) comparing changes in banks' net interest income between countries affected by negative interest rates and countries unaffected by this policy.

Table 3. EPU and bank interest expense

	Gross interest expense	Interest expense on deposits	Other interest expense
	(I)	(II)	(III)
EPU_t-1	-0.125	0.015	-0.140**
	[0.09]	[0.04]	[0.06]
R2(within)	0.188	0.022	0.240
Controls	Yes	Yes	Yes
Observations	22290	22290	22290
Number of banks	3252	3252	3252

Note: EPU_t1 refers to Economic Policy Uncertainty index lagged by one year. All estimates include bank fixed-effects and year fixed-effects. The controls include both bank-specific controls (natural logarithm of total assets, liquid assets to total assets ratio, equity to assets ratio, customer deposits to total assets, gross loans to customer deposits) and country-specific controls (Herfindahl-Hirschman index, inflation rate, real GDP growth rate, fiscal policy, unemployment rate, real interest rate). ***, ** and * indicate statistical significance a the 1%, 5%, and 10% levels respectively.

3.2. Economic policy uncertainty, banks specialization, and negative interest rate environment

In this subsection, we re-examine the relationship between EPU and banks' net interest income considering bank specialization and the negative interest rate environment. First, we recognize that changes in the banking industry (e.g., fees as well as the nature of financial services provided by banks) in recent years as a result of fintech innovations may (along with EPU) impact banks' ability to generate income. In doing so, we add to the net interest income equation two other variables related to the banking sector. We include (i) fees and commissions; (ii) other non-interest income such as net gains (losses) on trading and derivatives, net gains (losses) on other securities, and net insurance income. These two additional variables are scaled by total assets, and capture to a lesser extent the structural changes in the banking industry (i.e., bank specialization).

Second, the reduction in interest income is arguably due not only to economic policy uncertainty but also to historically low interest rates since the Great Recession. The recent introduction of negative policy interest rates by several European central banks and the Bank of Japan would add to the bill for banks. Taking this into account we divide our sample into two groups of countries: banks located in countries that have adopted negative interest rates (NIRP-affected) and those that have not (NIRP-unaffected). While NIRP-affected countries include France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Spain, and Sweden, NIRP-unaffected countries include Australia, Canada, Korea, Mexico, Singapore, the United Kingdom, and the United States. This distinction allows us to compare the effects of EPU on net interest income across countries according to the level of policy interest rates.

The results of our two additional analyses are reported in Table 4. Overall, we find similar results to our baseline, even controlling for banking sector specialization and the level of key interest rates. Notably, an increase in EPU reduces banks' net interest income. Moreover, our results highlight that the effects of EPU on banks' net interest income are stronger for banks located in countries where negative interest rates are in place. This result is consistent with the literature that suggests that negative interest rates reduce bank interest margins (see, Boungou, 2019; Molyneux et al. 2019; Lopez et al. 2020).

Table 4. EPU, bank specialization, and NIRP

| | Net interest income | | |
	Bank specialization	NIRP-affected	NIRP-unaffected
EPU_t-1	-0.076**	-0.073*	0.009
	[0.03]	[0.06]	[0.17]
R2(within)	0.126	0.050	0.113
Bank controls_t-1	Yes	Yes	Yes
Country controls	Yes	Yes	Yes
Observations	20510	19865	2425
Number of banks	3060	2814	438

Note: EPU_t1 refers to Economic Policy Uncertainty index lagged by one year. All estimates include bank fixed-effects and year fixed-effects. The controls include both bank-specific controls (natural logarithm of total assets, liquid assets to total assets ratio, equity to assets ratio, customer deposits to total assets, gross loans to customer deposits) and country-specific controls (Herfindahl-Hirschman index, inflation rate, real GDP growth rate, fiscal policy, unemployment rate, real interest rate). ***, ** and * indicate statistical significance a the 1%, 5%, and 10% levels respectively.

4. Conclusion

In this paper, we investigate the effects of economic policy uncertainty (EPU) on banks' interest income activities, which have been underexplored in the extant literature. Based on data from 3,252 banks located in 16 countries over the period 2009-2018, we find a negative and statistically significant relationship between EPU and banks' interest income activities (measured using the net interest income). This indicates that in times of high economic policy uncertainty, banks' net interest income decreases. Further analysis highlights that this reduction in net interest income comes from a reduction in other interest income that is only partially compensated for by the reduction in other

interest expenses. We also find that the reduction in the net interest income (due to EPU) is stronger for banks located in countries affected by negative interest rates.

A possible extension of our analysis could be to extend our approach to include the period of the Covid-19 health crisis (which is a source of much uncertainty) to identify how this crisis affected banks' ability to generate income and their risk profile.

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