Paper for Annual Meeting of Canadian Political Science Association, 2006

To Peg, or not to Peg? Exchange Rate Regime as an *ex ante* Commitment Device and Fiscal Decentralization

Han-Pu Tung*

Harvard University

Version: 05/2006

* Han-Pu Tung is a Ph.D. Candidate in Department of Government, Harvard University, N453 CGIS, 1737 Cambridge Street, Cambridge, MA 02138, USA. (tung@fas.harvard.edu)

I. Introduction

In the literature of exchange rate arrangements, there are two opposing views on whether it's fixed or flexible arrangements that can provide fiscal discipline on government spending (Frenkel and Goldstein1988 ; Aghevli, Khan and Montiel, 1991; Tornell and Valesco 2002). These two persuasions both employ argument of credibility to explain why the exchange rate regime can be related to fiscal policy. Both schools, however, are flawed for their failure to take fiscal game between central and local governments into account. They are both based upon a naïve assumption in public finance that as long as central government is disciplined, the aggregate government spending can be curbed. As I am going to show in the following sections, the assumption has in fact undermines the explanatory power of the theory.

In addition, this paper also tries to address the question by introducing the concept of commitment problem between central and local government in the decentralization literature into the debate. The problem is widely accepted in the literature (Wibbels 2006), but no suggestion about the commitment device has been made. This paper embarks on this theoretical challenge and provides empirical ground for the suggestion.

The article is organized as follows. The second section sets out views from both sides of exchange rate arrangement and the theoretical extensions of them to the commitment problem between central and local governments. The third section introduces the data and other related methodological issues. In the fourth section, I present the results of ordered probit model on exchange rate regime choices. I conclude with a discussion of implications and possible avenues for further research.

II. **Theory**

Exchange rate regime as an ex ante commitment device: Floating or Fixed?

Tie my hands up! The Virtues of the Fixed Exchange Rate Regime

On choosing between fixed and flexible exchange rate regime, a typical case for fixed nominal regime held by the conventional wisdom is its potential ability to impose discipline on fiscal and monetary policies and thereby facilitate the maintenance of price stability. Simply put, the pegged exchange rate arrangements are constraining in the sense that, in an open economy, they are unsustainable without a sound fiscal policy regime. What are the mechanisms at play in this argument?

A shaky balance between a sound budget structure and a lure of inflation always plagues the fiscal and monetary regimes in a country[1]. On the one hand, governments want to stay away from the any possible debt crisis due to extravagant spending, but they also have political incentive to embark on short-term inflationary shock in order to raise domestic output and employment. When a government attempts to adopt an expansionary fiscal policy to serve their political purposes, given capital mobility, the ensuing inflationary effects will generate pressure for the depreciation of the local currency. To maintain the nominal exchange rate under a pegged arrangements, the substantial amount of foreign currency reserves become critical. (Aghevli,

[1] The standard account for how and why governments embark on fiscal expansion to generate "inflationary surprise" is political business cycle. See Alesian, Roubini, and Cohen ,1997.

Khan and Montiel, 1991) If government spends money without discipline, the process will be repeated until the foreign reserves are drained and the peg collapses.

Of course, in an open economy, this constraint can be loosened to some extent by external borrowing. Namely, oftentimes governments can be bailed out by foreign creditors who might be private agents like investment bankers, or government agencies if capital is mobile across borders. This solution, however, only alleviates the draining situation and defers the collapse of the peg to a later period since there are probably no foreign creditors who will be willing to finance authorities' intervention operations to defend the peg indefinitely.

As a result, unless the government can discipline itself from spending lavishly, the commitment to peg is financially unsustainable as the mechanism shows. (Frenkel and Goldstein 1988 292-3)

The story, however, is not a complete account without taking the incentive structure of governments into consideration given that each of them is after all a *zoon politikon* (political animals). This is the most essential part of the argument. The cost accompanying the collapse of the peg has to be political to make the defense of the peg a policy imperative for governments.

Arguments from political economy: transparency

One obvious advantage of the pegged exchange rate regime has is its visibility[2]. This is key property of a pegged regime that makes the commitment credible. Since the daily fluctuations of exchange rates are so visible as long as a nation has a foreign exchange market, a single deviation from the announced level is easy to be identified. The foreign exchange market keeps sending signals to all private agents to let them know if the government actually sticks to its commitment. On the other hand, in addition to transparency of the peg that makes the commitment easier to be monitored, the political punishment due to the failure of keeping the

[2] Later we will see how the other persuasion, flexibility school, challenges this view.

peg plays a pivotal role. In a nutshell, in this persuasion, the financial constraint and political costs work in tandem to explain the disciplinary effect of the fixed exchange rate arrangements on national fiscal regime.

What flexible exchange rate regime can do?

On the contrary to the conventional wisdom that fixed exchange rate regime is highly correlated with disciplined fiscal authorities, a series of papers by Tornell and Velasco argue from a diametrically opposed perspective.

In the first place, peg is not as transparent as people tend to think it to be. Under a pegged regime, the fiscal and monetary adjustment doesn't take place through exchange rate movements but through reserves losses. Even though the level of exchange rate is highly transparent and visible, the reserves losses are in fact very difficult to monitor owing to the central bank secrecy. (Tornell and Velasco 2000, 401) The thrust of their argument is that a flexible exchange rate regime is, in comparison with a fixed one, a better "alarming sensor" of unsound fiscal policy.

Even if a flexible arrangement is a better alarming sensor, a more critical question to be answered is: why is it constraining in the fiscal sense? In response to the question, they argue that, contrary to what people thought conventionally, the imprudent fiscal behavior will incur substantial costs under the flexible exchange rate regimes as well. The only difference consists in the "intertemporal distribution of these costs." Under a fixed exchange rate arrangement, the intertemporal difference the reserves losses resulting from central bank secrecy actually create a buffer area for smoothing out the losses created by undisciplined fiscal behavior. Namely, the secret nature of central bank in fact creates a room for political maneuver of foreign reserves.

The bad news will only be made public when the peg collapses and the debt explodes. For those well-informed private agents whom governments try to convince, how can such a regime be credible when they can only be informed through informal exposés which reveals precious information of the foreign currency reserves? On the contrary, a flexible regime which precisely captures fluctuations caused by government's imprudent fiscal operations can force the government to pay the cost up-front. This instantaneity helps to monitor the fiscal behavior and eradicate the possibility of cheating.

Exchange rate regime as an *ex ante* commitment device

Although these two persuasions of exchange rate regime are well-established in the literature of international economics and international political economy, both of them are in fact based on a heroic (even naïve) assumption of public finance. The disciplinary effect is very much imposed on central government.

The assumption is so problematic because even if the constraints created by a flexible or fixed regime do disincentivize the "central" government from adopting expansionary fiscal policies, the local governments with partial fiscal autonomy in federal nations for example can in fact offset the effects of the exchange rate arrangement. This missing link in the argument is especially important when the fiscally undisciplined local governments are taken into consideration. If a fixed exchange rate regime does hold central government in check through the channel of unbearable political cost, the overall government spending is not necessarily under control when there are wanton local governments lavishly spending money. The problem

arguably is more serious and thornier in fiscally decentralized[3] countries where subnational jurisdictions enjoy substantial autonomy in the fiscal domain. Unless the constraint discipline both central and local governments, it's hardly effective.

In the literature of fiscal federalism or decentralization in general, the first and foremost insight to be learned is that the incentive structures for central and local governments are totally different (Oates 2005). In the context of this paper, the expectation values to be bailed out when they both run into financial trouble are calculated with reference to different parameters. The central government, which represents the state, faces other sovereign states, international organizations, and private creditors, of which the considerations include strategic interests in international politics and higher risks of default owing to fluctuations in domestic politics. The local governments, on the other hand, might also have access to foreign creditors and, more importantly, can rely on central government that have *ex post* incentive to bail them out during fiscal crisis. (Goodspeed 2002). I have no intention to suggest that which level of government has easier access to outsides funds. The point would rather be that they face different structural conditions, thereby having different ways to respond to constraints imposed by exchange rate regimes. The failure to defend the peg might be politically costly to central government but it might mean almost nothing to local governments.

Commitment problem is not only present in the relationship between government and private actors such as citizens and international investors but more importantly, also commonly seen within government, which in fact comprises of different tiers of administrative units. The problem is especially eminent in those countries with fiscally decentralized systems. The key is local governments do not have complete information of central government's payoff and

[3] Federalism is avoided because the problem can be as serious in countries where there are no federal constitutions but devolution of fiscal authority. China is a good example in this category since she is definitely a highly centralized country in political sense, whereas her provinces enjoy high fiscal autonomy.

therefore have no idea whatsoever about if central government is committed to no-bailout policy or not. (Rodden, Eskeland, and Litvack 2003, 8-9) If it is not, then you can expect the spending behavior of those local governments becomes less disciplined and reckless than it is otherwise. The source of this uncertainty is that even if the fiscal relations between central and local governments are all codified in laws, the decision to adopt bailout policy or not is still a political one. Some might ask why this is a question for central government, since it can simply turn down those bailout requests from those local ones. But the thorniest part of the game for the center is that the discontinuation of the project originally financed by the local governments might lead to a great loss of social welfare in general, or the negative externalities of the fiscal crisis in one jurisdiction might spread to other areas and in the end reflect poorly on the quality of center's governance.

The commitment problem in countries with fiscal decentralized arrangement has been widely recognized in the literature, but, interestingly, there is no suggestion of particular commitment device in the empirical studies of this fiscal game between central and local governments. Along this line of thought, the exchange rate regime as an *ex ante* commitment device can be an advisable choice to government vulnerable to profligate local spenders. Two assumptions have to be made up-front here. One is that, given the great harm brought by undisciplined fiscal behavior, central government must find a solution to commitment problem and preempt any possible spending spree at the local levels. The other one is that the both central and local governments have general knowledge of exchange rate regimes. On the basis of these two assumptions, I extend the previous two views on the exchange rate regimes' disciplinary effects to the commitment problem between central and local governments.

The argument on the pegger's side draws upon the conventional wisdom of the high correlation between fixed exchange rate regime and stricter fiscal policy. The peg makes the center's commitment credible not so much because the level of exchange rate is observable and can be monitored easily, as because the loose or expansionary fiscal policy is simply unsustainable under a fixed regime. Fixing the exchange rate to a certain level needs enough reserves that might be drained by undisciplined fiscal policy. Moreover, the final collapse of the regime also incurs larger political punishment. An advantage of tying one's hand in this case consists not in showing your audience how determined you are towards the goal you set but how incapable you are of getting rid of the fetters. Therefore, by adopting a fixed regime, the central government in fact sends a signal *ex ante* to the local governments that it is unable to bail them out because it is imperative to maintain the peg and the price of the bailout policy can also so large that the central government is not willing to pay.

On the floater's side, theoretically, can regimes of higher flexibility also be an *ex ante* commitment device? In terms of transparency, as Tornell and Valesco argue, flexible arrangements are even more visible and easier to monitor the fiscal behavior of government. In their original arguments, those who keep a close eye on government are private agents. In the context of this paper, however, it is local government who receives the signals from the exchange rate fluctuations. When government is even more sensitive to political costs in the temporal sense, the fetter becomes even tighter. In the following sections, we use objective data to test which theory is empirically supported.

III. Evidence

Data

My data about both central and subnational government statistics is taken from IMF's *Historical Government Finance Statistics Database* (HGFS) and *Government Finance Statistics 1990-2004* (GFS) CD-ROM. The data set is composed of yearly observations for 153 cases taken from a cross-section almost every sovereign state in the world for the period between 1974 and 1995. In both HGFS and GFS, subnational data is further divided into state and local levels. Since my argument is not sensitive to the differences between these two levels, each observation is the aggregate number of both levels. The last note about the data is that the data set unfortunately has a lot of missing entries, which creates a potential problem in our analysis.

Table 1 presents descriptive statistics for all explanatory variables. In addition, Table 2 presents the means of these variables under each of the five exchange rate regimes.

Table 1
Summary Statistics of Explanatory Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
CBI	.3408037	.1272228	.1	.69
Econ_Dev	4.065782	5.946675	.086058	37.58
Econ_size	3.854426	1.049639	1.388709	6.736463
Trade_open	.7426983	.4732795	.0376466	4.23325
Infla_diff	.0748596	.1566159	-.2001033	2.377836
Finan_open	7.343487	2.400536	2.5	13.5
Fore_res	3.282594	2.871294	-.0918688	25.17681
Feasibi	.6424213	.1419606	.3666667	.8828125
Tax_share	.2182795	.1818244	0	.815459
Expen_share	.2437351	.1493069	.0164725	.6209924
Fiscal_decent	.0750952	.0939509	0	.4862922
Political_decent	.5813488	.2691264	0	.97

Table 2
Summary Statistics: Means of Explanatory Variables under Different Exchange Rate Regimes

Variable	1[a]	2[b]	3[c]	4[d]	5[e]
CBI	.351	.446	.340	.333	.329
Econ_Dev	2.393	11.959	3.92	6.592	3.155
Econ_size	4.093	5.144	4.181	4.431	3.549
Trade_open	.507	.394	.621	.768	.899
Infla_diff	.259	.042	.058	.049	.047
Finan_open	6.755	9.586	6.717	8.077	7.669
Fore_res	3.395	3.068	4.085	3.931	2.594
Feasibi	.606	.591	.636	.627	.646
Tax_share	.140	.387	.16	.233	.118
Expen_share	.138	.290	.214	.288	.183
Fiscal_decent	.03	.106	.055	.090	.03
Political_decent	.627	.614	.573	.567	.572

a. Free falling
b. Free floating
c. *De facto* crawling band that is narrower than or equal to +/- 5% up to managed floating
d. 5: Pre-announced crawling peg up to *de facto*
e. No separate legal tender up to *de facto* peg

Main Variables

Exchange Rate Regime

De jure or de facto?

The first task is to come up with a way to code different exchange rate arrangements as an ordered categorical variable. The conventional method to code foreign exchange rate regime is to consult the classification system in IMF's *Annual Report on Exchange Rate Arrangement and Exchange Restrictions*. This method, however, is severely flawed owing to the inconsistency between what governments announced and what they actually did. Before 1999, the annual report was simply based on members' self-declarations (Alesina and Wagner 2006). Namely, IMF let each country to select one of the four categories (Pegged to one currency, composite of

currencies; Flexibility limited; Managed floating; and Free floating) in the annual report without further investigation until 1999. Before economists started to notice *de facto* deviations of the deeds from the words, *Annual Report* was taken to be the authoritative source for knowing how countries choose their exchange rate regimes. The discovery is definitely not trivial. Several studies have to drop their coveted asterisks representing statistical significance for their models[4]. IMF also has begun to change their methodology from 1999 on and balance the self-reports from its member states with its own evaluation of states' actual behavior.

Does this distinction between deeds and words matter to the question addressed by this paper? Which one should be used here?

The hypotheses broached in previous section predict that, in order to make its no-bailout policy credible, central government would like to use exchange rate arrangements as an *ex ante* commitment device to send a signal to local governments that it won't be able to bail them out. This distinction actually poses a far more complicated question than normally assumed. The paper is surely unable to address why countries announced one particular kind of exchange rate arrangement officially, but reneged on that announcement in practice[5]. This paper, nevertheless, has to address the impacts of this distinction on how signals are sent to local governments. Do local governments simply pay attention to what central government announces or they actually observe what it does in practice? Can we simply reject *de jure* classification or we actually need more solid theoretical ground to support our decision to drop or keep it? In most of literature, the receivers of the signal are private agents such as private investors and bankers. In the paper, however, the receivers are local governments. They are all arguably well-informed observers of

[4] For example, the democracy variable in Lanrence Broz's article (2002) becomes insignificant after *de jure* classification is replaced with *de facto* one (Simmons and Hainmueller 2006). Of course, respected scholars like Broz among others would surely have used the *de facto* classification if they could. The problem was just that the technique was not available when they wrote their papers.

[5] See Wagner 2003, Alesina and Wagner 2006.

central government's behavior. What is more important, the mechanisms through which the fiscal constraints are imposed on government will only be effective when certain kind of arrangement is adopted. Since the assumption that local governments are smart enough to spot the discrepancy is not too unrealistic, the credibility of the commitment should depend on what actually happens instead of what shows on paper.

The most popular *de facto* classification used among scholars now is one made by Reinhart and Rogoff (2004) [6] . Their classification utilizes parallel market exchange rates along with comprehensive country chronologies to determine the actual exchange rate arrangements. The data set they provide for public has two classifications, one 15-way and the other 5-way system. We choose the latter (coarse version) to facilitate the interpretation of the results. One final technical note is that, I reverse the sequence of numbers Reinhart and Rogoff originally assign to different regimes to make it more consistent with the convention. Now highest number 5 represents "no separate legal tender" and lowest number 1 stands for "free falling."

Decentralization

The concept of decentralization has two dimensions. The first one is the decision-making autonomy, which concern the extent to which local governments can decide things for themselves without too much intervention from the central government. The second is the scope of the governance, which concerns how many things they can decide for themselves. A local government can almost fully determine what it wants to do within a limited scope of things. On this conceptual basis, the operationalization of this variable of interest can be approached either from the revenue or expenditure sides (Schneider 2003). To begin with, subnational revenue share captures local fiscal autonomy from how much revenue local jurisdictions can use.

[6] The file is available at Carmen Reinhart's website (http://www.wam.umd.edu/~creinhar/Links.htmland therefore).

$$\frac{\sum_{i,t=1}^{n} Local\_government\_revenue_i^t}{\sum_{i,t=1}^{n} Total\_revenue_i^t}$$

The idea behind this measure is that the larger the share, the more the local autonomy. On the same revenue side, there is another similar measure, the share of subnational taxes:

$$\frac{\sum_{i,t=1}^{n} Local\_government\_tax\_revenue_i^t}{\sum_{i,t=1}^{n} Total\_tax\_revenue_i^t}$$

Although both these two measures attempt to capture the local autonomy by looking into the revenue side, the share of subnational taxes is better for several reasons. In the first place, revenue is composed of incomes from several different sources. Using such a composite measure might bring in conceptual confusion and therefore over- or under-estimate local autonomy. Moreover, the concept of revenue not only includes income from taxation but also the capital transfers between central and local government as well as those between local governments. The incomes from taxation and that from capital transfers are, however, based upon different political bargaining processes. In most cases, formulas for calculating subnational tax share are based upon explicit regulations and therefore basically needs no political costs for local governments to keep this part of the revenue[7]. The capital transfers, however, are made on irregular basis and therefore always the results of intensive bargaining in which a lot of political compromises have to be reached so as to obtain the resources you need. Conceptually, local autonomy is in fact undermined when these compromises are made. The share of tax, on the other hand, is a better

[7] Nonetheless, the formulas were surely the results of political struggle before the legal regulations were hammered out.

measure of local autonomy for its nonpolitical nature, which makes sure this part of income is not subject to discretion of other parties.

Another measure comes from the expenditure side:

$$\frac{\sum_{i,t=1}^{n} Local\_government\_Expenditure_i^t}{\sum_{i,t=1}^{n} Total\_Expenditure_i^t}$$

The share of subnational expenditure tries to measure the consequences of subnational autonomy. Even if the subnational share of tax can be a pretty good indicator of local autonomy, this measure tends to place more emphasis on the fiscal leeway instead of the actual governmental activities. This latter aspect can be better captured by the fiscal instrument like subnational expenditure since it precisely documents the resources used for governmental operations. Therefore, I decide to use an interaction term between share of subnational tax and that of subnational expenditure as the measure for fiscal decentralization in this paper.

Before moving on to other control variables, a few words about another dimension of decentralization, political decentralization, are in order. The importance of political decentralization consists in its transformative force of incentive structure in the local levels. When the political legitimacy and *fortuna* of local politicians depend on the local elections, the incentive to have more fiscal leeway to be able to respond to local demands also becomes stronger. Political decentralization, however, is by far a more difficult and elusive phenomenon to be captured by any concepts or measurements. There can be a more institutional approach that attempt to uncover the political dynamics between central and local governments by reading the constitutions of different countries (Treisman 2002). Although Treisman does control for political regimes and exclude those authoritarian countries whose constitutions are simply the

façades of the real political games underneath, his approach depends heavily on the formal structure of politics, which might fail to capture the vibrant part of it. On the contrary, the approach adopted by the other two scholars, Jonathan Rodden and Aaron Schneider switch the focus from formal institution to the vibrant and strategic side of politics (Rodden 2004; Schneider 2003). They both conceptualize political decentralization from electoral perspective. The power struggle between different tiers also has an enormous impact upon the autonomy of the local government or the control of central government over them. The institutions, such as the regulations of how taxes are levied and revenues are spent, by all means matter in the political games between them, but conceptually, they can't capture all the variances in political decentralization. The coattail effect in the American context is a good example of how party politics can influence the distribution of power in the short run. (Rodden 2002, 488) The indices of political decentralization in this paper is based on Aaron Schneider's factor analysis (2003)

Although the importance of political decentralization is undeniable, this paper, however, is specifically interested in understanding the scenario where fiscal decentralization is at play. In the spirit of parsimony, this paper unbundles the concept of decentralization and focuses on fiscal aspect. Moreover, fiscal autonomy plays a pivotal role in the tug of war between central and local governments because even an administratively and politically autonomous subnational jurisdiction is still under great financial constraints to do anything serving its political purposes. As I already mentioned, even if the fiscal autonomy is based upon political bargaining instead of legal codes, the political costs can still hold ambitious local governments in check. Things are gravely different if local dukes enjoy substantial fiscal power. The administrative and political autonomy can drastically intensify and aggravate the problem, but they are not as causally significant as fiscal one. As a result, I won't construct another interaction term between fiscal

and political decentralization but simply plug political decentralization into the equation as a control variable.

Control Variables

Following the convention in the exchange rate literature, this paper also includes several important control variables that might have impacts on the choice of exchange rate regimes.

In the first place, the level of economic development (the term is $Econ\_Dev_i^t$ in the equation) measured as gross domestic product (GDP) per capita[8] is controlled in order to isolate the effect of fiscal decentralization. The developing countries that are less able to bear fluctuations in international economy might arguably have a propensity to choose fixed arrangements, or those of higher fixity. Moreover, political transparency, which was once supported by Broz's research (2002), is not included in my model since its robustness was denied when the hypothesis was tested against *de facto* classification (Simmons and Hainmueller 2006).

In addition, the paper also incorporate most of the control variables in the burgeoning literature on domestic sources of exchange rate regime choices.

To begin with, the lagged dependent variable is included to capture the path-dependent nature of the exchange rate regime. Secondly, what can't be ignored in a study of exchange rate regime is an already well-established approach in international economics: optimal currency area (OCA). Several potential candidates derived from OCA approach include economic size ($Econ\_Size_i^t$), trade openness ($Trade\_Open_i^t$), inflation performance vis-à-vis trading partners ($Infla\_diff_i^t$), and financial openness ($Finan\_Open_i^t$). Following convention in the literature, I measure economic size as the log of GDP in constant U.S. dollars. Openness to trade is measured as the

[8] The data are from World Bank's World Development Indicators (WDI).

ratio of the sum of exports and imports to GDP, which captures the size of trade sector in one economy.

Financial openness is a 14-point scale borrowed from Broz's dataset, of which the index for financial openness was constructed with reference to Dennis Quinn's method. Regarding its impact on exchange rate regime, higher financial openness, which allows higher capital mobility, is going to make a peg less sustainable. Inflation differential is measured by taking logarithm of the absolute value of difference between the inflation rate of each country and the world inflation rate[9].

On the basis of the theory that currency peg provides government anti-inflation credibility, Jeffry Frieden incorporates central bank independence (CBI) into his model explaining European currency policy. (2002, 844) The argument, in short, is that given the correlation between low inflation and CBI, governments lose incentive to adopt currency peg when CBI is in place to secure its credibility. The likelihood for a government to adopt a regime of higher fixity increases as its central bank becomes less autonomous. Even though this argument is based upon the very theoretical point (credibility and currency peg) this paper tries to call into question, the possible effects of CBI on the choice of exchange rate regimes should not be ignored totally. My index for CBI is based upon Alex Cukierman's codings of basic legal variables in the Appendix of his book *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*. (1992) I take the average of the scores from all indices for each country.[10]

Other controls suggested by scholars working on exchange rate include foreign reserves ($fore\_res_i^t$), and feasibility ($feasibi_i^t$). The reason for including foreign currency reserves is

[9] The Data are from WDI.

[10] Cukierman's indices include "term of office," "who appoints CEO," "provision for dismissal," "another offices hold," "monetary policy formulation," "conflict resolution," "active role in budget," "CB's objective," "limit on advances," "who decides on lending terms," "width of circle of borrowers," "type of limit," maturity of loans," "limit on interest rate," and "lending in primary market."

quite intuitive. A peg is not sustainable without enough foreign reserves, so the amount of reserves a country has does put a constraint on her choice of exchange rate arrangement. The causal arrow, however, can go the other way round. Countries having fixed exchange regimes and resolutely keeping them will tend to maintain lager foreign reserves. Since this is not the variable of interest and I don't make any causal inference on the relationship between them, this issue of endogeneity won't be addressed here.

Most of the variables under scrutiny so far are domestic ones such as level of economic development and financial openness. Although it's the major thrust in this paper that exchange rate regime choice is mainly a function of domestic factors, there is no denying that international ones might have some impacts on the choices. Consequently, I further include the feasibility variable used in both pieces by Broz (2002), and Frieden et al. (2001). The variable is measured by the percentage of countries with currency pegs, which aims to capture the variations in the international environment. The presence of world events such as oil shocks and financial crises would surely increase the cost of sustaining the peg.

Table 3 and 4 provide the scatter plot and numbers of correlation coefficients for all independent variables to check if there is any potential collinearity problem among them.

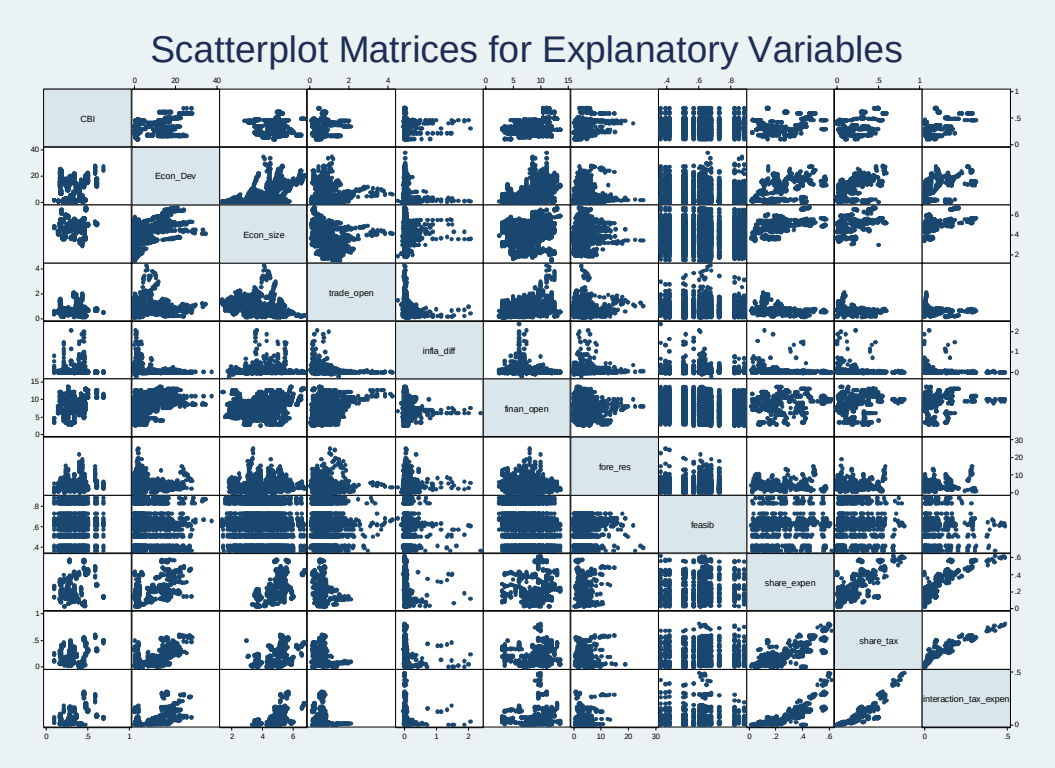

Table3

Table 4

	cbi	Econ_Dev	Econ_s~e	trade_~n	infla_~f	finan_~n	fore_res	feasib	share_~n	share_~x	intera..	pd
cbi	1.0000											
Econ_Dev	0.2667	1.0000										
Econ_size	-0.0146	0.1531	1.0000									
trade_open	0.2790	0.3977	-0.5583	1.0000								
infla_diff	-0.0529	-0.2786	-0.1794	-0.1941	1.0000							
finan_open	0.3860	0.6911	0.4084	0.2107	-0.2984	1.0000						
fore_res	0.0408	-0.3780	-0.0525	-0.1521	0.1039	-0.3197	1.0000					
feasib	-0.0160	0.0257	-0.0394	-0.0293	-0.0525	-0.1450	0.0431	1.0000				
share_expen	0.1069	0.2197	0.3418	-0.3948	-0.1061	0.0557	-0.0745	0.0347	1.0000			
share_tax	0.2468	0.3189	0.4587	-0.3737	-0.0349	0.2594	-0.1243	-0.0034	0.7838	1.0000		
~n_tax_expen	0.2411	0.2501	0.4665	-0.4269	-0.0412	0.1539	-0.0759	-0.0046	0.9306	0.9164	1.0000	
pd	0.1386	-0.2104	0.1342	-0.1958	-0.0251	-0.1645	-0.0270	-0.0050	0.0344	0.2250	0.1622	1.0000

Statistical Analysis

To understand the impact of the fiscal decentralization on the choice of exchange rate arrangements, I estimate the following model on a time-series cross-sectional panel of nations in Table 5. Given the ordered categorical nature of the dependent variable, the parameters in the equation are estimated by using ordered probit regression.

$$
\begin{aligned}
&Echange\_rate\_regimes_i^t \\
&= \beta_0 + \beta_1 Fiscal\_Decent_i^t + \beta_2 Pol\_Decent_i^t + \beta_3 Tax\_share_i^t \\
&+ \beta_4 Expen\_share_i^t + \beta_5 lag\_regime_i^{t-1} + \beta_6 CBI_i^t + \beta_7 Econ\_Dev_i^t \\
&+ \beta_8 Infla\_diff_i^t + \beta_9 Econ\_Size_i^t + \beta_{10} Trade\_Open_i^t + \beta_{11} Finan\_Open_i^t \\
&+ \beta_{12}\, fore\_res_i^t + \beta_{13}\, feasibi_i^t + \varepsilon_i^t
\end{aligned}
$$

In the first place, some results are not so different from the previous studies. The variable of lagged exchange rate regimes remains highly significant across all regression models. This shows the "stickiness" of the exchange rate arrangements. Once a particular regime is chosen, it becomes costly to change it from one arrangement to another. For example, it's difficult for a country to change from a floater to a pegger if it doesn't have enough foreign currency reserves. On the other hand, a pegger who wants to switch to a more flexible arrangement might have to face tremendous political pressure given the change will surely bring more risks in international transactions. A corollary that follows from this observation is the most studies on exchange rate regimes are destined to belong to those low-R^2 ones by which I mean the most variables of interest can still be statistical significant but are only able to explain a few variations of the regressand. Nonetheless, this does not make the efforts to explain the remaining variations a less challenging and rewarding task.

I start from the baseline model in which only fiscal decentralization, two lower-order terms (since the variable of fiscal decentralization is an interaction term between subnational share of tax and that of expenditure), lagged dependent variable, and CBI are included.

The coefficients of both fiscal and political decentralization are significant and, more importantly, the sign is "negative." The negative sign suggests that the conventional view of fiscal discipline is not supported in empirical sense. The propensity to peg that is assumed to grant credibility of no-bailout policy by conventional wisdom doesn't go up with the higher degree of fiscal decentralization. The revisionist view that flexible regimes provide more instantaneous sensor of fiscal behavior is gaining empirical ground as the model shows.

CBI is also significant but the sign is different from what the conventional theory expects. Based upon the assumption that peg can generate credibility, the conventional view holds that a pegger's central banker is supposed to be less autonomous because the fixity of the exchange rate arrangement has done the job. According to this view, the sign should be negative. The positive sign, however, is consistent with the revisionist account. If it is the floating system that creates credibility for government's commitment, then there should be no incentive for it to make central bank independent when the regime is a flexible one.

In the second model where the level of economic development is controlled, most of the variables (except *tax_share*) that are significant in model 1 still pass the test. The signs also remain unchanged. The fact that *Econ_Dev* is not significant shows that the level of economic development does not have a systematic effect on exchange regime choices.

Model 3 includes all variables derived from OCA approach. The positive sign for *Econ_size* contradicts the major prediction of OCA literature that the larger the economy, the stronger the case for flexible rates. This should not be too surprising since this is exactly the reason why the discovery of the discrepancy between *de jure* and *de facto* classification contributes so much to our understanding of exchange rate. The previous results were biased by those dishonest peggers who claimed to be floaters, or those floaters who did in the opposite way[11]. Trade openness is also significant and has a positive sign, which confirms the theoretical prediction that countries open to trade tend to favor exchange rate arrangements with higher fixity to reduce the impacts from ups and downs in the international economy.

In the full model where other control variables are also plugged in, variables of fiscal and political decentralization remain significant and the signs are still negative. Both lower-order variables of the interaction term also pass statistical test but have just the opposite sign to that for fiscal decentralization. The coefficients for lower-order terms, however, are meaningless in this model since GDP per capita can't go to zero[12]. *Fore_res* is significant and its positive sign is consistent with what the theory expects. Countries with higher foreign currency reserves tend to have exchange rate regimes of higher fixity. Nonetheless, as I have mentioned in the previous section, even though their high correlation is beyond doubt, the model has less to say about the causality. The cause might possibly go from the opposite direction.

[11] The fact that countries deviated from the official regimes, however, does not make *de jure* classification totally obsolete and irrelevant. The question about why peggers chose to declare themselves to be floaters is still an interesting one.

[12] For an insightful discussion of and practical advice on how to interpret interaction terms in regression models, see Bear F. Braumueller (2004).

Overall, the findings show pretty solid support for the revisionist hypothesis. The variable of interest is significant across all models. More flexibility in the exchange rate arrangement can better serve the central government's need for credibility of its no-bailout commitment. The instantaneous nature of the floating regimes is more convincing *ex ante* to local governments that their wanton spending spree is not going to be settled by central government.

Table 5
Fiscal decentralization and exchange rate regime choice, 1974-1995

Dependent variable: Reinhardt-Rogoff de facto exchange rate regime (Float=1 to Fixed=5)	(1) Baseline	(2) Controlling for Economic Development	(3) Optimal currency area controls	(4) Other controls
Lag_regime	1.395***	1.397***	1.2178***	1.255***
	(.202)	(.202)	(.229)	(.252)
Fiscal_decent	-11.943**	-11.671*	-25.287**	-31.521**
	(5.978)	(6.218)	(11.205)	(13.718)
Political_decent	-.938**	-.825*	-1.154**	-1.035*
	(.416)	(.477)	(.523)	(.555)
Tax_share	3.586*	3.130	6.571**	8.221**
	(2.109)	(2.493)	(3.011)	(3.564)
Expen_share	2.136	2.225	6.019*	7.374*
	(1.632)	(1.598)	(3.211)	(3.822)
CBI	2.262**	2.081**	2.405*	2.615**
	(.903)	(1.003)	(1.310)	(1.184)
Econ_Dev	—	.011	-.0183	.005
		(.017)	(.0318)	(.036)
Econ_size	—	—	.689***	.729**
			(.260)	(.297)
Trade_open	—	—	2.387*	2.337
			(1.393)	(1.49)
Finan_open	—	—	-.062	-.0527
			(.086)	(.082)
nfla_diff	—	—	-.584	-.471
			(.748)	(.836)
Fore_res	—	—	—	.135**
				(.065)
Feasibi	—	—	—	-1.66
				(1.281)
Pseudo R^2	0.49	0.49	0.50	0.53
Prob > chi^2	0.00	0.00	0.00	0.00
Observations	195	195	187	173

IV. **Implications and Conclusions**

In a broader sense, this article represents another attempt to bridge comparative and international political economy. This paper, however, also has two specific goals. On the one hand, the paper tries to unlock the black box of government spending and adds another analytical dimension to the theory of exchange rate arrangement. In addition, this paper also attempts to contribute to the federalism literature in which the commitment problem has been widely acknowledged but a feasible commitment device hasn't been suggested yet. According the statistical model, contrary to the conventional wisdom, the fiscally decentralized countries tend to use flexible exchange regime as an *ex ante* commitment device to make their no-bailout policy more credible. This attempt, however, is only the first step towards the full understanding of the relationship between domestic fiscal structure and foreign economic decision of exchange rate arrangement. There are surely a lot to be done from now on. In this first place, the theoretical discussion has not been formalized yet in this paper. Moreover, is this variable of interest is able to explain the discrepancy between deeds and words of exchange rate arrangements? Thirdly, I started out from a theoretical observation that the existing theories are based upon an unrealistic view of public finance, but this paper also faced serious constraints on data availability. More efforts in collecting empirical data are cordially expected.

References

Annual Report on Exchange Arrangements and Exchange Restrictions. Washington, D.C.: International Monetary Fund.

Aghevli, Bijan, et al. 1991. "Exchange Rate Policy in Developing Countries: Some Analytical Issues." *IMF Occasional Paper*.

Bahl, Roy. 1998. "Implementation Rules for Fiscal Decentralization." Presented at the International Seminar on Land Policy and Economic Development, Taiwan.

Baines, A. C. 2001. "Capital Mobility, Perspectives and Central Bank Independence: Exchange Rate Policy since 1945." *Policy Sciences* 34 (2):171-93.

Bearce, D. H. 2002. "Monetary Divergence - Domestic Political Institutions and the Monetary Autonomy - Exchange Rate Stability Trade-Off." *Comparative Political Studies* 35 (2):194-220.

Beck, T., G. Clarke, A. Groff, P. Keefer, and P. Walsh. 2001. "New Tools in Comparative Political Economy: The Database of Political Institutions." *World Bank Economic Review* 15 (1):165-76.

Bernhard, W., J. L. Broz, and W. R. Clark. 2002. "The Political Economy of Monetary Institutions." *International Organization* 56 (4):693-+.

Bleaney, M., and M. Francisco. 2005. "Exchange Rate Regimes and Inflation: Only Hard Pegs Make a Difference." *Canadian Journal of Economics-Revue Canadienne D Economique* 38 (4):1453-71.

Bleaney, Michael and Manuela Francisco. 2003. "Exchange Rate Regimes and Inflation-Only Hard Pegs Make a Difference." University of Nottingham.

Blomberg, S. Brock, Jeffry Frieden, and Ernesto Stein. 2005. "Sustaining Fixed Rates: The Political Economy of Currency Pegs in Latin America." *Journal of Applied Economics* 8 (2):203-25.

Brambor, T., W. R. Clark, and M. Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14 (1):63-82.

Braumueller, F. Bear. 2002. "Hypothesis Testing and Multiplicative Interaction Terms" (International Organization 58:4 (2004), 807-820.

Broz, J. L. 2002. "Political System Transparency and Monetary Commitment Regimes." *International Organization* 56 (4):861-+.

Canzoneri, M. B., R. E. Cumby, and B. T. Diba. 2001. "Fiscal Discipline and Exchange Rate Systems." *Economic Journal* 111 (474):667-90.

Cerniglia, F. 2003. "Decentralization in the Public Sector: Quantitative Aspects in Federal and Unitary Countries." *Journal of Policy Modeling* 25 (8):749-76.

Clark, W. R., and M. Hallerberg. 2000. "Mobile Capital, Domestic Institutions, and Electorally Induced Monetary and Fiscal Policy." *American Political Science Review* 94 (2):323-46.

De Mello, L. R. 2000. "Fiscal Decentralization and Intergovernmental Fiscal Relations: A Cross-Country Analysis." *World Development* 28 (2):365-80.

Dixit, A., and J. Londregan. 1998. "Fiscal Federalism and Redistributive Politics." *Journal of Public Economics* 68 (2):153-80.

Drazen, Allan. 2000. *Political Economy in Macroeconomics*. Princeton: Princeton University Press.

Ebel, Robert D. and Serdar Yilmaz. 2002. "On the Measurement and Impact of Fiscal Decentralization." World Bank Policy Research Working Paper No. 2809.

Edwards, S. 1996. "Exchange Rates and the Political Economy of Macroeconomic Discipline." *American Economic Review* 86 (2):159-63.

Fatas, A., and A. K. Rose. 2001. "Do Monetary Handcuffs Restrain Leviathan? Fiscal Policy in Extreme Exchange Rate Regimes." *Imf Staff Papers* 47:40-61.

Frankel, Jeffrey A. 1999. *No Single Currency Regime Is Right for All Countries or at All Times*. Princeton: International Financial Section, Department of Economics, Princeton University.

Frenkel, Jacob, et al. 1991. "Characteristics of a Successful Exchange Rate System," *IMF Occasional Paper*.

Frieden, Jeffry, Piero Ghezzi and Ernesto Stein. 2001. "Politics and Exchange Rates: A Cross-Country Approach to Latin America." In *The Currency Game: Exchange Rate Politics in Latin America*, ed. Stein, J. F. a. E. Baltimore: Johns Hopkins University Press.

Frieden, J. A. 1991. "Invested Interests: The Politics of National Economic-Policies in a World of Global Finance." *International Organization* 45 (4):425-51.

Garman, C., S. Haggard, and E. Willis. 2001. "Fiscal Decentralization: A Political Theory with Latin American Cases." *World Politics* 53 (2):205-+.

Ghosh, Atish R., Anne Marie Gulde, and Holger C. Wolf. 2002. *Exchange Rate Regimes : Choices and Consequences*. Cambridge, Mass.: MIT Press.

Goodspeed, T. J. 2002. "Bailouts in a Federation." *International Tax and Public Finance* 9 (4):409-21.

Grigonyte, D. 2003. "Impact of Currency Boards on Fiscal Policy in Central and Eastern European Countries." *Economics of Planning* 36 (2):111-33.

Hallerberg, M. 2002. "Veto Players and the Choice of Monetary Institutions." *International Organization* 56 (4):775-+.

Hamann, A. J. 2001. "Exchange-Rate-Based Stabilization: A Critical Look at the Stylized Facts." *Imf Staff Papers* 48 (1):111-38.

Husain, A. M., A. Mody, and K. S. Rogoff. 2005. "Exchange Rate Regime Durability and Performance in Developing Versus Advanced Economies." *Journal of Monetary Economics* 52 (1):35-64.

International Monetary, Fund. 1999. *Annual Report on Exchange Arrangements and Exchange Restrictions*. Washington, D.C.: International Monetary Fund.

———. 2002. *Government Finance Statistics*

Database. Compact disc ed. Washington, DC: International Monetary Fund.

Keefer, P., and D. Stasavage. 2002. "Checks and Balances, Private Information, and the Credibility of Monetary Commitments." *International Organization* 56 (4):751-+.

King, D., and Y. Ma. 2001. "Fiscal Decentralization, Central Bank Independence, and Inflation." *Economics Letters* 72 (1):95-8.

Kornai, J., E. Maskin, and G. Roland. 2003. "Understanding the Soft Budget Constraint." *Journal of Economic Literature* 41 (4):1095-136.

Larrain B., Felipe and Andres Velasco. 2001. *Exchange-Rate Policy in Emerging-Market Economies: The Case for Floating*. Princeton: International Economics Section, Department of Economics, Princeton University.

Leblang, D. A. 1999. "Domestic Political Institutions and Exchange Rate Commitments in the Developing World." *International Studies Quarterly* 43 (4):599-620.

Levy-Yeyati, Eduardo, Federico Sturzenegger and Iliana. 2004. "On the Endogeneity of Exchange Rate Regimes." In *Working Paper*.

Levy-Yeyati, E., and F. Sturzenegger. 2003. "To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth." *American Economic Review* 93 (4):1173-93.

———. 2005. "Classifying Exchange Rate Regimes: Deeds Vs. Words." *European Economic Review* 49 (6):1603-35.

Masson, P., and F. J. Ruge-Murcia. 2005. "Explaining the Transition between Exchange Rate Regimes." *Scandinavian Journal of Economics* 107 (2):261-78.

Moesen, W., and P. van Cauwenberge. 2000. "The Status of the Budget Constraint, Federalism and the Relative Size of Government: A Bureaucracy Approach." *Public Choice* 104 (3-4):207-24.

Moosa, Imad A. 2005. *Exchange Rate Regimes : Fixed, Flexible or Something in Between?* Houndmills [England] ; New York: Palgrave Macmillan.

Neyapti, B. 2004. "Fiscal Decentralization, Central Bank Independence and Inflation: A Panel Investigation." *Economics Letters* 82 (2):227-30.

Oates, W. E. 2005. "Toward a Second-Generation Theory of Fiscal Federalism." *International Tax and Public Finance* 12 (4):349-73.

Obstfeld, M., J. C. Shambaugh, and A. M. Taylor. 2005. "The Trilemma in History: Tradeoffs among Exchange Rates, Monetary Policies, and Capital Mobility." *Review of Economics and Statistics* 87 (3):423-38.

Orban, E., X. Y. Chen, and P. H. Koehn. 2003. "Great-Power Decentralization and the Management of Global/Local Economic Policy and Relations: Lessons in Fluidity from the People's Republic of China." *International Review of Administrative Sciences* 69 (2):235-58.

Qian, Y. Y., and G. Roland. 1996. "The Soft Budget Constraint in China." *Japan and the World Economy* 8 (2):207-23.

———. 1998. "Federalism and the Soft Budget Constraint." *American Economic Review* 88 (5):1143-62.

Reinhart, C. M., and K. S. Rogoff. 2004. "The Modern History of Exchange Rate Arrangements: A Reinterpretation." *Quarterly Journal of Economics* 119 (1):1-48.

Rodden, J. 2002. "The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World." *American Journal of Political Science* 46 (3):670-87.

———. 2003. "Reviving Leviathan: Fiscal Federalism and the Growth of Government." *International Organization* 57 (4):695-729.

———. 2004. "Comparative Federalism and Decentralization: On Meaning and Measurement." Comparative Politics 36(4): 481-500.

Rodden, Jonathan, Gunnar S. Eskeland, and Jennie I. Litvack. 2003. *Fiscal Decentralization and the Challenge of Hard Budget Constraints*. Cambridge, Mass.: MIT Press.

———. 2003. "Introduction and Overview." In *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, ed. Rodden, J., G. S. Eskeland and J. I. Litvack. Cambridge, Mass.: MIT Press.

Rodden, J., and E. Wibbels. 2002. "Beyond the Fiction of Federalism - Macroeconomic Management in Multitiered Systems." *World Politics* 54 (4):494-+.

Sato, M. 2002. "Intergovernmental Transfers, Governance Structure and Fiscal Decentralization." *Japanese Economic Review* 53 (1):55-76.
Schneider, A. 2003. "Decentralization: Conceptualization and Measurement." *Studies in Comparative International Development* 38 (3):32-56.
Simmons, A. Beth and Jens Hainmueller. 2006. "Beyond Domestic Institutions," Unpublished manuscript.
Stegarescu, D. 2005. "Public Sector Decentralisation: Measurement Concepts and Recent International Trends." *Fiscal Studies* 26 (3):301-33.
Stockman, A. C. 1999. "Choosing an Exchange-Rate System." *Journal of Banking & Finance* 23 (10):1483-98.
Stokey, N. L., P. N. Ireland, and L. E. O. Svensson. 2003. ""Rules Vs. Discretion" After Twenty-Five Years." In *Macroeconomics Annual 2002*.
Tavlas, G. S. 2000. "On the Exchange Rate as a Nominal Anchor: The Rise and Fall of the Credibility Hypothesis." *Economic Record* 76 (233):183-201.
———. 2003. "The Economics of Exchange-Rate Regimes: A Review Essay." *World Economy* 26 (8):1215-46.
Tornell, A., and A. Velasco. 2000. "Fixed Versus Flexible Exchange Rates: Which Provides More Fiscal Discipline?" *Journal of Monetary Economics* 45 (2):399-436.
Treisman, D. 2000. "Decentralization and Inflation: Commitment, Collective Action, or Continuity?" *American Political Science Review* 94 (4):837-57.
Treisman, Daniel. 2002. "Decentralization and the Quality of Government." *Working Paper*.
———. 2002. "Defining and Measuring Decentralization: A Global Perspective." In *Working Paper*.
von Hagen, J., and J. Z. Zhou. 2005. "The Choice of Exchange Rate Regime: An Empirical Analysis for Transition Economies." *Economics of Transition* 13 (4):679-703.
Wibbels, E. 2000. "Federalism and the Politics of Macroeconomic Policy and Performance." *American Journal of Political Science* 44 (4):687-702.
———. 2003. "Bailouts, Budget Constraints, and Leviathans - Comparative Federalism and Lessons from the Early United States." *Comparative Political Studies* 36 (5):475-508.
———. 2006. Madison in Baghdad? Decentralization and Federalism in Comparative Perspective." Annual Review of Political Science.
Wildasin, D. E. 2004. "The Institutions of Federalism: Toward an Analytical Framework." *National Tax Journal* 57 (2):247-72.
Wolf, M. 2002. "Exchange Rates in a World of Capital Mobility." *Annals of the American Academy of Political and Social Science* 579:38-52.