Eurozonization of the Chinese Economy:

How Do Intergovernmental Transfers Affect Local Government Debt in China? *

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Abstract: China's local government debt has risen dramatically, which brings risks to China's fiscal sustainability and long term economic growth, and intergovernmental fiscal transfers are of critical importance to it. From the lens of Urban Construction Investment Bonds (UCIBs) issued by Local Government Financing Vehicles (LGFVs), we study how intergovernmental fiscal transfers impact the issuance of UCIBs under China's unitary system. After the application of instrumental variable estimation, we find special-purpose fiscal transfer per capita is positively associated with the issuance of UCIBs: specifically, an increase in the special-purpose fiscal transfer per capita by one yuan RMB is associated with an increase in the issuance of UCIBs per capita by

^{*}This paper is supported by Major Program of National Social Science Foundation of China (13&ZD015). We thank for Tengjuan Xia's excellent research assistance.

0.282 yuan RMB; whereas, regular fiscal transfer (including tax rebate and general fiscal transfer) has nothing to do with the issuance of UCIBs. Furthermore, the effect of special-purpose fiscal transfer on the issuance of UCIBs mainly exists in the inland cities instead of coastal cities. This imposes the risk of Eurozonization for the Chinese economy. A further study also finds the deterioration of refinancing in terms of issuing more UCIBs.

Keywords: Intergovernmental Fiscal Transfers, Local Government Debt, UCIBs, Eurozonization

1. Introduction

Almost ten years after the global financial crisis started at 2008, the world is suffering from a debt hangover of unprecedented proportions. The massive government debt, as the share of GDP exceeding to 100% in advanced economies, brings risks not only to the fiscal sustainability, but also their long term economic growth (IMF, 2014; Woo and Kumar, 2015). As the potential sovereign default has a bearing on the financial market, any inappropriate effort in response to it would trigger a debt crisis or even financial crisis (Reinhart and Rogoff, 2011).

China, as a developing country, its government debt has also risen dramatically and receives growing attention right after the 2008 financial crisis. It has turned out to be a threat to China's financial stability and even the world's economic health (Lu and Sun, 2013; Bai et al. 2016; Gao et al. 2016; Huang et al., 2016; Lu and Xiang, 2016; Chen et al., 2017). International Monetary Fund (IMF) warned that Chinese debt would cause the next financial crisis if borrowing becomes unsustainable¹.

In general, China's government debt is made up of two parts: central government debt and local government debt. Unlike central government has strong financial power and the components of its debt is transparent, China's local government debt is the primary focus of the debt problem. It is much larger in size and keeps surging currently. According to the report published by the China's National Auditing Office (NAO), China's local government debt grows from 5.35 trillion yuan RMB at the end of 2008, 10. 72 trillion yuan RMB in 2010, to 15.89 trillion yuan RMB in 2012, with an annual

¹ See the Guardian news: https://www.theguardian.com/business/2017/aug/15/imf-warns-china-debt-slowdown-financial-crisis.

growth rate of 31.28% between 2008 and 2012.



Figure. 1 the Correlation between Debt/GDP and GDP per capita, 2013

Source: authors' calculation.

Note: Debt/GDP = (Provincial government debt/GDP)*100, Data for China's provincial government debt is from the report published by the China's National Auditing Office (NAO) in 2013. Data for GDP and population is from Wind Data.

However, when it comes to the issue of China's local government debt, few studies have noticed its regional heterogeneity, that is China's less developed regions have higher debt burden. Figure 1 uses the ratio of provincial government debt to GDP as a measure of debt burden. As seen, the ratio is higher in poorer interior provinces. The negative relationship between debt-to-GDP ratio and GDP per capita will become more significant, if we do not include Shanghai, Beijing and Tianjin, the three largest municipalities, in the figure. The same pattern also exists when we use UCIBs data in the city level. See the Figure 2.



Figure 2 the Correlation between UCIBs/GDP and GDP per capita,2012

Source: authors' calculation.

Note: This is a partial-regression plot. Debt/GDP = (Urban Construction Investment Bonds / GDP)*100. Data for UCIBs, GDP and population is from Wind Data

This phenomenon is much like what happened in Eurozone where the peripheral countries (which are also less developed) have higher debt-to-GDP ratio (Hale and Obstfeld, 2016). The reason for the similarity between China and Eurozone is: both are unified currency regions, and the poorer regions cannot depreciate their currencies to boost local economic growth. What they could do is to borrow for financing their fiscal expenditures.

Another critical factor that contributes to the fast expansion of China's local government debt is the central-local government relation. If the local governments have

the expectation that the central government will bail them out when they cannot pay back in the future, they will borrow more right now, which is a typical soft budget constraint problem (Kornai et al., 2003). Meanwhile, China's local governments receive large-scale intergovernmental fiscal transfers from the central government each year, which in turn may give rise to the soft budget constraint.

Concerning this, we have to consider how intergovernmental fiscal transfers affect the borrowing of local governments in China. Along with it, in China, a large share of intergovernmental fiscal transfers favoring the interior regions-central and western regions, which are less developed, may cause regional heterogeneity of borrowing. Whether the soft budget constraint problem is largely an issue existing in the interior regions is also a relevant question. If this is true, it also partly explains why the debt burden is heavier in the lagged regions in China.

In our study, we examine the effect of intergovernmental fiscal transfers on the issuance of Urban Construction Investment Bonds (UCIBs) which are issued by Local Government Financing Vehicles (LGFVs) using city-level panel data. Instrumental variable approach is adopted to deal with endogeneity. According to our study, we find a positive association between special-purpose fiscal transfer and the issuance of UCIBs: specifically, one-yuan increase in special-purpose fiscal transfer per capita leads to an increase in the issuance of UCIBs per capita of 0.282 yuan; whereas regular fiscal transfer, including tax rebate and general fiscal transfer, exerts an insignificant effect on the issuance of UCIBs. We then further split our sample into two categories: coastal and inland cities. In the inland cities, this relation exists, while in the coastal cities, such a relation does not exist significantly. Not least, we investigate the issue of refinancing in terms of issuing UCIBs, which turns out to be more severe recently.

The remainder of the paper proceeds as follows. The next section reviews the relevant literature. Section three introduces the institutional background of China's local government's debt and intergovernmental fiscal transfers. Section four describes the empirical strategy and data. Empirical results and analyses are in section five. Section six comes to the conclusion.

2. Literature Review

Although fiscally decentralization has undoubtedly been a clear trend around the world, nearly all localities are dependent on central government that distributes fiscal transfer to localities for the sake of government operations. Statistically, fiscal transfer in developing countries accounts to 60% as the percentage of local expenditure, and even for the OECD countries, its fraction is about 1/3 as the percentage of local expenditure (Broadway and Shah, 2007).

Such large scale of intergovernmental fiscal transfers must have immensely impact on regional economic growth and local government behavior. Relevant studies have already addressed the magnitude of this impact on public goods provision, human capital development, poverty rate, government quality, the corruption of local officials (Reinikka and Svensson, 2004; Kyriacou and Roca-Sagalés; Litschig and Morrison, 2013; Pal and Wahhaj, 2017; et al.).

Furthermore, intergovernmental fiscal transfers also carry with the inefficient local

governmental expenditure and debt expansion (Eyraud and Lusinyan, 2013; Potrafke and Reischmann, 2015; Martinez-Vazquez et al., 2016). In the literature, there are mainly two possible mechanisms to explain this: common pool problem and soft budget constraint problem. The common pool problem arises from the separation of the costs and benefits of public spending. Local governments which receive fiscal transfers benefit from its spending, but the cost is distributed over the whole nation, which provides incentives for each locality to obtain as much fiscal transfers as possible. To justify this incentive, when decide on the level of borrowing, they are more likely to have high levels of subnational borrowing to "prove" that they are under-financed (Plekhanov and Singh, 2006; Baskaran, 2010). The other mechanism comes to the problem of soft budget constraint. When local governments are unable to meet their financial commitments, central government often bails them out in a way of intergovernmental fiscal transfers. The expectation of receiving central bailout in the future would increase locality's current fiscal expenditure, which in turn generates more government debt (Rodden, 2002; Kornai et al., 2003; Pettersson-Lidbom, 2010; Akai and Sato, 2011).

With respect to China's government debt, a few empirical studies have been conducted, most of which focus on the consequences of local government debt, especially after the 2008 global financial crisis. Huang et al. (2017) observe that private firms' investment was crowded out by local government debt. Bai et al. (2016) emphasize the resulting inefficiency of capital misallocation caused by the 4-trillion-yuan stimulus program. Chen et al. (2017) find that the surging shadow banking activities after 2013 were partly driven by the rollover pressure of LGFVs that needs to repay maturing bank loans lent during the stimulus program. Gao et al. (2016) find that local governments would choose to default on commercial bank loans instead of policy bank loans and suggest that career concerns of politicians could discipline local government borrowing.

However, few studies have noticed that the underdeveloped regions in China have higher debt-to-GDP ratio, which share similarities with the Eurozone debt crisis. From the perspectives of central-local relations and regional heterogeneity, we use UCIBs issued by LGFVs to examine the effect of intergovernmental fiscal transfers and its subcategories on local governments' debt respectively, and the accompanying regional heterogeneity.

3. Institutional Background: China's Local Government Debt and Intergovernmental Fiscal System

3.1 China's Local Government Debt

China's government debt includes two parts: central government's debt and local governments' debt. The former consists of central fiscal deficit, central state-owned enterprises (SOEs) debt, bank debt and its non-performing loans, etc., while the latter is made up of sub-national unit (including province, city, county, township) debt, local SOEs debt (including LGFVs), and implicit pension debt, etc. Its forms are bank loan, BT (build and transfer), bond financing, trust financing, borrowing from other units or persons, etc. According to China's National Audit Office's report, central government debt reached to 12.38 trillion yuan RMB, local government debt to 17.89 trillion yuan

RMB and their sum totaled 30.27 trillion yuan RMB at the end of June, 2013, while local government debt accounted for 59.1% of total debt.

China's local governments' debt began to emerge after the economic reform in 1979. Continued growth in its size ends with a financial hardship at the township or county level after the "tax sharing reform" in 1994 that resulted in the fiscal recentralization and administrative decentralization. Albeit budgetary law stipulates that fiscal deficit is not allowed, many subnational governments, especially the central and western regions, have borrowed heavily to maintain their public operations. Another factor that leads to a rapid debt expansion is from the expansionary fiscal policy package after the Asian financial crisis in 1998. According to the National Audit Office's report, local government debt in 1998 increased by 48.2% compared with the level in 1997.

Afterwards, since government investment is an efficient instrument for economic management in China, a fast debt expansion took place again right after the global financial crisis started in 2008 (Tan et al., 2016). In response to the financial crisis, China's central government launched an unprecedented "4 trillion" yuan stimulus package, but most of which (about 2.8 trillion yuan) rested on local governments. However, given the limited fiscal capacity, local governments have to borrow to carry out government projects. According to the national budget law, local governments are not allowed to borrow by themselves, except with the permission from State Council or budget law. Hence, local governments are forced to rest on LGFVs to finance their investment spending.

LGFVs, traced back to the 1990s in the eastern coastal areas, expanded greatly after the

financial crisis in 2008. They are essentially state-owned enterprises (SOEs) which are created by local governments. Motivated by central bank and CBRC (China Banking Regulatory Commission), it serves as a financing channel that issues UCIBs, including corporate bonds, medium-term note (MTN), commercial paper, etc., to fund infrastructure investment in an effort to maintain economic growth. According to a LGFVs list reported by CBRC, its number exceeds 10,000 in 2010. In other words, there are about 30 LGFVs at the prefecture city level.

However, the debt borrowed by LGFVs evolved into the China's local government debt in the end, and three factors are accountable for it: firstly, LGFVs are very weak in making profit as it is often engaged in non-profit and quasi-operational projects; secondly, China's local governments always intervene or even control LGFVs' operational plans and their development; thirdly, directors at LGFVs are often designated from local government officials. For these reasons, LGFVs' debt has become the largest component of China's local government debt, and UCIBs issued by LGFVs, in fact, turn to be China's "municipal bond".

3.2 China's Intergovernmental Fiscal System

China's intergovernmental fiscal system had gone through a significant reform in 1994, which is called "tax sharing reform". Prior to the "tax sharing reform", Chinese government revenues as percentage of GDP was reduced from its peak, 25.5% in the 1980s, to 12.3% in 1993. At the same time, China's central government revenues as percentage of government revenues decreased from its peak 40.5% to 22% in 1993. A

fall in the two above ratios is detrimental to China's central government's capacity in macroeconomic regulations, and its authority as well. In extreme cases, China's central government needed to borrow from localities, so called "local governments' contribution", though this borrowing would not be paid off.

Afterwards, China's State Council came up with the decision to implement intergovernmental fiscal system reform which is called "tax sharing reform" that came into effect in January 1st, 1994. Under the new fiscal system, the central government share of total revenue has increased sharply, while local government share of total revenue has decreased substantially with certainty. However, after the reform, the local governments still maintained responsibilities for most parts of public goods and services in their jurisdictions. As a result, a huge mismatch between local governments' revenue assignments and expenditure responsibilities emerged.

In response to it, China's central government has to subsidize localities in terms of intergovernmental fiscal transfers after the "tax sharing reform". At present, intergovernmental fiscal transfers from the central government to the local governments could be broadly categorized into two groups: special-purpose fiscal transfer and regular fiscal transfer. Special-purpose fiscal transfer are usually program-based and endowed with strong bargaining features. Most of its current assignment is done through the processes of application which would cause opacity. In recent years, it has been widely used to deal with high-priority cases, for example, bailouts of local government social protection programs, etc. (Huang and Chen, 2012). Regular fiscal transfer. The

tax rebate aims at ensuring that local governments would receive government revenue no less than what they had received before the "tax sharing reform", while the general fiscal transfer's role was to reduce the fiscal gap between rich and poor regions. Both kinds of sub-regular fiscal transfers are allocated by formulas, and are also called formula-based fiscal transfers.

4. Empirical Strategy and Data

4.1 Empirical Strategy

The sample used in the study is Chinese city-level panel data, so we estimate the following equation:

$$perdebt_{it} = \alpha + \beta pertransfer_special_{it-1} + \gamma pertransfer_regular_{it-1} + X_{it-1}\delta + \theta_i + \sigma_t + \varepsilon_{it} \quad (1)$$

Where i denotes city, and t is year. Explained variable is the size of UCIBs per capita issued by the city each year; we center on two key explaining variables: special-purpose fiscal transfer per capita and regular fiscal transfer per capita, both of which indicate the intergovernmental fiscal relations. Other controlled variables X include budgetary revenue per capita, land sales revenue per capita, GDP per capita, trade of goods and services per capita. Additionally, we also include city and time fixed effects.

Given the long complicated process in issuing UCIBs (cost nearly a year)¹ and the possible reverse causality between the issuance of UCIBs and special-purpose fiscal

¹ Issuing UCIBs starts from LGFVs deciding to issue UCIBs, contacting principal underwriters to prepare materials related to the issuance, submitting them to relevant regulators for their approval, to the final success of bond issuance.

transfer per capita, all explaining variables in the equation are lagged by one year. As the issuance of UCIBs began to surge after 2006, the sample used in this study is 221 cities that had issued UCIBs during 2006 to 2012.

In our estimation equation, although we have already controlled city and time fixed effects and other relevant variables that might affect the issuance of UCIBs, it is still possible that certain unobserved variables that are correlated with special-purpose fiscal transfer per capita and also directly affect the issuance of UCIBs. Since special-purpose fiscal transfer is a variable determined by local governments' ability, any city-level missing variables that reduce special-purpose fiscal transfer will induce the local governments to borrow more to fill the gap between their revenue and expenditure, so that the coefficient of special-purpose fiscal transfer will be biased downward. We therefore adopt an instrumental variable estimation.

Two instrumental variables are used in this study: the first one is the previous fiscal year's special-purpose fiscal transfer per capita, as there is a correlation of special-purpose fiscal transfers in different years in the same region. In addition, in consideration of mutual interactions in applying for special-purpose fiscal transfer among localities, which is highly correlated between neighboring cities in the same province, we use the mean of neighboring cities' special-purpose fiscal transfer per capita in the same province as the second instrumental variable. This idea of IV is also coincident with Pettersson-Lidbom (2010) which studies the case of Sweden.

Given the great economic disparity between the coastal and inland areas in China, central government favors inland areas in transferring revenues concerning the regional

fiscal equalization. Is there any region heterogeneity in terms of how the favoring policy affects the issuance of UCIBs? We then divide our sample into two regions--coastal areas and inland areas--to further examine whether this effect is heterogeneous. The theoretical inference is: the inland laggard regions suffer from being members of the one currency area, so that they have stronger expectation of getting special-purpose fiscal transfer and being rescued when in trouble. Therefore, the transfer-debt relationship could be more significant in the inland provinces.

4.2 Data

The sample used in our empirical analysis is the Chinese city-level panel data from 2006 to 2012. The data of local government borrowing by issuing Urban Construction Investment Bond (UCIBs) is collected directly from WIND Data. This dataset provides information on all sorts of bonds issued by the Local Government Financing Vehicles (LGFVs) in bond markets (i.e. corporate bond, medium-term note, short-term financing bond, and private placement bond). We use the overall level of these bonds. Since knowing the issue date and amount of each UCIBs issuance, and the name of UCIBs' corresponding LGFVs, we can match the UCIBs data with other city-level variables. Another reason why we use UCIBs data is that there is no measurement error in this data, while the total debt data which are reported by the local governments, with great measurement error, are only available at provincial level in few years and hard to form a panel data set.

Regular and special-purpose fiscal transfer data in our empirical analysis are from

Financial Statistics of China's Cities and Counties. Other data, such as GDP, budgetary revenue, land sales revenue and trade openness are obtained from China City Statistical Yearbooks. Statistical descriptions for the main variables are shown in Table 1:

Varaibles	Ν	Mean	S.D.	Min	Max
perdebt	1512	208.1	511.7	0	5021
pertransfer_special	1512	583.3	485.1	18.67	4178
pertransfer_regular	1512	804.6	376.5	90.01	2929
perfiscal_income	1512	1658	1862	104.2	18433
perlandrevenue	1512	1151	1852	1.904	15801
pergdp	1512	24659	19980	3528	171381
pertrade	1512	9684	28444	12.79	251808

Table 1: Summary Statistics

Source: Authors' calculation.

5. Empirical Results

5.1 Baseline Results

Basic regression results are summarized in Table 2. Both column (1) and (2) use fixed effect estimation, but they are different in whether the regular fiscal transfer per capita variable is added. Seen from column (1), the effect of special-purpose fiscal transfer on the issuance of UCIBs is positively significant. An increase in special-purpose fiscal transfer per capita by 1 yuan is associated with an increase in the issuance of UCIBs per capita by 0.096 yuan. According to column (2), when regular fiscal transfer per capita is included, the coefficient of special-purpose fiscal transfer per capita remains stable and is significantly positive (coefficient 0.091). There is no significant effect of regular fiscal transfer per capita on the issuance of UCIBs per capita. This indicates that vertically assigned special-purpose fiscal transfer is the primary source that intergovernmental fiscal transfers affect the issuance of UCIBs instead of regular fiscal transfer, because the latter is assigned on a given formula in advance and local governments could predict this revenue in general.

	Dependent Variable: perdebt							
	F	FE		-IV1	FE+	-IV2	FE+IV(Both)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
pertransfer_special	0.096**	0.091**	0.264***	0.284***	0.254**	0.274**	0.282***	
	(0.039)	(0.041)	(0.074)	(0.083)	(0.106)	(0.125)	(0.076)	
pertransfer_regular		0.034		-0.054		-0.049	-0.053	
		(0.072)		(0.080)		(0.090)	(0.078)	
Controls:								
perfiscal_income	0.145***	0.149***	0.143***	0.138***	0.143***	0.138***	0.138***	
	(0.031)	(0.032)	(0.031)	(0.032)	(0.031)	(0.032)	(0.032)	
perlandrevenue	0.001	0.001	0.004	0.004	0.004	0.004	0.004	
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	
pergdp	0.015***	0.015***	0.014***	0.014***	0.014***	0.014***	0.014***	

 Table 2: Baseline Regression Results

	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
pertrade	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
City FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
First Stage Statistics			516.351	410.645	205.034	151.815	259.726
Sargan Test (p value)							0.936
Observations	1512	1512	1512	1512	1512	1512	1512
R-squared	0.447	0.447	0.439	0.437	0.440	0.438	0.437
Number of city	216	216	216	216	216	216	216

***, **, * denote significance at 1%, 5%, and 10% levels, respectively

Furthermore, we use IV estimation to control the omitted variables that might be correlated with special-purpose fiscal transfer per capita and also directly affect the issuance of UCIBs. Column (3) and column (4) are the estimates when the previous fiscal year's special-purpose fiscal transfer per capita is used as the IV. Concerning the weak IV problem, we use the first stage F statistics to test whether there is a weak IV problem. The results of two F statistics are 516.351 and 410.645 in column (3) and (4) respectively, which are much higher than the critical value (F=10). The coefficients on special-purpose fiscal transfer per capita in column (3) and (4) are significantly rising compared to column (1) and column (2), suggesting a downward bias obtained in column (1) and (2) owing to omitted variable. In column (4), 1-yuan increase in special-purpose fiscal transfer per capita generates the issuance of UCIBs per capita by as much

as 0.284 yuan, but, in comparison, regular fiscal transfer still has no significant effect on the issuance of UCIBs.

In the following regressions, the mean of neighboring cities' special-purpose fiscal transfer per capita in the current year then is adopted as the IV in an effort to further verify our regression results. Specific results are shown in column (5) and (6). The results of first stage F statistics are 205.034 and 151.815, and they are also much higher than the weak IV critical value (F=10). According to column (6), an increase in special-purpose fiscal transfer per capita by 1-yuan leads to an increase of 0.274 yuan of the issuance of UCIBs, which is consistent with the basic result from column (4). Likewise, regular fiscal transfer has no significant effect on the issuance of UCIBs, further proving the robustness of our regression results.

Seen from column (7), we use both IV to estimate the equation. As the number of IV excesses that of endogenous variable, we use Sargan statistics to do the overidentification test. The P value of the Sargan test is 0.936, so we cannot reject the null hypothesis, which suggests our two IVs are valid. In this estimation, special-purpose fiscal transfer per capita is positively associated with the issuance of UCIBs per capita: specifically, 1-yuan increase in special-purpose fiscal transfer per capita leads to an increase in the issuance of UCIBs per capita by 0.282 yuan, which is consistent with other regression coefficients and likewise regular fiscal transfer per capita has no significant effect on the issuance of UCIBs. It's worthy to notice that the three IV estimates show very similar coefficients of the special-purpose fiscal transfer.

When it comes to other controlled variables, column (7) generates estimates of the

association between public budgetary revenue and the issuance of UCIBs: specifically, 1-yuan increase in public budgetary revenue per capita generates an increase in the issuance of UCIBs per capita as much as 0.138 yuan. That is to say, the issuance of UCIBs is subject to the concerns of future repayment capacity. With respect to land sales revenue, there is uncertainty arose from it, as on one hand, land sales revenue encourages more borrowing on the part of local government, but which in turn reduces the demand of financing on the other hand. All results from above regressions show an insignificant impact of land sales revenue on the issuance of UCIBs, which might be the total effect among these two mechanisms. There is also an association between GDP per capita and the issuance of UCIBs: specifically, 1-yuan improvement of GDP per capita leads to 0.014 yuan increase in the issuance of UCIBs. An increase in total trade per capita by one yuan is associated with an increase in debt per capita by 0.008 yuan.

5.2 Robustness Check

In the baseline regressions, we run the within estimation in the panel data model. If the SBC problem exists, we should also see that special-purpose fiscal transfer impacts the issuance of UCIBs in a cross-sectional analysis. To verify this, we run the between estimation as the robust check. The corresponding regression results are presented in Table 3, where column (1) is the estimated results of OLS, column (2) and (3) are the estimated results of two IV, respectively. Column (4) is the results of using two IV jointly.

						Dependent	Variable			
	perdebt					Perdebt			pertransfer_special	
	OLS		OLS+IV		FE	Diff-	Sys-GMM		FE	
						GMM				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
pertransfer_special	0.206***	0.192***	0.259	0.192***	0.100**	0.083*	0.083***			
	(0.058)	(0.059)	(0.174)	(0.059)	(0.045)	(0.045)	(0.028)			
pertransfer_regular	-0.141**	-0.131**	-0.181	-0.131**	0.025	-0.009	-0.090			
	(0.065)	(0.064)	(0.140)	(0.064)	(0.084)	(0.133)	(0.063)			
perdebt								0.019		0.032
								0.028		0.029
L.perdebt					-0.291***	-0.319***	-0.159***		0.010	0.018
					(0.040)	(0.073)	(0.033)		(0.034)	(0.034)
Controls:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Statistics		3861.819	25.585	1924.101						

Tabel 3: Robustness

Sargan Test (p value)				0.684						
Observations	216	216	216	216	216	216	216	1296	1,080	1080
R-squared	0.502	0.502	0.500	0.502	0.461			0.564	0.509	0.510

***, **, * denote significance at 1%, 5%, and 10% levels, respectively

Obviously, special-purpose fiscal transfer also positively affects the issuance of UCIBs in the cross sectional regressions. One yuan increase in the special-purpose fiscal transfer per capita generates an increase in issuing the UCIBs per capita by 0.192 yuan, which is consistent with the basic regression results shown in Table 2. It is worthy to note that regular fiscal transfer per capita negatively affect the issuance of UCIBs per capita, and its coefficient is -0.131. This shows that, different from the role of special-purpose transfer, regular transfer helps to fill the gap between local revenue and expenditure, and reduces local fiscal burden in laggard regions. The regression results of other variables are also robust.

Furthermore, considering the possible serial correlation of the issuance of UCIBs every year, we also include the lagged dependent variable to characterize the dynamic adjustment process. To estimate the dynamic panel data model, we run fixed effect estimation, difference GMM and system GMM estimation together in Table 3. From column (5), (6) and (7) in Table 3, we can see that the special-purpose fiscal transfer per capita are still significant and the regular fiscal transfer per capita are not significant after adding the lagged dependent variable.

In concerning special-purpose fiscal transfer assignment, central government often requires localities to deliver copayment package along with the special-purpose fiscal transfer in an effort to increase the expenditure efficiency. To some extent, we may worry about the positive relationship between special-purpose fiscal transfer and debt, which is caused by the copayment requirement. Nevertheless, in practice, copayment ratio varies across regions. In general, this ratio in the coastal regions is much higher than that in the inland regions. To a great extent, this copayment fund is raised by the provincial government. In 2004, copayment ratio is 70%, 15% and 15% at provincial, city, and county respectively. As our sample is at city level, copayment pressure endured by city governments are far from intensive.

We then conduct an empirical test to formally prove the fact that copayment pressure is not responsible for the effect of special-purpose fiscal transfer on the issuance of UCIBs. Thus, we run regressions for special-purpose fiscal transfer per capita on the UCIBs per capita issued in the current or previous year in the same region. If the copayment pressure is responsible for the positive correlation, we would expect that the coefficient of UCIBs per capita will be positive and significant. This is because local governments could apply for more special-purpose fiscal transfer when they have more financial resources from borrowing. However, from the column (8), (9) and (10) in Table 3, the growing issuance of UCIBs don't increase the special-purpose fiscal transfer significantly. We are, therefore, convinced that special-purpose fiscal transfer positively impacts the issuance of UCIBs, but isn't necessarily driven from the pressure of copayment package.

5.3 Regional Differences

As China's central government favors central and western region, we further examine the possible resulted regional heterogeneity that fiscal transfer exerts on the issuance of UCIBs. We split our sample into two categories: coastal cities in the eastern provinces and inland cities in the central and western regions. From the regression results in Table 4, column (1) and (2) use the previous fiscal year's special-purpose fiscal transfer per capita as IV, suggesting that the positive significant effect of special-purpose fiscal transfer on UCIBs mainly exists in the inland cities rather than in the coastal cities; its coefficient on special-purpose fiscal transfer per capita is at 0.302.

	Dependent Variable: perdebt							
	FE+I	V(1)	FE+I	V(2)	FE+IV(Both)			
	(1) (2)		(3)	(4)	(5)	(6)		
	inland	coast	inland	coast	inland	coast		
pertransfer_special	0.302***	0.232	0.305**	0.694	0.303***	0.237		
	(0.091)	(0.191)	(0.136)	(0.943)	(0.083)	(0.191)		
pertransfer_regular	0.018	-0.025	0.017	-0.223	0.017	-0.027		
	(0.088)	(0.254)	(0.094)	(0.472)	(0.088)	(0.254)		
Controls								
perfiscal_income	0.166***	0.063	0.165***	0.037	0.166***	0.063		
	(0.042)	(0.059)	(0.043)	(0.079)	(0.041)	(0.059)		
perlandrevenue	0.006	0.007	0.006	0.008	0.006	0.007		
	(0.019)	(0.017)	(0.019)	(0.018)	(0.019)	(0.017)		

pergdp	0.009**	0.030***	0.009**	0.032***	0.009**	0.030***
	(0.004)	(0.008)	(0.004)	(0.009)	(0.004)	(0.008)
pertrade	0.012	0.004	0.012	0.003	0.012	0.004
	(0.009)	(0.004)	(0.009)	(0.005)	(0.009)	(0.004)
City FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
First Stage Statistics	253.916	229.135	99.691	6.143	164.269	114.776
Sargan Test (p value)					0.982	0.613
Observations	1,071	441	1,071	441	1,071	441
R-squared	0.406	0.497	0.405	0.476	0.406	0.497
Number of city	153	63	153	63	153	63

***, **, * denote significance at 1%, 5%, and 10% levels, respectively

Column (3) and (4) use the mean of neighboring cities' special-purpose fiscal transfer per capita as IV, and consistent findings are obtained. For the inland sample regression, the coefficient of special-purpose fiscal transfer per capital is 0.305, which is highly consistent with column (1). Seen from column (5) and column (6) which use these two IV jointly, its regression results remain highly robust with that of other four equations. One yuan increase in the special-purpose fiscal transfer per capita leads to an increase in the issuance of UCIBs by 0.303 yuan in the inland cities, but has no significant effects in the coastal provinces. In aggregate, across six equations we find consistently that regular fiscal transfer exerts no significant impact on the issuance of UCIBs.

5.4 Further Discussions

Furthermore, despite the fact that central government has already carried out relevant policies in dealing with local governments' debt, local governments in all likelihood keeps borrowing because of growing intensity on economic outcomes, possibly creating a large and expanding debt stock for local governments. Their debt, however, is set to come due. According to a report released by National Audit Office in 2013, local governments' debt repayment reached its peak in 2014, 2015 and 2016. In response, local governments have to borrow new loans in order to pay back the old. Driven by the dual pressure, whether this new debt will be used to repay the mature debt is the issue empirically examined in this paper. If future debt stock is going to be reduced gradually, in a long run, China's debt problem will not be plagued; but if the localities are borrowing to pay off the old debts, the local debt is likely to accumulate and evolve into a serious debt crisis.

Concerning this issue, a further empirical test is adopted to examine whether localities issue UCIBs to pay off its debt. We run regressions as follows: as UCIBs surges after the financial crisis in 2008, we compute the stock of UCIBs that has not come to due at the end of 2009, 2010, and 2011 in the sample data, and then run regressions which take the issued UCIBs in 2010, 2011 and 2012 as the explained variable. If the regression coefficient on debt stock is positive, the statement that the localities are borrowing to pay off their old debts and their debts are accumulating may hold true.

Table 5: Borrowing New Money to Pay off Old Debt

Dependent Variable: perdebt

	FE+IV(both)						
	(1)	(2)	(3)				
	2010	2011	2012				
perdebt_stock	0.038	0.088**	0.251***				
	(0.050)	(0.038)	(0.045)				
pertransfer_special	0.101	0.155*	0.613***				
	(0.085)	(0.081)	(0.148)				
pertransfer_regular	-0.086	-0.130	-0.186				
	(0.119)	(0.099)	(0.130)				
perfiscal_income	0.150**	0.058	-0.003				
	(0.058)	(0.047)	(0.054)				
perlandrevenue	-0.007	0.011	0.080***				
	(0.025)	(0.020)	(0.031)				
pergdp	0.002	0.003	0.004				
	(0.004)	(0.003)	(0.004)				
pertrade	-0.008***	-0.001	0.003*				
	(0.002)	(0.001)	(0.002)				
Constant	-76.070	-6.434	-184.980				
	(88.397)	(88.672)	(129.727)				
First Stage Statistics	472.365	249.500	74.116				
Observations	216	216	216				
R-squared	0.220	0.259	0.515				

***, **, * denote significance at 1%, 5%, and 10% levels, respectively

Table 5 presents these regression results, where column (1), (2) and (3) are the regression results of the issuance of UCIBs in 2010, 2011, and 2012 respectively to the debt stock in its previous year. In 2010, the coefficient on debt stock is 0.038, which is not significant, indicating that the phenomenon of paying off the old debt by borrowing new has not emerged yet. A turning point occurred in 2011 when this coefficient is positively significant, at 0.088, implying that this phenomenon started to become prominent, but this coefficient is not so large. An increase in the debt stock per capita by 1-yuan is associated with an increase in the issuance of UCIBs per capita by 0.088 yuan in 2011. But in 2012, this phenomenon grew in intensity, and its coefficient is 0.251, positively significant. This conveys that 1-yuan increase in debt stock per capita in 2011 will leads to 0.251 yuan increase in the issuance of UCIBs in 2012. The comparison of these three equations captures the severity of China's local government's debt.

6. Concluding Remarks

This paper investigates how intergovernmental fiscal transfers affect the issuance of UCIBs issued by LGFVs in China by using a carefully constructed city-level panel data set. After coping with possible endogeneity by instrumental variable approach, we come to a conclusion that the special-purpose fiscal transfer per capita is associated with the issuance of UCIBs: specifically, an increase in the special-purpose fiscal transfer per capita by 1 yuan increases the issuance of UCIBs per capita by 0.282 yuan; whereas, formula-based regular fiscal transfer (including tax rebate and general fiscal transfer) has nothing to do with the issuance of UCIBs. Furthermore, the effect of special-purpose fiscal transfer on the issuance of UCIBs mainly exists in the inland cities instead of coastal cities. Another emerging phenomenon of refinancing by issuing more UCIBs is found in this study as well. Under this context, it is more difficult for the central government to cope with the growing local government debt in China.

There are some common features between China's local government debt problem and Eurozone sovereign debt crisis. The Eurozone debt crisis mainly took place in the southern European countries with low labor productivity, but in nature it comes from Euro's single currency policy. Each member in the Eurozone maintains the same exchange rate that is much higher compared to the productivity for those southern European countries. In other words, the poor countries have lost their independent monetary policies to boost their economic growth. To resolve this issue under Eurozone unity, it requires intra-governmental fiscal transfer from rich countries, like France and Germany, to bail out the countries mired in the sovereign debt crisis. Nevertheless, this fiscal transfer might also lead to moral hazard problem of the southern European countries which need to be rescued.

Likewise, China adopts a single currency policy to maintain the same level of exchange rate that is too high for those inland regions with low labor productivity. In response to the 2008 financial crisis, China's central government launched a 4-trillion stimulus package in efforts to stabilize their economies and employment, which massively increase the debt of localities. Similar to the situation of the poor Eurozone countries, the laggard regions in China are unable to recover their economy by increasing their export through depreciation of RMB. As a result, the laggard regions need to borrow more compared to coastal regions and have accumulated higher debt-to-GDP ratios. In this case, the clearing up of China's local government's debt requires intergovernmental fiscal transfer from the center, especially special-purpose fiscal transfer. However, in practice, the special-purpose fiscal transfer to inland regions may lead to the soft budget constraint problem of the laggard regions.

In this paper, we define the phenomenon of the debt accumulation process of China's local government, especially in the laggard regions, as "the Eurozonization of Chinese economy". When digging into the rising debt-to-GDP ratio in common currency area, like either Eurozone or China with great international or interregional labor productivity difference, we will find a tradeoff between fiscal transfer to the laggard regions and accumulating debts under the soft budget constraint problem.

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