THE IMPACT OF INTERGOVERNMENTAL TRANSFERS ON STATE AND LOCAL GOVERNMENTS' TAX PROGRESSIVITY AND REDISTRIBUTIVE EXPENDITURE POLICY

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INTRODUCTION

THE PRECISE ROLE INTERGOVERNMENTAL transfers play in subnational governments' financing remains a notoriously open question in public finance. From the theoretical standpoint of fiscal federalism, it is the central government's responsibility to pursue redistributive policy. Redistributive revenue policy of the state and local level will lead to an increase in pretax wages of high-skilled workers to prevent out-immigration of high-skilled workers. At equilibrium, the difference of the posttax wages of low-skilled workers and high-skilled workers remains the same. Therefore, the redistributive revenue tax at the state and local level fails to reduce posttax inequality and just increases the pretax inequality. This is considered to be inefficient. However, in practice subnational governments do have redistributive budgets. This research aims to answer three questions. First, what is the impact of intergovernmental transfers on state and local governments' choice of tax progressivity and redistributive expenditure? Second, is there a flypaper effect? In addition, I test for the impact of intergovernmental transfers on tax progressivity and redistributive expenditure over the business cycle.

This paper proceeds as follows. The first section outlines the theoretical background. The second section reviews previous research on tax progressivity, redistributive expenditures, and intergovernmental transfers. The third section then explains the research design and empirical results. The last section concludes and provides direction for future research.

THEORY OF FISCAL FEDERALISM

There are two views of fiscal federalism, the old view and the new view. The old view focused on the advantages of decentralized decision making. Local governments have the best information about their local situations and their residents' preferences. Also, it is costly to transfer that information to the central government. Therefore, local government is placed in a better position to make decisions about local public goods and services.

The new view of fiscal federalism explores issues of principal-agent problems, the economics of information, the new theory of the firm, organization theory, and the theory of contracts.

On the basis of Tiebout's model, Musgrave (1959) and Oates (1972) built a theory of fiscal federalism—"Decentralization Theorem." By application of the traditional Pigouvian theory of subsidies, they emphasize the rational assignment of taxation, expenditure, and intergovernmental transfers. Later, some scholars follow the theory of fiscal federalism to address aspects of localities' incentive to provide public goods and services. On the other hand, the tax assignment should also consider the expenditure side—what is the responsibility of subnational governments,—because residents vote with their feet not only depending on the tax burden, but also based on the public services the governments can provide. However, the problem with most of the empirical studies of redistributive tax and expenditure policy is the failure to take into account both sides.

The reason we need intergovernmental transfers is rooted in the fact that the responsibilities cannot clearly be marked as central responsibility or local responsibility. Sometimes the subnational governments need to coordinate rather than compete. In addition, progressive federal tax and the devolution of expenditure choices, which cause the inequality in vertical and horizontal levels, require returning part of the federal revenue to the states. Since transfers reflect closely the nature of a country's political system, Bird (1993) recommends designing transfers by focusing on their effects rather than on the instruments to achieve them. He argues that transfers are neither good nor bad; the emphasis should be on the effects of such policy outcomes as allocation efficiency, distributional equity, and macroeconomic stability.

Inman (2003) proposes that a system of "centrally financed taxes and transfers targeted to deserving poor households," (p. 61) which can minimize economic spillover and adverse distributional consequences from a local government default, is necessary for an intergovernmental

relationship where local governments will not need bailouts from the central government. However, there is an "assignment problem" (Oates, 1972). On the one hand, it is the central government's responsibility to redistribute income to eliminate the spillover effect on people's mobility. On the other hand, subnational governments are in the best position to provide public goods and services because they know the needs of their residents better due to information asymmetry. Therefore, intergovernmental transfers play a critical role in financing cash and in-kind redistributive policies.

As discussed in the old view of fiscal federalism, intergovernmental transfers serve important economic functions: for example, matching grants can internalize spillover effects of local policy according to Pigouvian theory, while block grants serve to redistribute income from richer regions to poorer regions. In addition, intergovernmental transfers can play an "insurance" function to aid subnational governments when they face fiscal distress (Bucovetsky, 1997). However, there is a moral hazard problem where subnational governments will lose their incentive to prepare for a downturn if central government has a soft budget constraint and will bail out subnational governments.

PREVIOUS RESEARCH ON REDISTRIBUTIVE TAX AND EXPENDITURE POLICY

The redistributive tax and expenditure policy has attracted the attention of economists and political scientists. However, they focus on different aspects. Economists have devoted much attention on the revenue side—tax progressivity—while political science researchers focus more on expenditure policy. There are some researches trying to take into account both sides.

The empirical study of Feldstein and Wrobel (1998) supports the basic theoretical presumption that state and local governments cannot redistribute income in the long run. Feldstein and Wrobel (1998) use the Current Population Survey (CPS) data for March 1983 and March 1989 and prove that individuals can avoid progressive taxes by moving to jurisdictions with favorable taxes. As a result, a more progressive tax raises the cost of hiring high-skilled workers and reduces the cost of low-skilled workers. Therefore, a progressive tax in the state level creates deadweight efficiency losses without achieving any net redistribution of real income. Chernick (2005) estimates the determinants of subnational tax progres-

sivity in the United States for the years 1977, 1985, and 1991. He concludes that tax exporting through deductibility of state and local taxes has a significant impact on tax progressivity. In addition, a regressive state is geographically contiguous. Expenditure is not related to tax progressivity, because higher welfare spending is financed by proportionally higher tax burdens throughout the income distribution.

Using March CPS data from both years—1983 and 1989—and the National Bureau of Economic Research's Taxsim progress, Leigh (2008) calculated a "simulated tax redistribution index" called the Reynolds-Smolensky index, which is the difference between the Gini coefficients for after-tax earnings and the Gini coefficients for before-tax earnings, in order to analyze the effect of redistributive state taxes on inequality. He concludes that redistributive state taxes do not have significant impact on equality of pretax hourly wages on migration or on per-capita state personal income. Craw (2006) used county-level census data from 1992 to 2002 (5-year intervals) including the Welfare Reform Act in 1996. The redistributive policy includes public welfare, healthcare and hospitals, and housing and community development. His result is consistent with Oates' (1972) theory that redistributive functions of government should be centralized to avoid the free riding that occurs under a decentralized regime. He concludes that intergovernmental factors drive local social welfare policy and suppress the local welfare race to the bottom.

Intergovernmental Transfers and the Flypaper Effect

Based on the median-voter model, an increase in intergovernmental transfers from a higher level of government should result in the same amount of increase in local spending as that associated with an equivalent increase in local income. However, the empirical observation is that transfer receipts have a higher-income effect than local income, which is called the flypaper effect, because money stays where it hits. There is rich literature on the flypaper effect that is tested by running reduced form regressions of subnational spending on intergovernmental transfers, local per capita income, demographics, and other control variables.

Recently research on intergovernmental transfers argue that depending on how intergovernmental aids have been raised (from a common pool of revenue, for instance) and how transfer arrangements are designed (unconditional or special-purpose, open- or

Table 1
Description of Variables

Aged	*The percentage of 65 years old and over*
Black	The percentage of Black
Business Cycle	year-to-year percentage changes in real GSP for each of the states
Expenditure Redistribution	Per capita state and local government expenditures on health, welfare, primary and secondary education, housing, and community development
Fed Transfer	Federal aid per capita on health, welfare, primary and secondary education, housing, and community development
Other Fed Transfer	Federal aid other than the above mentioned
Population	Population size
Popden	Population density
Poverty	The percentage of people below poverty rate
Tax Progressivity	1. The share of income tax 2. The ratio of the average tax burden of the top quintile of the income distribution versus the average tax burden of the lowest quintile
Unemployment	Unemployment rate
Income	Real per capita income
Itemized	The percentage of families who itemize deductions on their federal return
Eduwage	The relative price of education services is the ratio of the average wage of a teacher to the average wage of a private sector teacher working in that state
Govwage	The relative price of all other state and local government services is the average salary of state and local government workers deflated by the average wage of all private sector workers in that state.

closed-ended, matched or unmatched, discretionary or formula-based, etc.), intergovernmental transfers have different impact on subnational finances. Gramkhar and Oates (1996) conclude that the flypaper effect is stronger for matching grants than unconditional transfers. Deller and Maher (2005) prove that the flypaper effect is stronger for government spending on "luxury" goods, such as parks, culture amenities, than on necessary goods, such as fire and police. Another research on the flypaper effect is to test whether it is symmetric to the response to reduction and increases in intergovernmental grants. Using U.S. data, Gramlich (1987) and Benton (1992) find that subnational spending is more responsive to increases in transfer receipts. Melo (1996) proves the same asymmetric effect using Columbian subnational data. Heyndels (2001) finds the same asymmetric effect using Flemish municipalities.

The empirical results of the flypaper effect have been challenged due to failure to consider endogeneity between intergovernmental transfers and subnational expenditures. Knight (2000) analyzes the endogenous problem and uses political power of recipient jurisdictions as the instrument variable for a special case like transportation. His instrument variables include committee representation, proportion of representatives in the majority party, average tenure of representatives, etc. He also finds there is no flypaper effect because local income and intergovernmental transfers have the same income effect on transportation spending. Some argue that the flypaper effect is sensitive to functional specification and it actually results from model misspecification. For example, empirical evidence prefers log-linear models than linear estimation equations (Becker, 1996). In this paper, I discuss the endogeneity problem of intergovernmental transfers in the redistributive spending and tax progressivity policies.

Using Simultaneous Equations

Bahl, Martinez-Vazquez, and Wallace (2002) argue that the federal government has an impact on

local governments' redistributive policy of budget through price effects and income effects (e.g., tax deductibility provisions on the revenue side and matching grant provisions on the expenditure side, or block and categorical grants). The measurement of tax progressivity they use is the income tax revenue as a share of total tax revenue, because it is well known that personal income tax and corporate income tax are progressive. On the expenditure side, they use the share of state local expenditures for welfare and elementary and secondary education as an index of pro-poor expenditures. I apply their endogeneity equations to my research and analyze specifically the impact of intergovernmental transfers and the flypaper effect. In addition, I will use a different index of progressivity to test the robustness of this model.

RESEARCH DESIGN AND EMPIRICAL RESULT

This paper provides an empirical model to identify the relationship between redistributive tax policy and redistributive expenditure policy. Using data from 1977, 1985, 1991, 1995, and 2002, I employ a 3-stage least squares (3SLS) regression model to allow for simultaneity in the relationships between redistributive tax policy, redistributive expenditure policy, and labor mobility. I pool data from all years and use time and state fixed effects.

In this paper, I use two measurements of tax progressivity. The first is the income tax share of total tax revenue across states. The second is the ratio of the average tax burden of the top quintile of the income distribution versus average tax burden of the lowest quintile. The tax burden data is from Phares (1980) and the Citizens for Tax Justice (1991, 1996, 2003). The redistributive expenditure of this analysis includes public welfare, health and hospital, elementary and secondary education, and housing and community development. Table 1 shows the descriptive statistics of the variables included in the model.

In this paper I use two alternative measures of tax progressivity—one is the income tax share of total tax revenue and the other is the ratio of the average tax burden of the top income quintile versus the average tax burden of the lowest quintile. The results using each measure of tax progressivity are consistent on intergovernmental transfers' effect but not always consistent on the control variables included in the model, shown in Table 2 and Table 3. The model performs generally well with most of the variables significant at the .01 level.

The level of intergovernmental transfers on health and welfare should be treated as endogenous because it is determined partly by state and local government expenditures on those services. The results show that intergovernmental transfers for redistributive purposes have a significant effect on the likelihood of choosing redistributive expenditure policy due to income and substitution effects. Intergovernmental transfers have a significant positive sign, since states and local governments have been stimulated by federal programs to spend more, which results in a larger budget in redistributive spending. In addition, the real per capita income also has a significant positive impact on redistributive expenditures, which shows the income effect on expenditure share. Through an F-test, I found that there is a flypaper effect in redistributive spending, which means intergovernmental transfers have a higher income effect than local income. Money sticks where it hits, which will result in an upward pressure on local redistributive spending.

Looking at the expenditure equations first, the unemployment rate is negatively related to the redistributive expenditures in Table 2, but not significant when the alternate measure of tax progressivity is used. This is opposite to what I expected since there should be some entitlement programs responding to economic downturns. One explanation is that unemployment has a lagged effect, since a higher unemployment rate will attract more votes for redistributive programs. The cost of redistributive services will increase with a higher relative price of state and local government services and with a lower relative price of education services.

In the federal aid equation, the poverty rate stimulates intergovernmental transfers and real per capita income has a negative impact on intergovernmental transfers, which is consistent with what I expected. The per capita level of other aid is included to capture the substitution effect of other types of intergovernmental transfers. However, it is not significant. In addition, redistributive spending results in a higher level of intergovernmental transfers for health and welfare programs.

Turning to the tax progressivity equation, intergovernmental transfers have a significant positive impact on both models. The direct income effect or real per capita income on tax progressivity is negative, which is consistent with the expectation, since higher-income people and business tend to vote against heavier income taxes. The unemployment rate has a negative impact on tax progressivity

Table 2
3SLS Estimates: Expenditure Redistribution, Tax Progressivity, Poverty and Intergovernmental Transfer Equations on Pooled Cross-Section, Time Series Data for 50 States for 1977-2006

	Expenditure Redistribution	Tax Progressivity	Poverty	Fed Transfer
Poverty *	-0.060*** (-9.15)	-0.0002 (-1.14)		0.031*** (13.01)
Fed Transfer *	2.425*** (47.48)	0.156*** (3.86)	18.764*** (21.13)	
Tax Progressivity*	-0.02 (-0.29)			
Expenditure Redistribution *		-0.023 (-1.41)	-7.105*** (-22.21)	0.405*** (47.79)
Income	0.00005*** (5.46)	-0.00002*** (-4.73)		-0.00002*** (-4.2)
Population	1.758E-8*** (6.02)		2.117E-7*** (8.32)	-7.96E-9*** (-6.57)
Aged			0.076 (1.31)	
Popden			-0.003*** (-4.46)	0.00006** (2.52)
Itemized		0.970*** (13.07)		
Unemployment	-0.024** (-2.48)	-0.008** (-2.52)		0.006 (1.59)
Govwage	0.101 (1.39)			
Eduwage	-0.250*** (-3.06)			
Other Fed Transfer				-0.008 (-0.55)
Business Cycle *Fed Transfer	-5.06 (-1.12)	-0.364 (-1.37)		
System Weighted R²	0.945			

Notes: N=457. Data covers 1977, 1985, 1992, 1994, 1997, 1999, 2002, 2004, and 2006.
*endogenous. *t*-statistics in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
State fixed-effect and year-dummy variables not reported. Tax progressivity is measured by the income tax share of total tax revenue.

because when the economy is not performing well, the income tax base will shrink. In this case, state and local governments tend to rely more on other taxes and the tax system is more likely to be regressive. The variable itemed is the percentage of tax filing units that itemize, which indicates state and local tax exportability through federal tax deductibility. Also, the likelihood of itemizing is related to a taxpayer's income, the higher the percentage of people who itemize, the lower the marginal tax price for high-income taxpayers. Therefore, a higher percentage of people who itemize result in

Table 3
3SLS Estimates: Expenditure Redistribution, Tax Progressivity, Poverty and Intergovernmental Transfer Equations on Pooled Cross-Section, Time Series Data for 50 States for 1977, 1985, 1991, 1995, and 2002

	Expenditure Redistribution	Tax Progressivity	Poverty	Fed Transfer
Poverty *	-0.04*** (-5.56)	-0.014*** (-3.88)		0.019*** (7.05)
Fed Transfer *	2.54*** (33.09)	0.48*** (4.61)	23.8*** (12.95)	
Tax Progressivity*	-0.112 (-1.39)			
Expenditure Redistribution *		-0.08** (-1.99)	-9.13*** (-13.94)	0.40*** (34.01)
Income	0.00004*** (3.39)	-0.00003*** (-4.52)		-0.00002*** (-3.12)
Population	1.302E-8*** (4.02)		2.24E-7*** (5.54)	-5.57E-9*** (-3.94)
Aged			0.123 (1.39)	
Popden			-0.005*** (-4.44)	0.00007** (2.45)
Itemized		0.698*** (5.75)		
Unemployment	-0.011 (-1.08)	-0.012** (-2.07)		0.001 (0.33)
Govwage	0.14* (1.72)			
Eduwage	-0.278*** (-3.2)			
Other Fed Transfer				0.002 (0.06)
Business Cycle *Fed Transfer	-1.46** (-2.36)	-1.257** (-2.22)		
System Weighted R^2	0.947			

Notes: N=250. *endogenous. *t*-statistics in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$. State fixed-effect and year-dummy variables not reported. Tax progressivity is measured by the ratio of the average tax burden of the top quintile of the income distribution versus the average tax burden of the lowest quintile.

stronger tax progressivity due to the reduced tax price. Also, poverty rate has a negative impact on tax progressivity in Table 3, which means a state with a higher concentration of rich people tends to rely more on progressive tax. However, the result is not significant in Table 2. In addition, redistributive expenditure has a negative impact on poverty rate, which indicates that health and welfare spending actually increase economic well-being.

It is believed that redistributive spending is countercyclical and revenue is pro-cyclical during a recession, because people are more likely to lose jobs and rely on public welfare during a recession and the revenue capacity is worsened for the same

reason. The coefficient for the interactive variable (Business Cycle*Federal Transfer) in Table 3 shows that the impact of intergovernmental transfers on tax progressivity and redistributive expenditures increases during economic downturn.

CONCLUSION

The results obtained from the estimation undertaken for this study shed light on fiscal responsibility devolution under the federalism system, especially the impact of intergovernmental transfers on decision making and financial obligations of subnational governments. This research aims to test the impact of intergovernmental transfers on state and local governments' choice of tax progressivity and redistributive expenditure. This paper uses multiple measures of tax progressivity and shows robustness of the results. The level of intergovernmental transfers on health and welfare, tax progressivity, redistributive expenditure, and poverty rate are treated as endogenous. On the one hand, intergovernmental transfers for redistributive purposes are positively related to state and local governments' spending on health and welfare. There is a flypaper effect in redistributive spending. On the other hand, redistributive spending results in a higher level of intergovernmental transfers on health and welfare programs. Also, the impact of intergovernmental transfers on tax progressivity and redistributive expenditures varies over the business cycle. In addition, the poverty rate stimulates intergovernmental transfers on health and welfare. Future research will focus on different levels of governments, such as county level and municipalities.

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