China Economic Review 56 (2019) 101303

Contents lists available at ScienceDirect

China Economic Review

journal homepage: www.elsevier.com/locate/chieco

Economic policy uncertainty, tax quotas and corporate tax burden: Evidence from China

Dandan Dang[a], Hongsheng Fang[a,b,*], Minyuan He[a]

[a] School of Economics, Zhejiang University, China
[b] Institute for Fiscal Big-Data & Policy, Zhejiang University, China

ARTICLE INFO

Keywords:
Economic policy uncertainty
Corporate tax burden
Tax quota
Tax collection

ABSTRACT

This paper studies how economic policy uncertainty affects corporate tax burden. We show that economic policy uncertainty is positively related to corporate tax burden, and the effect is stronger when the tax quotas are higher. Furthermore, we find that economic policy uncertainty strengthens tax collection by increasing government fiscal pressure, thereby increasing corporate tax burden. Besides, the effects of economic policy uncertainty on corporate tax burden are primarily significant in state-owned enterprises (SOEs), non-high-tech firms, firms from the eastern areas and service industry firms. The evidence illustrates that keeping the transparency and stability of economic policies helps to cut tax burden effectively.

1. Introduction

Uncertainty about government policies and their potential effects can impose profound impacts on the macro economy, the financial market and firm behavior (Gulen & Ion, 2016; Phan, Sharma, & Tran, 2018; Zhang, Han, Pan, & Huang, 2015). Since the financial crisis in 2008, national governments around the world have enacted a variety of economic policies as attempts to minimize the impact of the global financial crisis. However, the different potential implementation processes and effects of these policies also increase the economic policy uncertainty (Baker, Bloom, & Davis, 2016). The extant literatures find that economic policy uncertainty has strong negative short-term influences on inflation and output (Jin, Zhong, & Wang, 2014; Jones & Olson, 2013), employment (Caggiano, Castelnuovo, & Figueres, 2017; Stock, Watson, Blinder, & Sims, 2012) and economic development (Jin et al., 2014; Scheffel, 2016; Stock et al., 2012). Besides, economic policy uncertainty also causes a drop in stock returns (Bekiros, Gupta, & Majumdar, 2016; Kang, Gracia, & Ratti, 2017; Li, Balcilar, Gupta, & Chang, 2016), increases the risk premium of municipal bonds (Gao & Qi, 2012), and causes bank credits to contract or even damages their overall financial function (Alessandri & Bottero, 2017). In addition, prior researches indicate that when firms face higher economic policy uncertainty, they will be more conservative in making investment decisions (Bernanke, 1983; Bloom, Bond, & van Reenen, 2007) and lower their investment level (Gulen & Ion, 2016; Kang, Lee, & Ratti, 2014; Wang, Chen, & Huang, 2014; Kim & Kung, 2017;Wang, Wei, & Song, 2017; Rao, Yue, & Jiang, 2017), increase cash holdings (Demir & Ersan, 2017; Hanlon, Maydew, & Saavedra, 2017; Wang, Li, & Xing, 2014) and reduce leverage ratios (Cao, Duan, & Uysal, 2013; Zhang et al., 2015).

This study tries to examine the relationship between economic policy uncertainty and corporate tax burden. Since tax sharing reform in 1994, China's tax revenue as a proportion of GDP has exhibited a rising trend (Fang & Zhang, 2013). At present, Chinese government has implemented the policy of tax reduction. Then, will economic policy uncertainty counteract effects of tax reduction

* Corresponding author at: School of Economics, Zhejiang University, 38 Zheda Rd., Hangzhou 310027, China.
E-mail addresses: dangdandan@zju.edu.cn (D. Dang), fhs@zju.edu.cn (H. Fang), zjuhmy@zju.edu.cn (M. He).

https://doi.org/10.1016/j.chieco.2019.101303
Received 31 October 2018; Received in revised form 8 May 2019; Accepted 10 May 2019
Available online 14 May 2019
1043-951X/

policies in China? Using a panel of Chinese publicly listed firms from 2003 to 2016, we examine impacts of economic policy uncertainty on corporate tax burden and find that the corporate tax burden would be higher when economic policy uncertainty increases, and the effect is stronger when the tax quotas are higher. Moreover, we find that economic policy uncertainty strengthens tax collection by increasing government fiscal pressure, thereby increasing corporate tax burden. The heterogeneous results indicate that the effect of economic policy uncertainty on corporate tax burden is primarily significant in state-owned enterprises (SOEs), non-high-tech firms, firms from the eastern areas and service industry firms.

Our study is closely related to the research on the relationship between economic policy uncertainty and corporate tax avoidance. Li, Maydew, Willis, and Xu (2016) argue that economic policy uncertainty after the election is higher, firms face the risk of significant shifts in the business and tax environment, which might undermine existing tax avoidance strategies. So firms will increase tax avoidance before the election and reduce it after the election. Based on the theory of political relations, Yu, Li, and Yuan (2015) find that economic policy uncertainty caused by policy turnover is negatively related to corporate tax avoidance. On the contrary, Chen, Chen, and Dong (2016) propose that enterprises will increase tax avoidance to increase cash holdings after new leaders take office. Furthermore, Lu and Zhang (2016) and Chen, Tang, Wu, and Yang (2015) argue that political turnover leads to the failure of political association and the incentive of political promotion, which makes local governments increase the intensity of tax collection, thereby decreasing the degree of tax avoidance. However, as argued by Gulen and Ion (2016) and Li and Yang (2015), the economic policy uncertainty measured by national election or political turnover have some deficiencies as follows. First, they can't measure the short and medium term variations of uncertainty. Second, the election indicator does not capture the variation in policy-related uncertainty in nonelection years, while the policy turnover only measures the economic policy uncertainty at the local government level. In order to address these problems, we use the “Economic Policy Uncertainty Index for China” developed by Baker et al. (2016) to measure Chinese economic policy uncertainty. It targets to capture uncertainty concerning the current and future policy actions of decision makers as well as the effects. This uncertainty can be about monetary, fiscal, or other regulatory policies (Baker et al., 2016; Demir & Ersan, 2017). The indicator can measure not only the economic policy uncertainty at the local government level and the central government level, but also the short and medium term variations of uncertainty. Besides, we not only identify fiscal pressure as primary channel through which uncertainty affects the intensity of tax collection, but also indentify tax collection as an important channel through which policy uncertainty affects corporate tax burden. Moreover, we introduce tax quotas that have significant influence on transition economies in the research, and find that when tax quotas are higher, the positive effect of economic policy uncertainty on corporate tax burden is stronger. Our findings contribute to the literatures and offer meaningful insights to policy makers: transparency and stability of the economic policies help to cut tax burden effectively.

The rest of this paper is organized as follows. Section 2 develops our hypotheses. Section 3 introduces data and discusses empirical strategy. Section 4 presents the empirical findings. Section 5 shows the robustness checks. Section 6 shows the further analyses. The final section concludes and offers some important policy implications.

2. Hypothesis development

When the economic policy uncertainty increases, tax avoidance strategies could be ineffective since they may not adapt to the new policies (Lu & Zhang, 2016), and the probability of being investigated increases because of tax avoidance failure (Chen, Chen, Wang, & Zheng, 2018; Lu & Zhang, 2016; Mills, Nutter, & Schwab, 2013). Thus, enterprises would be initiative to reduce tax avoidance for the purpose of preventing risks (Chen, Chen, & Dong, 2016; Li, Maydew, et al., 2016). Obviously, less corporate tax avoidance means more corporate tax burden. This is a response mechanism of enterprises to uncertainty that is easily inferred from the extant literatures. Furthermore, we propose a new response mechanism of governments to uncertainty. Economic policy uncertainty can depress economic growth (Baker et al., 2016; Baker, Bloom, & Davis, 2012; Jin et al., 2014; Jones & Olson, 2013), cause a drop in stock returns (Bekiros et al., 2016; Kang et al., 2017; Li, Balcilar, et al., 2016), reduce corporate investment and increase cash holdings (Kang et al., 2014; Rao et al., 2017; Wang, Li, & Xing, 2014; Wang, Chen, & Huang, 2014; Hanlon et al., 2017; Demir & Ersan, 2017). As a result, economic policy uncertainty leads to a decline in governments' fiscal revenue, meanwhile local governments are motivated to increase fiscal spending to inhibit economic recession (Chen, Kong, & Wang, 2016), which increases governments' fiscal pressure. In order to alleviate the pressure, local governments will try their best to increase tax revenue (Chen, 2016; Chen, Kong, & Wang, 2016), which would cause the increase of corporate tax burden. As current tax system in China has huge space of tax collection, the actual tax burden of Chinese enterprises is generally lower than the statutory tax burden (Gao, 2006; Xie & Fan, 2015; Zhou, Liu, & Li, 2012), which makes it possible for local governments to increase corporate tax burden and tax revenue by strengthening tax collection[1] (Chen, Chen, & Dong, 2016). We present the impact chain more clearly and intuitively in Fig. 1. Based on this new response mechanism of governments to uncertainty, we have the following hypothesis.

Hypothesis 1. Economic policy uncertainty strengthens tax collection by increasing government fiscal pressure, thereby increasing corporate tax burden.

The effect of economic policy uncertainty on corporate tax burden can also be affected by local tax departments' tax quotas. In China, the current year's tax quota is determined on the basis of the previous year's real tax revenue, the planned growth of national economic development in this budget year and special factors (Feng & Shen, 2015; Chen, Kong, & Wang, 2016). It is noteworthy that tax quotas are the main indicators to evaluate local tax departments' performance, and whether the tax quotas are accomplished

[1] Because of the existence of tax quotas, local governments would not decrease the intensity of tax collection when facing fiscal pressure.

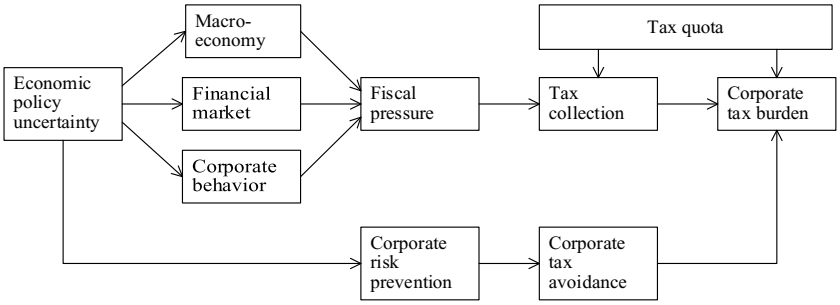

Fig. 1. The possible mechanism of the impact of economic policy uncertainty on tax burden.

determines the tax officers' position promotion and material reward directly (Chen et al., 2015). When tax quotas are higher, a decline in fiscal revenue and an increase in fiscal expenditure caused by economic policy uncertainty will make local tax departments face more fiscal pressure, which force them to strengthen tax collection, resulting in an increase in corporate tax burden. Hence, we have the following hypothesis.

Hypothesis 2. The positive effect of economic policy uncertainty on corporate tax burden is stronger when the tax quotas are higher.

3. Data and methodology

3.1. Empirical strategy

To identify the effect of economic policy uncertainty on corporate tax burden, this study establish Model 1 as follows:

$$ETR_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 size_{it} + \beta_3 leverage_{it} + \beta_4 inasset_{it} + \beta_5 flasset_{it} + quarter_t + industry_i + province_i + \varepsilon_{it} \quad (1)$$

In Model 1, ETR indicates effective tax rate, which reflects the corporate tax burden. The dependent variable ETR is measured using two methods. The first method is: ETR1 = (income tax expenses - deferred income tax expenses)/earnings before interest and taxes (Porcano, 1986). The second method is: ETR2 = (income tax expenses - deferred income tax expenses)/(earnings before taxes - deferred tax changes/statutory tax rates) (Shevlin, 1987).

EPU indicates economic policy uncertainty. This study uses the monthly "Economic Policy Uncertainty Index for China" to measure Chinese economic policy uncertainty. The economic policy uncertainty index is developed by Baker et al. (2016), which has been widely applied. The subject of analysis for this index is Hong Kong's largest English language newspaper, the South China Morning Post (SCMP)[2]; the index is calculated by identifying articles related to Chinese economic policy uncertainty each month and divides the number of such articles by the total number of articles published that month.[3] To match with other quarterly variables, we use two methods to calculate the uncertainty indices. The first method is based on Gulen and Ion (2016), which calculates weighted averages for each quarter, i.e., $EPU1 = \frac{3EPU_m + 2EPU_{m-1} + EPU_{m-2}}{6}/100$. The second method is based on Wang, Chen, and Huang (2014), which uses the geometric average method to convert monthly data into quarterly data, i.e., $EPU2 = \frac{EPU_m + EPU_{m-1} + EPU_{m-2}}{3}/100$. EPU_i (i = m, m-1, m-2) indicates the monthly policy uncertainty index and the subscript i represents the month.

The control variables of the model include company size, profitability, financial leverage, capital concentration, and inventory density. In this case, company size (size) is measured by the natural logarithm of total assets. Return on assets (roa) is defined as the ratio of net income to total assets, which measures company profitability. Liabilities serve as a tax shield, and leverage is defined as the ratio of total liabilities to total assets. The characteristics of a company's assets affect its real tax rate, and hence flasset ((fixed assets + intangible assets)/total assets) and inasset (inventory/total assets) represent capital concentration and inventory density, respectively. The variable $quarter_t$ indicates the time fixed effect, $industry_i$ indicates the industry fixed effect, and $province_i$ indicates the province fixed effect. ε_{it} is a random error term.

This study uses the method developed by Acemoglu, Robinson, Thaicharoen, and Johnson (2003) to identify the mediating role of fiscal pressure on the relationship between economic policy uncertainty and tax collection. In the first step, we use Model 2 to identify the relationship between economic policy uncertainty (EPU)and tax collection (TC). In the second step, we use Model 3 to identify the relationship between economic policy uncertainty (EPU) and fiscal pressure (FP). In the third step, we add mediating variable of fiscal pressure (FP) into model 2 to get model 4. If the effect of economic policy uncertainty (EPU) on tax collection (TC) decreases but is still significant and fiscal pressure (FP) has a significant positive effect on tax collection (TC), it would indicate that fiscal pressure (FP) is an important channel; if economic policy uncertainty (EPU) no longer has a significant effect on tax collection (TC) and fiscal pressure (FP) has a significant effect on tax collection (TC), it would indicate that fiscal pressure (FP) is a primary channel.

[2] The South China Morning Post (SCMP) is the first (founded in 1903) and largest Hong Kong English-language newspaper published by the SCMP Group. Its contents cover news regarding Hong Kong, Mainland China and Asia.

[3] Data and calculation methods are available from the authors' website: http://www.policyuncertainty.com/china_monthly.html.

Specifically, this study establishes Models 2–4 as follows:

$$TC_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 urban_{it} + \beta_3 pop_{it} + \beta_4 open_{it} + \beta_5 ind_{it} + \beta_6 employ_{it} + quarter_t + province_i + \varepsilon_{it} \quad (2)$$

$$FP_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 urban_{it} + \beta_3 pop_{it} + \beta_4 open_{it} + \beta_5 ind_{it} + \beta_6 employ_{it} + quarter_t + province_i + \varepsilon_{it} \quad (3)$$

$$TC_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 FP_{it} + \beta_3 urban_{it} + \beta_4 pop_{it} + \beta_5 open_{it} + \beta_6 ind_{it} + \beta_7 employ_{it} + quarter_t + province_i + \varepsilon_{it} \quad (4)$$

In Models 2 and 4, the dependent variable TC indicates the intensity of tax collection. TC is defined as the ratio between the actual tax revenue and forecasted tax revenue of a region. We follow the model used by Morss Elliott, Fredland Eric, and Hymans Saul (1967), Mertens (2003), Zeng and Zhang (2009) to estimate the forecasted tax revenue for each region as follows: $\frac{TAX_{it}}{GDP_{it}} = \beta_0 + \beta_1 \frac{IND1_{it}}{GDP_{it}} + \beta_2 \frac{IND2_{it}}{GDP_{it}} + \beta_2 \frac{OPENNESS_{it}}{GDP_{it}} + \varepsilon_{it}$. In this case, $\frac{TAX_{it}}{GDP_{it}}$ indicates tax revenue at the end of the year divided by GDP for each region in the current year. IND1 represents primary industry output value for each region at the end of the year, IND2 represents secondary industry output value for each region at the end of the year, and OPENNESS represents value of imports and exports for each region at the end of the year.

In Model 3, the dependent variable FP represents fiscal pressure. We follow the method used by Yang and Yang (2016) to use the ratio of financing gap (i.e., budgetary expenditure minus budgetary revenue) to regional GDP to measure the fiscal pressure faced by the local government.

Following Zhao, Yang, and Zhou (2010), this study chooses the following control variables at the provincial level: urbanization rate (urban), population (pop), the degree of openness (open), industrialization rate (ind), and employment rate (employ). Urban is measured by the ratio between the urban population and the total population. Pop is measured by taking the natural logarithm of the permanent population. Open is measured by the proportion of total trade volume of local imports and exports to local GDP. Ind is measured by the ratio between the industrial output value and local GDP. Employ is measured by the ratio of urban and rural employed populations and the total population. $Quarter_t$ and $province_i$ control for time and province fixed effects respectively. ε_{it} is a random error term.

Furthermore, this study uses the method developed by Acemoglu et al. (2003) (i.e., Model 1, 2, 5) to identify the mediating role of tax collection on the relationship between economic policy uncertainty and corporate tax burden. Specifically, this study establishes Models 5 as follows.

$$ETR_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 TC_{it} + \beta_3 size_{it} + \beta_4 leverage_{it} + \beta_5 inasset_{it} + \beta_6 flasset_{it} + quarter_t + industry_i + province_i + \varepsilon_{it} \quad (5)$$

In order to test the hypothesis 2, we establish Model 6 and focus on the coefficient of the interaction term. Besides, in order to further validate the robustness of the mechanisms proposed in this study, we establish model 7 to identify whether the effect of economic policy uncertainty on tax collection increases as tax quotas are higher, and establish model 8 to confirm the mediating role of tax collection.

$$ETR_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 EPU_{it} * TQ_{it} + \beta_3 size_{it} + \beta_4 leverage_{it} + \beta_5 inasset_{it} + \beta_6 flasset_{it} + quarter_t + industry_i + province_i + \varepsilon_{it} \quad (6)$$

$$TC_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 EPU_{it} * TQ_{it} + \beta_3 urban_{it} + \beta_4 pop_{it} + \beta_5 open_{it} + \beta_6 ind_{it} + \beta_7 employ_{it} + quarter_t + province_i + \varepsilon_{it} \quad (7)$$

$$ETR_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 EPU_{it} * TQ_{it} + \beta_3 TC_{it} + \beta_4 size_{it} + \beta_5 leverage_{it} + \beta_6 inasset_{it} + \beta_7 flasset_{it} + quarter_t + industry_i + province_i + \varepsilon_{it} \quad (8)$$

The tax quato is a planned growth rate of tax revenues, which indicates the tax target for local governments. We follow Feng and Shen (2015) to use $(budget_t - account_{t-1})/account_{t-1}$to measure tax quota. In this formula, $budget_t$ indicates the fiscal budget revenue for the current year and $account_{t-1}$ indicates the final fiscal revenue in the previous year. In model (6)-(8), if tax quota is larger than the average, then TQ = 1, otherwise TQ = 0.

3.2. Data and variables

We use a sample of Chinese listed companies' quarterly financial statement data. Our sample period goes from the first quarter of 2003 to the fourth quarter of 2016. To better interpret the economic meaning of the ETR variables, we delete the following observations: (1) companies with real tax rates larger than 1 or less than 0, (2) finance and ST firms. Data for corporate financial variables established in this study are derived from the CSMAR database; fiscal budget revenue and fiscal revenue data required to calculate tax quotas are sourced from the *Financial Yearbook of China*, while data related to mechanism test, such as real local tax revenue, primary and secondary industry output values, import and export volume, and statutory corporate tax rates are sourced from the WIND database. In addition, all data except for dummy variables are winsorized at the 1st and 99th percentiles to minimize the influence of outliers.

Table 1 shows the descriptive statistics of the variables. The average value of corporate tax burden (ETR1 and ETR2) are 0.217 and 0.217, with minimum of 0, and maximum of 0.808 and 0.796. It shows that there is relatively large variation in corporate tax burden. The maximum values of EPU1 and EPU2 are 5.257 and 6.469 respectively, and their minimum values are 0.540 and 0.396 respectively; they have standard deviations of 1.049 and 1.257 respectively. This indicates that there are relatively large fluctuations in Chinese economic policy uncertainty. Other variables are not described here and can be viewed in Table 1.

Table 1
Simple Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
ETR1	72, 496	0.217	0.152	0	0.808
ETR2	66, 993	0.217	0.149	0	0.796
EPU1	74, 423	1.606	1.049	0.540	5.257
EPU2	74, 423	1.684	1.257	0.396	6.469
size	74, 311	7.949	1.236	5.565	11.890
leverage	74, 263	3.573	3.626	1.117	23.578
flasset	74, 311	0.161	0.145	0	0.731
inasset	74, 311	0.282	0.184	0.003	0.792
roa	72, 572	0.019	0.017	0.001	0.093
TQ	73, 942	0.492	0.500	0	1
TC	434	1.035	0.315	0.342	1.8090
FP	434	0.136	0.174	0.012	1.1520
urban	426	0.499	0.147	0.232	0.893
pop	434	8.083	0.859	5.649	9.268
open	434	0.043	0.049	0.004	0.213
ind	434	0.386	0.097	0.075	0.518
employ	422	0.558	0.067	0.396	0.709

4. Empirical results

4.1. Baseline regression estimates

Table 2 presents estimation results for baseline regression which adopt Model 1 as described above. The results show that the coefficients of economic policy uncertainty (EPU1 and EPU2) are all significant and positive, indicating that firms face higher tax burden when economic policy uncertainty is higher.

In addition, the estimation results for other regression variables are reasonable. The regression coefficient of company size (size) is positive, indicating that large firms are typically more visible and are subject to more intensive oversight by governments than are small firms (Du, Fang, & Jin, 2014; Tybout, 2000), and hence they have to pay larger tax burden. Financial leverage (leverage) has a

Table 2
The impacts of economic policy uncertainty on tax burden.

	Model1			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2
EPU1	0.004**	0.004**		
	(2.46)	(2.53)		
EPU2			0.003**	0.003**
			(2.46)	(2.53)
size	0.009***	0.008***	0.009***	0.008***
	(15.45)	(14.10)	(15.45)	(14.10)
leverage	−0.001***	−0.001***	−0.001***	−0.001***
	(−10.40)	(−9.70)	(−10.40)	(−9.70)
flasset	0.093***	0.099***	0.093***	0.099***
	(15.40)	(15.96)	(15.40)	(15.96)
inasset	−0.020***	−0.013***	−0.020***	−0.013***
	(−4.49)	(−2.84)	(−4.49)	(−2.84)
roa	−1.591***	−1.602***	−1.591***	−1.602***
	(−47.15)	(−46.02)	(−47.15)	(−46.02)
time	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes
adj. R^2	0.128	0.126	0.128	0.126
N	71, 964	66, 923	71, 964	66, 923

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses)/(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 3
Identifying the fiscal pressure channel.

	Model 2		Model 3		Model 4	
	(1) TC	(2) TC	(3) FP	(4) FP	(5) TC	(6) TC
EPU1	0.067***		0.064***		0.012	
	(3.19)		(5.93)		(0.56)	
EPU2		0.039***		0.037***		0.007
		(3.19)		(5.93)		(0.56)
FP					0.854***	0.854***
					(4.97)	(4.97)
urban	−1.141***	−1.141***	−0.741***	−0.741***	−0.507*	−0.507*
	(−4.38)	(−4.38)	(−4.15)	(−4.15)	(−1.94)	(−1.94)
pop	0.640***	0.640***	−0.101	−0.101	0.726***	0.726***
	(3.00)	(3.00)	(−1.58)	(−1.58)	(3.40)	(3.40)
open	−1.907**	−1.907**	0.839***	0.839***	−2.624***	−2.624***
	(−2.31)	(−2.31)	(3.70)	(3.70)	(−3.19)	(−3.19)
ind	3.366***	3.366***	0.013	0.013	3.354***	3.354***
	(12.23)	(12.23)	(0.16)	(0.16)	(13.05)	(13.05)
employ	−0.029	−0.029	0.229***	0.229***	−0.224	−0.224
	(−0.11)	(−0.11)	(2.63)	(2.63)	(−0.93)	(−0.93)
time	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.852	0.852	0.955	0.955	0.861	0.861
N	414	414	414	414	414	414

Note: All columns control for urban, pop, open, ind and employ. The dependent variable FP in columns 3–4 is the ratio of financing gap to regional GDP. The dependent variable TC in columns 1–2 and 5–6 is the ratio between the actual tax revenue and forecasted tax revenue of a region. The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Urban is calculated using the ratio between the urban population and national population. Pop is measured by taking the natural logarithm of the region's permanent population. Open is calculated using the ratio between the local trade volume and local GDP, Ind is defined as the ratio between the industrial output value and local GDP. Employ is defined as the proportion of urban and rural employed populations as a proportion of the region's total population. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

negative coefficient, indicating that the interest tax shield function allows companies with high levels of leverage to enjoy lower tax burden. The estimated coefficient of capital density (flasset) is significant and positive while capital density (inasset) is significant and negative. This indicates that the accelerated depreciation of long-term assets reduces corporate tax burden. Higher level of capital concentration determines low level of inventory density, thereby suggesting that inventory density is negatively correlated with corporate tax burden. The estimated coefficient of profitability (roa) is significant and negative. It suggests that firms with higher profitability can save more profit by tax avoidance, so that they have stronger incentive to avoid tax, resulting in lower tax burden. This result is consistent with the studies of Gupta and Newberry (1997) and Kim and Limpaphayom (1998).

4.2. Identifying the fiscal pressure channel

Table 3 presents mechanism test regression results which adopt Models 2–4 as described above. The results in columns 1–2 show that the coefficients of uncertainty (EPU1 and EPU2) are all significant and positive, implying that uncertainty has a positive effect on tax collection. Columns 3–4 show the regression results for uncertainty and fiscal pressure. These results show that the coefficients of uncertainty (EPU1 and EPU2) are all significant and positive, indicating that uncertainty has a significant and positive effect on fiscal pressure. Columns 5–6 add the mediating variable of fiscal pressure and present regression results. The results show that, compared with columns 1–2, the coefficients of uncertainty (EPU1 and EPU2) are no longer significant, and that fiscal pressure (FP) is significant and positive, indicating that fiscal pressure is a primary channel through which uncertainty affects tax collection. So far, we have confirmed that policy uncertainty increases the fiscal pressure faced by local governments and therefore strengthen tax collection.

4.3. Identifying the tax collection channel

Table 4 presents mechanism test regression results which adopt Model 5 as described above. The results show that when tax collection and policy uncertainty are simultaneously included in the equation, EPU1 and EPU2 remain significant. In addition, the coefficient of tax collection is significant and positive, indicating that tax collection is an important channel through which uncertainty affects corporate tax burden. Therefore, hypothesis 1 is confirmed.

Table 4
Identifying the tax collection channel.

	Model5			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2
EPU1	0.004**	0.004**		
	(2.40)	(2.48)		
EPU2			0.003**	0.003**
			(2.40)	(2.48)
TC	0.018***	0.018***	0.018***	0.018***
	(4.27)	(4.19)	(4.27)	(4.19)
time	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes
adj. R^2	0.128	0.127	0.128	0.127
N	71, 964	66, 923	71, 964	66, 923

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. TC is the ratio between the actual tax revenue and forecasted tax revenue of a region. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

4.4. The impact of tax quota

Table 5 presents regression results using model 6–8 to identify the impact of tax quota on the effect of economic policy uncertainty and further verify the robustness of the mechanism analyses in this study. Columns 1–4 show that the coefficients of EPU1 and EPU2 are positive and significant, indicating that firms face higher tax burden when economic policy uncertainty is higher, and the coefficients of EPU1*TQ and EPU2*TQ are also significant and positive, indicating that the positive effect of economic policy uncertainty on corporate tax burden is stronger when governments face higher tax quotas. Columns 5–6 show that the interaction terms of policy uncertainty and the tax quota are positive and significant; this verifies that when tax quotas are higher, the effect of

Table 5
Economic policy uncertainty, tax quota and corporate tax burden.

	Model6				Model 7		Model 8			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) TC	(6) TC	(7) ETR1	(8) ETR2	(9) ETR1	(10) ETR2
EPU1	0.004**	0.004**			0.068***		0.003**	0.004**		
	(2.40)	(2.45)			(3.33)		(2.14)	(2.23)		
EPU1*TQ	0.002***	0.003***			0.021*		0.002**	0.002**		
	(2.96)	(2.99)			(1.84)		(2.06)	(2.13)		
EPU2			0.003**	0.003**		0.039***			0.003**	0.003**
			(2.39)	(2.44)		(3.25)			(2.14)	(2.22)
EPU2*TQ			0.002***	0.002***		0.018**			0.002**	0.002**
			(3.06)	(3.11)		(1.98)			(2.20)	(2.29)
TC							0.021***	0.021***	0.021***	0.021***
							(4.52)	(4.31)	(4.50)	(4.29)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.128	0.126	0.128	0.126	0.853	0.853	0.128	0.127	0.128	0.127
N	71, 964	66, 923	71, 964	66, 923	414	414	71, 964	66, 923	71, 964	66, 923

Note: 1–4 columns and 7–10 columns control for size, leverage, flasset, inasset, roa. 5–6 columns control for urban, pop, open, ind and employ. The dependent variable in 1–4 columns and 7–10 columns is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/ earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/ statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Tax quota$_t$ = (budget$_t$-account$_{t-1}$)/account$_{t-1}$. TQ is a dummy variable, which is equal to 1 when tax quota is larger than the average, 0 otherwise. TC is the ratio between the actual tax revenue and forecasted tax revenue of a region. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 6
mitigating the concern of omitted variables by controlling expectations about future economic conditions.

	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.008***	0.008***	0.043***	0.037***	0.065***	0.057***	0.294**	0.380***
	(4.69)	(4.33)	(5.54)	(4.69)	(5.38)	(4.53)	(2.33)	(2.93)
LEI	−4.889***	−4.207***					20.145*	28.328**
	(−5.03)	(−4.19)					(1.81)	(2.49)
CCI			−1.414***	−1.217***			−0.309	−0.423
			(−5.03)	(−4.19)			(−0.97)	(−1.29)
CICSI					−1.513***	−1.302***	−7.416**	−9.614***
					(−5.03)	(−4.19)	(−2.34)	(−2.95)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.128	0.126	0.128	0.126	0.128	0.126	0.128	0.126
N	71, 964	66, 923	71, 964	66, 923	71, 964	66, 923	71, 964	66, 923

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. The results using EPU2 are also valid in all specifications, space limited, the results are not reported. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

policy uncertainty on tax collection is stronger. Columns 7–10 show that tax collection is still an important channel. This supports Hypothesis 2.

5. Robustness checks

5.1. Addressing endogeneity

EPU may not be a strictly exogenous variable. Our results are likely to be driven by endogeneity bias such as omitted variables, measurement error or reverse causality. Omitted variable such as the heterogeneous expectation of future may be ignored in empirical tests. The Baker et al. (2016) index may capture other general sources of uncertainty, which could lead to the existence of measurement error. The government may introduce various tax reduction policies to alleviate the phenomenon of excessive corporate tax burden, which may cause the reverse causal problem.

To address the concern of omitted variables, we follow Gulen and Ion (2016) to include several variables relating to expectations about future economic conditions in our main model. First, we use the monthly Leading Economic Index (LEI) that is used to forecast the future economic trend.[4] Our proxy is a period-on-period log change in this index. Second, we control for consumer' expectations about future economic prospects using the Consumer Confidence Index (CCI) from the national bureau of statistics. Third, we control for expectations by equity-market participants using the monthly Investor Sentiment Index (CICSI) from Yi and Mao (2009). We include these variables one-by-one in column 1–6 and control for all three proxies at the same time in column 7–8 of Table 6. These results indicate that expectations about future economic conditions also affect tax burden. The positive relationship between economic policy uncertainty and tax burden remains valid in all specifications as shown in Table 6, which mitigate our concern of omitted variables.

To address the concern of measurement error bias, we leverage similarities between China and three other countries (US, Korea and Japan)[5] to get a purer measure of China's EPU. China have established close ties between these countries through a wide range of international trade activities (Wu, Zhang, Wu, & Kong, 2019). Specifically, we resort to Gulen and Ion's (2016) method by running a time-series regression of the other countries' EPU on China' EPU, respectively. In order to control for observable economic conditions, we include the cross-sectional means of the firm-level variables and GDP growth in the time series regression. Then, the residuals from this regression could present a purer measure of China's EPU, as they have been eliminated of general uncertainty shocks that affect both countries. From column 1, 4 and 7 in Table 7, we can see that China' EPU is positively and significantly related with these three countries' EPU, respectively. From column 2–3, 5–6 and 8–9 in Table 7, the results show that there is still a strongly positive

[4] The index is based on a group of eight indicators reflecting different aspects of economic activity including: Hang Seng China Mainland circulation index, investment in newly started project, ratio of industrial production, real estate development leading index, money supply M2, national debt interest rate spread, consumer expectations index, logistics Index. Data and calculation methods are available from the website:https://zh.tradingeconomics.com/china/leading-economic-index

[5] We ranked countries in terms of the value of imports and exports in China's Statistical Yearbook in 2018, then we choose the top three countries: US, Korea and Japan.

Table 7
Mitigating the concern of measurement error by using new measures of EPU.

	(1) EPU1	(2) ETR1	(3) ETR2	(4) EPU1	(5) ETR1	(6) ETR2	(7) EPU1	(8) ETR1	(9) ETR2
US	1.468***								
	(3.43)								
Korea				1.075***					
				(5.52)					
Japan							1.387***		
							(3.77)		
$EPU1_{US}$		0.005**	0.006**						
		(2.51)	(2.55)						
$EPU1_{Korea}$					0.008**	0.008**			
					(2.51)	(2.55)			
$EPU1_{Japan}$								0.006**	0.006**
								(2.51)	(2.55)
time	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
industry	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
province	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
adj. R^2	0.509	0.128	0.126	0.509	0.128	0.126	0.528	0.128	0.126
N	56	71, 964	66, 923	56	71, 964	66, 923	56	71, 964	66, 923

Note: Columns 2–3, 5–6, 8–9 control for size, leverage, flasset, inasset, roa. Columns 1, 4, 7 further add GDP growth in the regression. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. The results using EPU2 are also valid in all specifications, space limited, the results are not reported. US, Korea and Japan mean the EPU of US, Korea and Japan, respectively. $EPU1_{US}$, $EPU1_{Korea}$ and $EPU1_{Japan}$ mean the residuals of the time-series regressions. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

relationship between new measures of economic policy uncertainty and corporate tax burden, which mitigate our concern of measurement error.

Since the methods above can only mitigate measurement error and omitted variables but not deal with these problems, we use 2SLS to deal with measurement error, omitted variables and reverse causal problem. We follow the existing literatures to apply the one-period lagged U.S. EPU as instrumental variable for China's EPU (Jin, Chen, & Yang, 2019; Wang, Chen, & Huang, 2014; Zhang et al., 2015). In order to match China's EPU, we use weighted averages and geometric average method to convert monthly data to get US1 and US2, respectively. The United States is the world's largest country, and the fluctuations of its economic policy tend to affect other countries. In contrast, the China's economic policy uncertainty has little impact on America's economic policy uncertainty (Gu, Chen, & Pan, 2018). Moreover, U.S. EPU is a suitable instrumental variable because it only affects Chinese corporate tax burden through China's EPU (Jin et al., 2019; Wang, Chen, & Huang, 2014).

Table 8 presents the 2SLS regression results. We can see that both EPU1 and EPU2 are significantly and positively correlated with the instrumental variable, and the first stage F-statistics is more than 10. This results show that the instrumental variable is appropriate. The results of the second stage show that a positive relationship between economic policy uncertainty and tax burden remains significant after controlling for endogeneity concerns.

5.2. Concerning spurious correlation

We address the concern that our results may be driven by a spurious correlation induced by a common trend in the economic policy uncertainty and tax burden. Following the method of Gulen and Ion (2016), we linearly detrend the monthly index proposed by Baker et al. (2016)and instead use this as the basis for our proxy variables. Then, we calculate weighted average and geometric average of this detrended monthly index to get the quarterly economic policy uncertainty variables: DEPU1 and DEPU2. In column 1–4 of Table 9, the results show that the effects of economic policy uncertainty on tax burden are still positive when using these alternative variables.

5.3. Financial crisis as a proxy for economic policy uncertainty

Since governments need to adjust their economic policies to overcome a financial crisis, we use the dummy variable of financial crisis as a proxy variables for economic policy uncertainty (Wang, Chen, & Huang, 2014) and further test the robustness of our findings. And the dummy variable for financial crisis is 1 if the sample period is after the 3rd quarter of 2008, otherwise, it equals 0. Columns 5–6 in Table 9 show that the coefficients of financial crisis are still positive and significant, indicating that corporate tax burden is higher when economic policy uncertainty increases after financial crisis.

Table 8
Mitigating endogeneity concerns by using 2SLS.

	(1) EPU1 1st	(2) ETR1 2st	(3) EPU1 1st	(4) ETR2 2st	(5) EPU2 1st	(6) ETR1 2st	(7) EPU2 1st	(8) ETR2 2st
L.US1	0.561***		0.565***					
	(42.88)		(41.75)					
L.US2					0.238***		0.238***	
					(20.53)		(20.53)	
$EPU1_{L.US1}$		0.025***		0.025***				
		(4.26)		(4.18)				
$EPU2_{L.US2}$						0.047***		0.044***
						(5.04)		(4.78)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1st F-value	1838.68		1743.43		430.477		421.57	
adj. R^2		0.123		0.123		0.084		0.087
N	58, 461	58, 461	54, 507	54, 507	58, 461	58, 461	54, 507	54, 507

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. L.US1 and L.US2 are one-period lagged of US1 and US2. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

5.4. Different methods for measuring economic policy uncertainty

We use weighted average and simple quarter average of the monthly index proposed by Baker et al. (2016) to calculate quarter index on the above. Alternatively, we use the quarter-end value of the monthly index as a measure of the economic policy uncertainty. Columns 7–8 in Table 9 show that the coefficients of EPU3 are still positive and significant, which conform the robustness of positive effects of economic policy uncertainty on tax burden.

5.5. Using 3SLS in the channel test

In the above empirical analyses, we follow Acemoglu et al. (2003) to do the channel test using the technique of single-equation

Table 9
Financial crisis as a proxy and different methods for calculating EPU.

	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
DEPU1	0.006**	0.006**						
	(2.46)	(2.53)						
DEPU2			0.007**	0.008**				
			(2.46)	(2.53)				
Crisis					0.043***	0.041***		
					(4.63)	(4.44)		
EPU3							0.005**	0.005**
							(2.51)	(2.55)
time	yes	yes	yes	yes	yes	yes	yes	yes
industry	yes	yes	yes	yes	yes	yes	yes	yes
province	yes	yes	yes	yes	yes	yes	yes	yes
adj. R2	0.128	0.126	0.128	0.126	0.128	0.126	0.128	0.126
N	71, 964	66, 923	71, 964	66, 923	71, 964	66, 923	71, 964	66, 923

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); In column 1–4, We calculate weighted average and geometric average of this detrended monthly index get DEPU1 and DEPU2. In column5–6, we use this dummy variable as a proxy for economic policy uncertainty, crisis is a dummy variable, if the sample period is after the 3rd quarter of 2008, 0 otherwise. In column 7–8, we use quarter-end value of the Baker et al. (2016) index to get EPU3. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 10
Identifying the fiscal pressure channel using 3SLS.

	3SLS			
	(1) FP	(2) TC	(3) FP	(4) TC
EPU1	0.064***	0.013		
	(11.153)	(0.631)		
EPU2			0.037***	0.007
			(11.153)	(0.631)
FP		0.849***		0.849***
		(5.568)		(5.568)
time	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes
adj. R^2	0.960	0.877	0.960	0.877
N	414	414	414	414

Note: We define eqs.(3) and (4) as simultaneous equations, and the result was obtained by using the 3SLS estimation method. All columns control for urban, pop, open, ind and employ. The dependent variable FP in columns 1 and 3 is the ratio of financing gap to regional GDP. The dependent variable TC in columns 2 and 4 is the ratio between the actual tax revenue and forecasted tax revenue of a region. The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 11
Identifying the tax collection channel using 3SLS.

	3SLS							
	(1) TC	(2) ETR1	(3) TC	(4) ETR1	(5) TC	(6) ETR2	(7) TC	(8) ETR2
EPU1	0.009***	0.004**			0.008***	0.004**		
	(8.111)	(2.228)			(6.856)	(2.283)		
EPU2			0.007***	0.003**			0.006***	0.003**
			(8.111)	(2.228)			(6.856)	(2.283)
TC		0.022***		0.022***		0.023***		0.023***
		(4.806)		(4.806)		(4.900)		(4.900)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	No	Yes	No	Yes	No	Yes	No	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.904	0.130	0.904	0.130	0.904	0.129	0.904	0.129
N	71, 964	71, 964	71, 964	71, 964	66, 923	66, 923	66, 923	66, 923

Note: We define eqs.(2) and (5) as simultaneous equations, and the result was obtained by using the 3SLS estimation method. The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. In columns 1, 3, 5 and 7, the dependent variable TC is the ratio between the actual tax revenue and forecasted tax revenue of a region; control variables include size, leverage, flasset, inasset, roa. In columns 2, 4, 6 and 8, the dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); control variables include urban, pop, open, ind and employ. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

estimation. However, because the equations constitute a simultaneous equation system, the single-equation estimation is consistent but not the most efficient.[6] To address the concern, we estimate them using the 3SLS method in the channel test as a robustness check (Chen & Yao, 2011; Mobarak, 2005). Specifically, We define eq. (3) and (4) as simultaneous equations to identify the fiscal pressure channel, and define eq. (2) and (5) as simultaneous equations to identify the tax collection channel. The results in Tables 10 and 11 show that our conclusions remain unchanged using the 3SLS estimation method, which confirm the robustness of our results.

6. Further analyses

The results above suggest that economic policy uncertainty has positive effect on corporate tax burden and the effect is stronger when the tax quotas are higher. In this section, we consider the heterogeneous effect of economic policy uncertainty on corporate tax burden.

[6] The single-equation estimation ignores the possible correlation between the disturbance terms of different equations.

Table 12
Economic Policy Uncertainty and Corporate Tax Burden: Corporate Ownership.

	SOE				Non-SOE			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.006***	0.006**			0.003	0.004		
	(2.71)	(2.25)			(0.85)	(1.50)		
EPU2			0.005***	0.005**			0.002	0.004
			(2.71)	(2.25)			(0.85)	(1.50)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.123	0.121	0.123	0.121	0.141	0.139	0.141	0.139
N	34, 834	31, 727	34, 834	31, 727	37, 096	35, 175	37, 096	35, 175

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

6.1. The impact of corporate ownership

The effect of economic policy uncertainty on corporate tax burden might be affected by the nature of the firms. Many studies have found that SOEs face higher tax burden than non-SOEs (Bradshaw, Liao, & Ma, 2012; Cao, Liu, & Zhang, 2009; Chan, Mo, & Zhou, 2013; Wang, Wang, & Peng, 2010; Wang, Wang, & Peng, 2012). When economic policy uncertainty is higher, local governments face more fiscal pressure. To alleviate the fiscal pressure, local governments can persuade SOEs to pay more taxes. Moreover, when government's tax quotas are higher, the tax burden of SOEs is larger.

According to the ownership natures of the subsamples, we divide the sample into two subsamples—SOEs and non-SOEs. The results in Table 12 show that in the SOE sample, both EPU1 and EPU2 have significant and positive coefficients, indicating that the tax burden of SOEs increases significantly when the economic policy uncertainty increases. In the non-SOE sample, the coefficients of EPU1 and EPU2 are both not significant, implying that economic policy uncertainty does not significantly affect the tax burden of non-SOEs.

Then, we test the heterogeneity between the SOEs and non-SOEs by adding an interaction term of economic policy uncertainty and tax quotas. The results in Table 13 show that in the SOE sample, EPU1*TQ and EPU2*TQ have significant and positive coefficients, but they are not significant in the non-SOE sample. This indicates that the positive effect of economic policy uncertainty on corporate tax burden is only significant in the SOEs and the effect is stronger when the tax quotas are higher.

6.2. The impact of high-tech corporate qualifications

The effect of economic policy uncertainty on corporate tax burden may also be affected by corporate qualification. According to the *2008 Measures for Determination of High and New Tech Enterprises*, when firms are awarded qualification of high and new technology, they enjoy a preferential statutory income tax rate of 15%, thereby reducing their overall corporate tax burden. First, when economic policy uncertainty increases, local governments tend to strengthen tax collection on non-high-tech firms rather than high-tech firms that are supported by governments. Second, when high-tech firms enjoy a preferential statutory tax rate of 15%, their real tax rates are close to the statutory tax rate and might be less sensitive to economic policy uncertainty (Cao et al., 2009). On the contrary, non-high-tech firms face a higher statutory tax rate and have stronger motivations to engage in tax planning, so that there would be a larger space for tax collection. Therefore, when the economic policy uncertainty increases, tax burden of non-high-tech firms is significantly higher than high-tech firms. This effect is stronger when the tax quotas are higher.

According to *Qualification of Listed company* in CSMAR database, we divide the sample into high-tech firm and non-high-tech firm subsamples. The results in Table 14 show that in the high-tech firm sample, the coefficients of EPU1 and EPU2 are not significant, implying that uncertainty does not significantly affect the tax burden of high-tech firms. In the non-high-tech firm sample, the coefficients of EPU1 and EPU2 are significant and positive, indicating that when economic policy uncertainty increases, the tax burden of non-high-tech firms increases significantly.

Then, we test the heterogeneity between high-tech firms and non-high-tech firms by adding an interaction term of economic policy uncertainty and tax quotas. The results in Table 15 show that in the non-high-tech firm subsample, EPU1*TQ and EPU2*TQ have significant and positive coefficients, but they are not significant in the high-tech firm subsample. This indicates that the positive effect of economic policy uncertainty on corporate tax burden is only significant in the non-high-tech firms, and the effect is stronger when the tax quotas are higher.

Table 13
Economic Policy Uncertainty, Tax Quotas and Corporate Tax Burden:Corporate Ownership.

	SOE				Non-SOE			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.006**	0.005**			0.003	0.004		
	(2.54)	(2.11)			(0.85)	(1.49)		
EPU1*TQ	0.005***	0.004***			−0.000	0.001		
	(3.40)	(2.61)			(−0.12)	(0.57)		
EPU2			0.005**	0.004**			0.002	0.004
			(2.51)	(2.07)			(0.86)	(1.50)
EPU2*TQ			0.005***	0.004***			−0.000	0.000
			(3.66)	(2.94)			(−0.28)	(0.38)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.123	0.122	0.123	0.122	0.141	0.139	0.141	0.139
N	34, 834	31, 727	34, 834	31, 727	37, 096	35, 175	37, 096	35, 175

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Tax quota$_t$ = (budget$_t$-account$_{t-1}$)/account$_{t-1}$. TQ is a dummy variable, which is equal to 1 when tax quota is larger than the average, 0 otherwise. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

6.3. The impact of industrial classifications

The effect of economic policy uncertainty on corporate tax burden might be affected by the different industrial classifications. Manufacturing industry firms often have stronger mobility (Fan & Tian, 2013), they can choose to move to other areas when governments strengthen tax collection, which can cause outflows of local capital. Therefore, even when local governments face fiscal pressure caused by economic policy uncertainty, they might avoid strengthening tax collection on manufacturing industry firms to prevent capital outflows. On the contrary, service industry firms often have weaker mobility, especially in non-tradable service industry firms whose outputs are depended on the local market demand (Fan & Tian, 2013). Local governments are more likely to focus on service industry firms when collecting taxes. Hence, when the economic policy uncertainty increases, tax burden of service industry firms is significantly larger than manufacturing industry firms. This effect is larger when tax quotas are higher.

According to the *Classification of 2012 Industry Code,* we divide the sample into two subsamples—manufacturing industry and

Table 14
Economic Policy Uncertainty and Corporate Tax Burden: Qualification Recognition.

	High-tech firms				Non-high-tech firms			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.001	0.001			0.007***	0.007***		
	(0.25)	(0.21)			(3.09)	(2.97)		
EPU2			0.000	0.000			0.006***	0.005***
			(0.25)	(0.21)			(3.09)	(2.97)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.102	0.103	0.102	0.103	0.147	0.142	0.147	0.142
N	35, 048	33, 338	35, 048	33, 338	36, 916	33, 585	36, 916	33, 585

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 15
Economic Policy Uncertainty, Tax Quotas and Corporate Tax Burden: Qualification Recognition.

	High-tech firms				Non-high-tech firms			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.001	0.001			0.006***	0.006***		
	(0.25)	(0.21)			(2.94)	(2.80)		
EPU1*TQ	0.000	0.000			0.004***	0.004***		
	(0.18)	(0.28)			(3.42)	(3.36)		
EPU2			0.000	0.000			0.005***	0.005***
			(0.25)	(0.21)			(2.91)	(2.77)
EPU2*TQ			0.000	0.000			0.004***	0.004***
			(0.19)	(0.38)			(3.49)	(3.40)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.102	0.103	0.102	0.103	0.147	0.142	0.147	0.142
N	35, 048	33, 338	35, 048	33, 338	36, 916	33, 585	36, 916	33, 585

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Tax quota$_t$ = (budget$_t$-account$_{t-1}$)/account$_{t-1}$. TQ is a dummy variable, which is equal to 1 when tax quota is larger than the average, 0 otherwise. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

service industry firms. The results in Table 16 show that, in the manufacturing industry subsample, the coefficients of EPU1 and EPU2 are not significant, implying that uncertainty does not significantly affect the tax burden of manufacturing industry firms. In the service industry subsample, the coefficients of EPU1 and EPU2 are significant and positive, indicating that when economic policy uncertainty increases, the tax burden of service industry firms increases significantly.

Then, we test the heterogeneity between manufacturing industry firms and service industry firms by adding an interaction term of economic policy uncertainty and tax quotas. The results in Table 17 show that in the service industry subsample, EPU1*TQ and EPU2*TQ have significant and positive coefficients, but they are not significant in the manufacturing industry subsample. This indicates that the positive effect of economic policy uncertainty on corporate tax burden is only significant in the service industry firms, and the effect is stronger when the tax quotas are higher.

Table 16
Economic Policy Uncertainty and Corporate Tax Burden: Industry Type.

	Manufacturing industry				Service industry			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	−0.001	−0.000			0.012***	0.013***		
	(−0.33)	(−0.09)			(4.63)	(4.72)		
EPU2			−0.001	−0.000			0.010***	0.011***
			(−0.33)	(−0.09)			(4.63)	(4.72)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.079	0.082	0.079	0.082	0.163	0.154	0.163	0.154
N	42, 852	41, 610	42, 852	41, 610	29, 112	25, 313	29, 112	25, 313

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 17
Economic Policy Uncertainty, Tax Quotas, and Corporate Tax Burden: Industry Type.

	Manufacturing industry				Service industry			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	−0.001	−0.000			0.012***	0.013***		
	(−0.35)	(−0.10)			(4.51)	(4.60)		
EPU1*TQ	0.001	0.002			0.004***	0.003**		
	(1.29)	(1.63)			(2.58)	(2.14)		
EPU2			−0.001	−0.000			0.010***	0.010***
			(−0.35)	(−0.10)			(4.49)	(4.57)
EPU2*TQ			0.001	0.001			0.003***	0.003**
			(1.28)	(1.58)			(2.69)	(2.31)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.079	0.082	0.079	0.082	0.163	0.154	0.163	0.154
N	42, 852	41, 610	42, 852	41, 610	29, 112	25, 313	29, 112	25, 313

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Tax $quota_t$ = ($budget_t$-$account_{t-1}$)/$account_{t-1}$. TQ is a dummy variable, which is equal to 1 when tax quota is larger than the average, 0 otherwise. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

Table 18
Economic Policy Uncertainty and Corporate Tax Burden: Location.

	Eastern Region				Non-eastern Region			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.007***	0.007***			−0.001	−0.000		
	(3.57)	(3.42)			(−0.19)	(−0.10)		
EPU2			0.006***	0.006***			−0.000	−0.000
			(3.57)	(3.42)			(−0.19)	(−0.10)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.140	0.140	0.140	0.140	0.120	0.115	0.120	0.115
N	46, 478	43, 666	46, 478	43, 666	25, 486	23, 257	25, 486	23, 257

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

6.4. The impact of firm location

In addition to the characteristics of the firm, the effect of economic policy uncertainty on corporate tax burden may also be related to the firm's geographical location. Governments in developed eastern regions of China have more sufficient tax bases and are not motivated to increase the intensity of tax collection (Xie & Fan, 2015). When economic policy uncertainty increases, there is sufficient room for strengthening tax collection. So, increased economic policy uncertainty will significantly increase the corporate tax burden of firms in the eastern areas of China. Moreover, the tax burden is larger when government's tax quotas are higher. Non-eastern regions of China experience a slower pace of economic development, and governments try their best to collect all receivable taxes, there is little room to strengthen tax collection when economic policy uncertainty increases. So economic policy uncertainty do not have a significant influence on tax burden in non-eastern regions of China.

We divide the sample into two subsamples according to the firm location. The results in Table 18 show that for the firms in the

Table 19
Economic Policy Uncertainty, Tax Quotas and Corporate Tax Burden: Location.

	Eastern Region				Non-eastern Region			
	(1) ETR1	(2) ETR2	(3) ETR1	(4) ETR2	(5) ETR1	(6) ETR2	(7) ETR1	(8) ETR2
EPU1	0.007***	0.007***			−0.001	−0.000		
	(3.49)	(3.34)			(−0.19)	(−0.09)		
EPU1*TQ	0.003***	0.003***			0.000	0.001		
	(2.82)	(2.95)			(0.22)	(0.51)		
EPU2			0.006***	0.006***			−0.000	−0.000
			(3.48)	(3.32)			(−0.19)	(−0.09)
EPU2*TQ			0.003***	0.003***			0.001	0.001
			(2.90)	(3.08)			(0.33)	(0.56)
time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R2	0.141	0.140	0.141	0.140	0.120	0.115	0.120	0.115
N	46, 478	43, 666	46, 478	43, 666	25, 486	23, 257	25, 486	23, 257

Note: All columns control for size, leverage, flasset, inasset, roa. The dependent variable is measured using two methods. ETR1 = (income tax expenses - deferred income tax credits)/earnings before interest and taxes; ETR2 = (income tax expenses - deferred income tax expenses) /(earnings before taxes - deferred tax changes/statutory tax rates); The independent variable is proxied by the Chinese monthly index of policy uncertainty calculated by Baker et al. (2016).We use the weighted average and geometric average method to get EPU1 and EPU2 respectively. Tax $quota_t$ = ($budget_t$-$account_{t-1}$)/$account_{t-1}$. TQ is a dummy variable, which is equal to 1 when tax quota is larger than the average, 0 otherwise. Size is determined by the natural logarithm of total assets. Roa is defined as the ratio of net income to total assets. Leverage is expressed as the ratio of total liabilities to total assets. Flasset is defined as the sum of fixed assets and intangible assets divided by total assets. Inasset is equal to inventory divided by total assets. Space limited, the results of control variables are not reported. *, ** and *** indicate significance at 10%, 5% and 1% levels respectively. T values are in parentheses.

eastern region, the coefficients of EPU1 and EPU2 are significant and positive, indicating that when uncertainty increases, the tax burden of firms in the eastern region increases significantly. For firms in the non-eastern region, the coefficients of EPU1 and EPU2 are not significant, implying that economic policy uncertainty does not significantly affect the corporate tax burden of firms in the non-eastern region.

Then, we test the heterogeneity on the above subsamples by adding an interaction term of economic policy uncertainty and tax quotas. The results in Table 19 show that for the firms in the eastern region, the coefficients of EPU1*TQ and EPU2*TQ are both significant and positive, but these coefficients are not significant for the firms in the non-eastern region. This indicates that the positive effect of economic policy uncertainty on corporate tax burden is only significant in the firms in the eastern region, and the effect is stronger when the tax quotas are higher.

7. Conclusions and policy implications

From the perspective of government behavior, this paper explores the impact of economic policy uncertainty on corporate tax burden in Chinese listed companies using quarterly financial statements from 2003 to 2016. Our findings point out that economic policy uncertainty has a positive effect on corporate tax burden, and the effect is stronger when the tax quotas are higher. Furthermore, we provide consistent evidence that economic policy uncertainty strengthens tax collection by increasing government fiscal pressure, thereby increasing corporate tax burden. By considering the heterogeneous effect of firms, we find that the positive effects of economic policy uncertainty on corporate tax burden are primarily significant in state-owned enterprises (SOEs), non-high-tech firms, firms from the eastern areas and service industry firms. Our main results remain robust when we consider potential endogeneity problems, spurious correlation, alternative proxy for economic policy uncertainty, different methods for measuring economic policy uncertainty and different regression techniques in channel test.

Our study provides important implications. First, *New Budget Law*[7] prohibits local governments from allocating tax quotas to departments of tax collection. We should carry out the *New Budget Law* strictly and weaken the role of the tax quotas to reduce the impact of tax burden increase brought by economic policy uncertainty. Second, when governments adjust economic policies to stimulate the economy, they should consider the negative effects of the economic policy uncertainty caused by frequent changes of economic policies and maintain transparency and stability of the economic policies; given the current policy of “reducing taxes and fees”, policymakers should reduce policy uncertainty to ensure that the effects of tax reduction policies are not counteracted by the tax-increasing effect of uncertainty.

[7] “New Budget Law of the People's Republic of China”.

Acknowledgments

This paper was supported by the Key Research Project of the National Social Science Foundation under Grant no. 15AJY016; Key Research Project "Development Strategy, Financial Structure and Economic Structural Adjustment: Theory and Evidence" of the Humanities and Social Sciences of Ministry of Education of the People's Republic of China under Grant no. 12JJD790009; Key Research Project of Zhejiang Provincial Social Science Foundation of China under Grant no. 16NDZB01ZD; Key Research Project of the National Natural Science Foundation "The Mechanism and Policy Research of Promoting Industrial Transformation and Upgrading in Developed Districts" under Grant no. 71333002; Key Research Project of the National Social Science Foundation "The Tendency Characteristics and Policy Preference of Chinese Economy Development under The New Normal" under Grant no. 15ZDA008; Key Research Project of National Science Fund for Distinguished Young Scholar under Grant no. 71525006; and the Cultural Masters and "Si Ge Yi Pi" Talents project in 2014 of the Propaganda Department's General Office of CPC Central Committee "China's Industrial Transformation and Employment Change: Theory and Empirical Research", the Fundamental Research Funds for the Central Universities of China, Center for Research in Regional Economic Opening and Development of Zhejiang University of China and Institute for Fiscal Big-Data & Policy of Zhejiang University, Zhejiang Provincial 151 Talent Project, and the Project of Key Discipline in Political Economy from the "Double-First Class" Initiative at Zhejiang University.

References

Acemoglu, D., Robinson, J. A., Thaicharoen, Y. Y., & Johnson, S. (2003). Institutional causes, macroeconomic symptoms: Volatility, crises and growth. *Journal of Monetary Economics, 50*(1), 49–123.
Alessandri, P., & Bottero, M. (2017). *Bank lending in uncertain times.* Social Science Electronic Publishing.
Baker, S. R., Bloom, N., & Davis, S. J. (2012). *Has economic policy uncertainty hampered the recovery?* Social Science Electronic Publishing.
Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics, 131*, 1593–1636.
Bekiros, S., Gupta, R., & Majumdar, A. (2016). Incorporating economic policy uncertainty in US equity premium models: A nonlinear predictability analysis. *Finance Research Letters, 18*, 291–296.
Bernanke, B. S. (1983). Non-monetary effects of the financial crisis in the propagation of the great depression. *Journal of Economics and Business, 51*(3), 215–235.
Bloom, N., Bond, S., & van Reenen, J. (2007). Uncertainty and investment dynamics. *Review of Economic Studies, 74*(2), 391–415.
Bradshaw, M., Liao, G., & Ma, M. S. (2012). *State ownership, tax and political promotion: Evidence from China.* (Working Paper).
Caggiano, G., Castelnuovo, E., & Figueres, J. M. (2017). Economic policy uncertainty and unemployment in the United States: A nonlinear approach. *Economics Letters, 151*, 31–34.
Cao, S. J., Liu, X., & Zhang, W. J. (2009). Fiscal decentralization, local government competition and the actual tax burden of listed companies. *Journal of World Economy, 4*, 69–83.
Cao, W., Duan, X., & Uysal, V. B. (2013). Does political uncertainty affect capital structure choices? *University of Oklahoma Working Paper*.
Chan, K. H., Mo, P. L. L., & Zhou, A. Y. (2013). Government ownership, corporate governance and tax aggressiveness: Evidence from China. *Accounting and Finance, 53*, 1029–1051.
Chen, B., & Yao, Y. (2011). The cursed virtue: Government infrastructural investment and household consumption in Chinese provinces. *Oxford Bulletin of Economics and Statistics, 73*(6), 856–877.
Chen, D., Kong, M. Q., & Wang, H. J. (2016). Return the compliment: The economic cycle and the tax avoidance of state-owned enterprises. *Management World, 5*, 46–63.
Chen, D. Q., Chen, Y. S., & Dong, Z. Y. (2016). Policy uncertainty, tax collection and management intensity and corporate tax evasion. *Management World, 5*, 151–163.
Chen, H., Tang, S., Wu, D., & Yang, D. (2015). The political dynamics of corporate tax avoidance: The Chinese experience. *Social Science Electronic Publishing, 628*(1).
Chen, X. G. (2016). Fiscal pressure, tax administration and regional inequality. *Social Sciences in China, 4*, 53–70.
Chen, Y., Chen, D., Wang, W., & Zheng, D. (2018). Political uncertainty and firms' information environment: Evidence from China. *Journal of Accounting and Public Policy, 37*(1), 39–64.
Demir, E., & Ersan, O. (2017). Economic policy uncertainty and cash holdings: Evidence from BRIC countries. *Emerging Markets Review, 33*, 189–200.
Du, J. L., Fang, H. S., & Jin, X. R. (2014). The "growth-first strategy" and the imbalance between consumption and investment in China. *China Economic Review, 31*(9), 441–458.
Fan, Z. Y., & Tian, B. B. (2013). Tax competition, tax enforcement and corporate tax avoidance. *Economic Research Journal, 9*, 99–111.
Fang, H. S., & Zhang, J. (2013). Grabbing hand, helping hand and tax-exceeding-gdp growth. *Economic Research Journal, 3*, 108–121.
Feng, H., & Shen, Z. Z. (2015). Political incentive, tax plan and the budget revenue forecast error of local government. *Journal of Guangdong University of Finance & Economics. 30*(5), 58–68.
Gao, P., & Qi, Y. (2012). *Political uncertainty and public financing costs: Evidence from US municipal Bond markets.* (Working Paper).
Gao, P. Y. (2006). Riddle of the sustained and rapid tax increase in China. *Economic Research Journal, 12*, 13–23.
Gu, X. M., Chen, Y. M., & Pan, S. Y. (2018). Economic policy uncertainty and innovation: Evidence from listed companies in China. *Economic Research Journal,* (2), 109–123.
Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Social Science Electronic Publishing,* (3), 29.
Gupta, S., & Newberry, K. (1997). Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data. *Journal of Accounting and Public Policy, 16*(1), 1–34.
Hanlon, M., Maydew, E. L., & Saavedra, D. (2017). The taxman cometh: Does tax uncertainty affect corporate cash holdings? *Review of Accounting Studies, 22*(3), 1198–1228.
Jin, X. J., Chen, Z. Q., & Yang, X. L. (2019). Economic policy uncertainty and stock price crash risk. *Accounting and Finance, 58*, 1291–1318.
Jin, X. J., Zhong, Y., & Wang, Y. Z. (2014). Macroeconomic consequences of policy uncertainty. *Economic Theory & Business Management, 3*, 17–26.
Jones, P. M., & Olson, E. (2013). The time-varying correlation between uncertainty, output, and inflation: Evidence from a DCC-GARCH model. *Economics Letters, 118*(1), 33–37.
Kang, W., Gracia, F., & Ratti, R. (2017). Oil price shocks, policy uncertainty, and stock returns of oil and gas corporations. *Journal of International Money and Finance, 70*, 344–359.
Kang, W., Lee, K., & Ratti, R. A. (2014). Economic policy uncertainty and firm-level investment. *Journal of Macroeconomics, 39*(3), 42–53.
Kim, H., & Kung, H. (2017). The asset redeploy ability channel: How uncertainty affects corporate investment. *Review of Financial Studies, 30*(1), 245–280.
Kim, K. A., & Limpaphayom, P. (1998). Taxes and firm size in pacific-basin emerging economies. *Journal of International Accounting, Auditing and Taxation, 7*(1), 47–68.
Li, F. Y., & Yang, M. Y. (2015). Can economic policy uncertainty influence corporate investment? The empirical research by using China economic policy uncertainty index. *Journal of Financial Research,* (4), 115–129.
Li, Q., Maydew, E. L., Willis, R. H., & Xu, L. (2016). *Corporate tax behavior and political uncertainty: Evidence from national elections around the world.* Social Science Electronic Publishing.
Li, X., Balcilar, M., Gupta, R., & Chang, T. (2016). The causal relationship between economic policy uncertainty and stock returns in China and India: Evidence from a

bootstrap rolling window approach. *Emerging Markets Finance and Trade, 52*, 674–689.
Lu, H. Y., & Zhang, N. (2016). Political turnover, tax enforcement and tax aggressiveness. *Business Management Journal, 2*, 160–168.
Mertens, J. B. (2003). Measuring tax effort in central and Eastern Europe. *Public Finance & Management, 3*, 530–563.
Mills, L. F., Nutter, S. E., & Schwab, C. M. (2013). The effect of political sensitivity and bargaining power on taxes: Evidence from federal contractors. *The Accounting Review, 88*(3), 977–1005.
Mobarak, A. M. (2005). Democracy, volatility, and economic development. *The Review of Economics and Statistics, 87*(2), 348–361.
Morss Elliott, R., Fredland Eric, J., & Hymans Saul, H. (1967). Fluctuations in state expenditures: An econometric analysis. *Southern Economic Journal, 33*(4), 496.
Phan, D. H. B., Sharma, S. S., & Tran, V. T. (2018). Can economic policy uncertainty predict stock returns? Global evidence. *Journal of International Financial Markets Institutions and Money, 55*, 134–150.
Porcano, T. M. (1986). Corporate tax rates: Progressive, proportional, or regressive. *Journal of American Taxation Association, 7*(2), 17–31.
Rao, P., Yue, H., & Jiang, G. (2017). Economic policy uncertainty and firms' investment. *Journal of World Economy, 2*, 27–51.
Scheffel, E. M. (2016). Accounting for the political uncertainty factor. *Journal of Applied Econometrics, 31*(6), 1048–1064.
Shevlin, T. (1987). Taxes and off-balance-sheet financing: Research and development limited partnerships. *Accounting Review, 62*(3), 480–509.
Stock, J. H., Watson, M. W., Blinder, A. S., & Sims, C. A. (2012). Disentangling the channels of the 2007–09 recession. [with comments and discussion] *Brookings Papers on Economic Activity, 1*, 81–156.
Tybout, J. (2000). Manufacturing firms in developing countries: How well do they do, and why? *Journal of Economic Literature, 38*, 11–44.
Wang, H. J., Li, Q., & Xing, F. (2014). Economic policy uncertainty cash holdings and market value. *Journal of Financial Research, 9*, 53–68.
Wang, Y., Wei, Y., & Song, F. M. (2017). Uncertainty and corporate R & D investment: Evidence from Chinese listed firms. *International Review of Economics and Finance, 47*, 176–200.
Wang, Y. T., Wang, L., & Peng, Y. (2010). Ownership nature of ultimate controller, debt-related tax shields and capital structure. *Economic Research Journal, 9*, 122–136.
Wang, Y. Z., Chen, C. R., & Huang, Y. S. (2014). Economic policy uncertainty and corporate investment: Evidence from China. *Pacific-Basin Finance Journal, 26*(3), 227–243.
Wang, Y. Z., Wang, G., & Peng, Y. (2012). Does ownership nature affect tax sensitiveness?—Evidence based on firm's labor demand. *Economic Research Journal, 4*, 52–63.
Wu, J., Zhang, J., Wu, Y., & Kong, D. (2019). When to go abroad: Economic policy uncertainty and Chinese firms' overseas investment. *Accounting and Finance,* 1–36.
Xie, Z. F., & Fan, Z. Y. J. (2015). Chinese-style tax-sharing system, tax collection centralization and tax competition. *Economic Research Journal, 4*, 92–106.
Yang, J. D., & Yang, Q. J. (2016). Growth pressures, stimulus plan and industrial land transfer. *Economic Research Journal, 1*, 99–113.
Yi, Z. G., & Mao, N. (2009). Research on the measurement of investor sentiment in Chinese Stock market: The CICSI's construction. *Journal of Financial Research,* (11), 174–184.
Yu, W. C., Li, S., & Yuan, Y. (2015). Official substitution, nature of property right and enterprises tax avoidance. *Zhejiang Social Science, 8*, 14–25.
Zeng, Y. M., & Zhang, J. S. (2009). Can tax administration play the role of corporate governance? *Management World, 3*, 143–151.
Zhang, G., Han, J., Pan, Z., & Huang, H. (2015). Economic policy uncertainty and capital structure choice: Evidence from China. *Economic Systems, 39*(3), 439–457.
Zhao, W. Z., Yang, Q. J., & Zhou, Y. A. (2010). A study on the relationship between the inequality aversion, the fiscal competition, and the deficit expansion of the local government. *Management World, 22*(1), 44–53.
Zhou, L. A., Liu, C., & Li, X. (2012). Tax effort, tax bureaus and the puzzle of the abnormal tax growth. *China Economic Quarterly, 11*(1), 1–18.