Taxation, Corruption and the Exchange Rate Regime

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Abstract

The paper analyzes the relation between institutional quality, such as corruption, in a country and its monetary regime. It is shown that a credibly fixed exchange rate to a low inflation country, like a currency board, can reduce corruption and improve the fiscal system. A monetary union, however, has ambiguous effects. I find that that there is convergence between countries with regard to the level of corruption.

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1 Introduction

Empirical evidence shows a marked contrast concerning the choice of exchange rate regime for industrialized and developing countries, with emerging markets falling somewhat in between. Whereas industrial countries (with the notable exception of the member states of the European Union) mostly tend to have floating exchange rates, developing and transition countries often choose fixed exchange rates, at least de facto if not de jure (Calvo and Reinhart 2002, Reinhart and Rogoff 2004, Meissner and Oomes 2007). Arguments explaining this difference include the lower credibility of the monetary regime, the shallowness of financial markets, the openness of the country, and the existence of a dominant trading partner or a former colonial tie (for a survey of the arguments, see Rogoff et al. 2004, Isard 2005). Another dimension in which these countries tend to differ is the amount of corruption or the quality of institutions and amount of good governance more general. Although industrial countries are not immune to these problems, they are clearly more prevalent in developing and transition countries as indices developed by Transparency International (TI 2006) or the World Bank (Kaufmann et al. 2007) show.

In this paper I aim to explore the connection between institutional quality, the fiscal system, and the choice of the exchange rate regime. The issue is important for countries in which monetary policy is not completely unaffected by fiscal policy and where monetary policy plays an important role in financing the public budget (Cukierman et al. 1992, Crowe 2006). In addition, in countries where central banks are not completely independent and able to ensure monetary stability, other dimensions of institutional quality are often lacking as well. Corruption and rent-seeking are prevalent phenomena in many developing and transition countries, going hand in hand with higher rates of inflation and ambitious spending policies.[1] In particu-

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[1]Corruption is only one indicator of bad institutions. However, indices such as the one developed by Kaufman et al. (2007) show a high correlation of corruption with other

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lar, resource rich countries are often characterized by high levels of corruption and rent-seeking (Ahrend and Thompson 2006, Havrylyshyn 2006, Lane and Tornell 1996, van der Ploeg 2006).

The model developed in this paper is hence relevant for countries in Africa, Central Asia or the Caucasus where corruption is a widespread phenomenon. Countries in Africa and the Commonwealth of Independent States (CIS) to a large extent exhibit traits that are reflected in the model. Several of them have considerable amounts of natural resources such as oil or gas, are plagued by widespread corruption and weak institutional capacities, and have distortive and highly unequal tax systems (pushing economic activities underground). At the same time, monetary policy institutions are not very credible. For this and other reasons, many consider forming a monetary union among themselves, such as a Western Africa Monetary Union (WAEMU) (Masson and Pattillo 2005) or among CIS states (Chaplygin et al. 2006).

Another option is a unilateral peg to a low inflation anchor currency or the introduction of a foreign currency as a means of payment. However, monetary arrangements need not be based on a peg to the dollar or the euro, anchor currencies where the connection between monetary policy and corruption is largely non-existent. Instead, they might be based on regional anchor currencies which are themselves subject to pressures that result in relatively high inflation. This case is relevant for some countries of the former Soviet Union, contemplating to peg to the Russian ruble (Gulde et al. 2004), or African nations that might consider joining a monetary union with, say, Nigeria (Masson and Pattillo 2005). The paper finds that such a pegs to regional currencies will not necessarily improve the institutional quality in the pegging country.

The paper is related to three issues so far discussed separately in the literature. One dimension discussed in the literature is the question how

indicators of institutional quality.

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fiscal policy and exchange rate regimes go together (De Kock and Grilli 1993, Tornell and Velasco 2000). Monetary policy is considered part of fiscal policy and needed to finance part of the budget. While DeKock and Grilli (1993) find that fixed exchange rates collapse when fiscal shocks hit, Tornell and Velasco (2000) argue that flexible rates impose more fiscal discipline because fixed rates shift the costs of deficits into the future and thus induce reckless fiscal policy.

This literature overlooks the second dimension of fiscal policy, that is, the question of corruption or leakages from fiscal revenue more general (for a survey, see Aidt 2003). In particular many transition economies and developing countries have a fundamental problem of corruption affecting fiscal revenues. A closely related literature discusses the influence of interest groups on fiscal policy, arguing that powerful interest groups tend to overspend revenues (Tornell and Velasco 1992, Lane and Tornell 1996). This is a standard tragedy-of-the-commons-problem in which uncoordinated groups do not take into account the external effects of their behavior and thus overuse a given resource. While this literature usually asks what institutional solutions might help to solve this problem, I ask whether a particular exchange rate regime could help to induce governments to be less tolerant with corruption or other forms of appropriation of fiscal resources.

Finally, there exits a voluminous literature on the connection between monetary policy and institutional quality more broadly. This literature, starting with Rogoff (1985), usually focuses on the institutional independence of the central bank or other institutional solutions that lead to a low rate of inflation. The closely related dimension of institutional quality in the sense of corruption and rent-seeking, however, is largely unexplored.

Most closely related to this paper is recent work by Huang and Wei (2006) who also explore the connection between institutional quality and monetary policy but with a different focus. They analyze the question of optimal monetary regime more broadly and include also the possibility of appointing a

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conservative central banker. Given deficits in institutional quality in many of these countries, however, internal solutions, such as appointing an independent and conservative central banker or moving to inflation targeting, are not very credible and I therefore focus on different types of external solutions like a peg or monetary union.[2] Moreover, I reach different results than they do concerning the desirability of choosing fixed exchange rates. While they argue that pegging is not the best result, I conclude that pegging to a stable anchor currency will lead to lower levels of corruption than monetary autonomy or a monetary union.

Another relevant paper, that has a different focus but finds evidence supported by the theory developed here, is Alesina and Wagner (2006). They are interested in the choice of exchange rate regime per se but incidentally find a U-shaped relation between corruption and the degree of exchange rate fixity (measured by the Reinhart-Rogoff index). While countries that are characterized by good institutions tend to have flexible exchange rates the same is true for countries with very bad institutions. They interpret this as evidence that countries with good institutions can afford to have flexible rates whereas countries with bad institutions need flexible rates. Countries with intermediate levels of institutional quality tend to have more or less rigid exchange rates. Alesina and Wagner (2006), however, do not provide a theory that could explain a causal relationship between these observations.

The paper is structured as follows. Section 2 develops a theoretical model that analyzes the relation between fiscal policy, corruption and inflation. Sections 3-5 look at monetary independence, a tight peg, and a monetary union respectively. Section 6 discusses the results, and section 7 concludes.

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[2]Curiously, Huang and Wei (2006) rightly argue that many countries lack the capacity for inflation targeting but assume at the same time they are able to credibly create independent central banks, thus overlooking the vast literature that focusses on differences between de-facto and de-jure central bank independence (Cukierman 1992, Siklos 2002).

2　The Model

The model I use is an extension of the models used by Alesina and Tabellini (1987), De Kock and Grilli (1993), Velasco (1996) or Huang and Wei (2006) among others. The real economy is reflected in an expectation augmented Phillips-curve (with slope $\alpha < 1$), where output can be increased by inflation above its expected value $\pi > \pi^e$ and is lowered by distortive taxation τ. All variables are expressed in natural logarithms. Thus, output follows

$$y = \alpha \left(\pi - \pi^e - \tau \right) \tag{1}$$

The budget constraint comprises distortionary taxation and revenue from inflation (seigniorage) as main sources of revenue. Extending the standard model, I assume the government benefits from some exogenous income stream, $\kappa \geq 0$, that might be thought of as revenue from natural resources, such as oil, gas, diamonds or gold.[3] This allows introducing aspects important for many developing and transition economies with considerable amounts of natural resources at their disposal.

Nominal tax revenue, to be determined by the government, is τ. θ denotes the degree of theft, corruption or the institutional quality more broadly. Corrupt officials (or parts of the government) may be bribed into not collecting all tax obligations by underreporting profits of firms, they may steal part of the revenue, or might divert funds for personal purposes, and a non-benevolent government might abuse public funds for personal use and prestige objects.[4] Finally, it could also reflect the access of uncoordinated interest groups to the budget (Tornell and Velasco 1992). $\delta\theta$ measures the impact of corruption on the budget so that $\theta = 0$ would characterize an economy with no leakages

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[3]Alternatively, this can be thought of as non-distortionary taxation.

[4]Corruption is only a shorthand expression for all forms of expropriation of official funds. This can be by the bureaucracy, government ministers, managers of publicly owned resource extraction industries, or anybody else with access to public funds. See Aidt (2003) for a thorough discussion of how corruption leads to revenue leakages.

or corruption.

Notice that in contrast to Huang and Wei (2006), I do not assume that corruption is a share of tax revenue but an absolute sum that might, because of κ, even be larger than the tax revenue τ. Corruption is not only a reduction of tax revenue but it might in addition divert a part of the exogenous revenue stream from natural resources and from seigniorage into private pockets.

In addition, the government benefits, depending on the exchange rate and monetary system that it operates, from seigniorage revenue that is assumed to be transferred from the central bank to the budget. The contribution of inflation to the budget is as s.[5]

Summarizing, the budget constraint is

$$g = \kappa + \tau - \delta\theta + s\pi \tag{2}$$

There are three players: the private sector, the central bank and the government. The private sector forms rational expectations about the rate of inflation and is otherwise passive. Government and central bank are two independent actors. This could either reflect some degree of independence of the central bank or describe a conflict between different entities of the government, such as between the ministry of finance and other ministries and the central bank. All players play Nash against each other, so fiscal policy, monetary policy, expectations and anti-corruption measures are all taken simultaneously and non-cooperatively. The Nash-assumption is justified because this is a long-term model that looks at structural policy choices. Of course, fiscal policy is usually more flexible than institutional quality, and monetary policy is even more flexible. However, since there are no shocks to fiscal policy, output or monetary policy the model focusses on structural

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[5]A fully or nearly fully dollarized economy would thus have s close to zero. In fact, one might argue that eventually s might become negative with very high rates of inflation. For simplicity, following the literature I assume that s is positive and constant. Not much would change by modelling s as a declining function of π (Huang and Wei 2006).

influences which makes Nash the appropriate assumption on timing.[6]

Like it is standard in the literature (Barro and Gordon 1983, Rogoff 1985), I assume that the central bank is concerned with avoiding deviations of inflation from zero and stabilizing output, where the (log of) the natural level is assumed to be zero.[7] The degree of conservatism of the central bank (Rogoff 1985) is measured with c. The higher is c, the more the bank is concerned with stabilizing inflation at zero. Then, the central bank's objective function is given as

$$L = c\pi^2 + y^2 \tag{3}$$

The government is supposed to be under the influence of several important interest groups in the economy, so that it aims simultaneously to stabilize output and inflation, as well as meeting a spending target, which could reflect the aim of being reelected or other demands from interest groups the government must satisfy. The more the government is under pressure to meet spending targets, the higher is the spending target $\overline{g}$. In addition the government in concerned with corruption (or leakages of fiscal revenue). Changes to the given level of corruption $\widehat{\theta}$ are assumed to be costly in political terms. Increasing corruption might result in protest from the population, lower foreign investment or less support from international financial organizations, like the World Bank and the International Monetary Fund.[8] A reduction in corruption, in contrast, leads to personal income losses for the government,

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[6]Using Stackelberg as the solution concept, with the government being the Stackelberg leader would yield the same results in this setup.

[7]Huang and Wei (2006), using Alesina and Tabellini's (1987) approach, assume that the central bank is also concerned with stabilizing government spending around the target value which leads to the standard inflation bias of monetary policy. However, since it is not obvious why central banks should be concerned with spending targets, I use the standard formulation. In Huang and Wei's setup with symmetric utility functions and weights, there is no difference between a cooperative and non-cooperative game, thus boiling down to having only one policy maker. My formulation implies that relative utility weights on inflation c differ between government and central bank as the government has additional targets, and thus allows for conflicts between policy makers.

[8]Pomfret (2006) and Havrylyshyn (2006) for instance report that strong increases in corruption have lead to stops in credits from IMF and World Bank in several CIS states.

or, in case of a benevolent government, to alienation of former beneficiaries of corruption, such as interest groups or bureaucrats that resist corruption fighting. On the other hand, the government might be honest and interested in reducing corruption, in which case it is a negative influence on the utility of the government. In any case, I assume that corruption can be reduced by the government from a given level $\widehat{\theta}$ by increasing the control of public servants, by reducing the influence of interest groups and rent-seeking, and by creating better institutions like setting up independent courts and improving public administration. Because of the personal or political costs of fighting corruption, changes in either direction from the given level are costly. For simplicity, $C(\theta)$ is specified as $C(\theta) = \gamma \left(\theta - \widehat{\theta}\right)^2$ in what follows.

The government's objective function is thus

$$V = c\pi^2 + y^2 + b(g - \overline{g})^2 + C(\theta) \tag{4}$$

Recall that, in contrast to Huang and Wei (2006), I assume that θ is chosen simultaneously with taxation. This implies that governments, because they can control corruption to some degree, consider fighting corruption as an alternative to increasing taxation and thus optimize between fighting corruption and increasing taxation. As argued above, this timing makes sense in a model without stochastic elements.

3   Taxes and Corruption With Independent Monetary Policy

One possible choice of the government is to choose flexible exchange rates which allow to set monetary policy independently. Assuming that the central bank is independent enough not to be a direct instrument of the government, the two national players choose their optimal policies in a non-cooperative game.

I begin by describing the choice of the central bank. Its optimal policy follows form minimizing (3) as $\pi = \frac{\alpha^2(\tau+\pi^e)}{1+c}$.[9] With rational expectation of the private sector, expected inflation can be derived as $\pi^e = \frac{\alpha^2}{c}\tau$, leading to

$$\pi^N = \frac{\alpha^2}{c}\tau^N \tag{5}$$

where the index N refers to nationally set monetary policy. Because of the deterministic structure of the model actual and expected inflation are equal and monetary policy has no stabilization role but only contributes to financing the government's budget.[10] The more inflation averse is the central bank the lower is the reaction to fiscal policy. Increasing c can thus be seen as appointing a more conservative central banker, leading to a lower rate of inflation in response to taxation.

Next, I analyze the policy choices of the government. Optimization of (4) with respect to fiscal policy and corruption yields for taxation $\tau = \frac{b}{\alpha^2+b}\left(\overline{g} - \kappa + \theta - s\pi\right)$ and a level of corruption of $\theta = \frac{b\delta}{\gamma+b\delta^2}\left(\tau + s\pi + \kappa - \overline{g}\right) + \gamma\widehat{\theta}$. Thus, corruption and taxation are strategic complements. A high tax revenue leads government to allow more corruption and vice versa. Solving these equation simultaneously, yields taxation under monetary autonomy as

$$\tau^N = \frac{cb\gamma\left(\overline{g} - \kappa + \delta\widehat{\theta}\right)}{c\left(\gamma\left(\alpha^2 + b\right) + \alpha^2 b\delta^2\right) + \alpha^2 b\gamma s} \tag{6}$$

Taxation is increasing in the difference between spending targets and ex-

[9]Notice that I part again from Huang and Wei (2006) here who assume that the central bank, which is basically the same as the government in their model, is able to commit its monetary policy. Thus, $\pi = \pi^e$ at all times in their model. In their model there is no credibility gain from pegging to an external currency, which is arguably the main argument for many developing countries.

[10]As indicated above, assuming that the central bank is concerned with a spending target would additionally increase inflation due to the bank's intention to contribute to financing these expenditures. Here, inflation is increasing in taxation because the central bank compensates for the negative output effect of taxes.

ogenous revenue (windfalls) $\overline{g} - \kappa$ and in the initial degree of corruption $\widehat{\theta}$. An ambitious spending target increases taxation (also increasing distortions in the real economy as the output equation (1) shows), and so do high levels of corruption (or poor institutional quality). Taxations is falling in the contribution of seigniorage to the budget, measured by s, and is increasing in c, the central bank's conservatism. Because c lowers inflation and seigniorage, taxation has to increase to finance expenditures and corruption.

Corruption is allowed to be

$$\theta^N = \frac{\gamma\widehat{\theta}\left(c\left(\alpha^2 + b\right) + \alpha^2 bs\right) - \alpha^2 bc\delta\left(\overline{g} - \kappa\right)}{c\left(\gamma\left(\alpha^2 + b\right) + \alpha^2 b\delta^2\right) + \alpha^2 b\gamma s} \tag{7}$$

which is falling in $\overline{g} - \kappa$, meaning that a higher spending target induces more efforts to fight corruption, and increasing in initial corruption $\widehat{\theta}$. The higher is the windfall κ, the higher corruption will be allowed, as is frequently observed in resource rich countries (van der Ploeg 2006).[11] θ^N is increasing in s (the contribution of seigniorage to the budget) if (and only if) $\widehat{\theta} > \overline{g} - \kappa$, and decreasing in c. That is, the more conservative is the central bank the more efforts the government will make to lower corruption and other forms of leakages because it can expect only little contribution from seigniorage to the budget.

4   A Unilateral Exchange Rate Peg

One alternative to independent monetary policy, frequently chosen by developing and transition countries, is an exchange rate peg that should help to solve persistent credibility problems (Calvo and Reinhart 2002, Reinhart and Rogoff 2004, Keller and Richardson 2003, Rogoff et al. 2004). There are many forms of pegs, of course, but I focus on the subgroup of very hard

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[11]Notice, however, that there is no voracity effect, as derived by Lane and Tornell (1996). They show that appropriations from the budget might even increase more than windfalls. Here instead $\partial\theta/\partial\kappa < 1$.

peg, such as dollarization and currency boards. Intermediate regimes with some limited flexibility provide a combination of peg and flexible rate and are chosen by many more advanced developing countries and larger transition economies (Frankel 1999). However, intermediate forms are in general much less credible than hard pegs, which is particularly relevant for countries plagued by high levels of corruption and weak institutions. The difference to the case of monetary union, to be considered in the next section, is that the central bank of the anchor country does not take developments in the pegging country into account. Hence, inflation is completely exogenous for the pegging country and there is no reaction of monetary policy to taxation or corruption in this country. While this provides the most credibility in terms of lowered expectations of inflation, it increases budgetary problems because there is no longer any seigniorage revenue.[12]

Denoting inflation in the anchor country as $\widehat{\pi}$, the government's choice of taxation and corruption tolerated under a hard peg (indexed P) are

$$\tau^P = \frac{b\gamma\left((\overline{g} - \kappa) + \delta\widehat{\theta} - s\widehat{\pi}\right)}{\gamma\left(\alpha^2 + b\right) + \alpha^2 b\delta^2} \tag{8}$$

and

$$\theta^P = \frac{\gamma\widehat{\theta}\left(\alpha^2 + b\right) - \alpha^2 b\delta\left((\overline{g} - \kappa) - s\widehat{\pi}\right)}{\gamma\left(\alpha^2 + b\right) + \alpha^2 b\delta^2} \tag{9}$$

For all practical purposes, it can be assumed that inflation in the anchor country is so low that the contribution of seigniorage to the budget at this rate of inflation is negligible. I therefore set $\widehat{\pi} = 0$ in what follows.[13] This implies that I cannot distinguish between a very tight peg, such as a currency board, and full dollarization. While the former, in principle, implies at least

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[12]While it is theoretically possible that the anchor country transfers seigniorage revenue to the pegging country, this is not observed in reality (Williamson 2006).

[13]This may of course be different for a country that unilaterally pegs to another developing or transition country. Since most pegs are to the dollar or the euro, however, I neglect this case.

some seigniorage revenue as long as the anchor currency's rate of inflation is positive, this is not the case in the latter case.

Comparing monetary autonomy and pegging, one finds that corruption will go down with a credible peg and that taxation will go up. Thus, $\tau^P > \tau^N$ and $\theta^N > \theta^P$. Hence, exchange rate pegging will lead to a more distortinary fiscal system. Because the output gap is, without stochastic shocks, only a function of the level of taxation, it also follows that the output gap will increase under pegging, $y^N > y^P$. Inflation, due to the assumption of zero inflation under pegging will obviously fall in comparison to autonomy $\pi^N > \pi^P$, and so will the level of spending $g^P < g^N$.

This is summarized in the following proposition:

Proposition 1 *A unilateral hard peg leads to more taxation, lower output, lower inflation, lower spending, and lower corruption than monetary autonomy.*

Because the government loses seigniorage the budget constraint becomes harder, forcing the government to look for alternative sources of finance and to lower overall spending. There are two sources which are both used to make up for the loss of seigniorage, taxation and fighting corruption. Because both instruments have increasing marginal costs of using them, both will be used instead of only increasing taxation or fighting corruption.

5   Monetary Union

The case of a monetary union is more complicated. I assume there are two countries in the monetary union and that the individual country i has a relative share of z_i so that $z_1 + z_2 = 1$.[14] Since I am interested in the situation of the individual country, which is likely to be rather small in comparison to

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[14]One may also assume a union of n countries with $z_1 = \frac{1}{n} z_i$ and $z_2 = \frac{1}{n} \sum_{j=1, j \neq i}^{n} z_j$ as the average of all other countries in the union.

the rest of the monetary union, I assume $z_2 > z_1$. This reflects, for instance, a monetary union between a large and a small country, such as discussed between Russia and individual CIS countries, or the case of a single country joining an existing monetary union, such as the European monetary union. As Chaplygin et al (2006) argue it is even possible that $z_1 \rightarrow 0$ and that the smaller country plays no role in determining monetary policy. The difference to a unilateral peg, however, is that some seigniorage revenue is distributed to the country. I assume that the share of each country in overall seigniorage corresponds to its relative economic size z_i.

In a Nash-game it is obvious that with symmetric countries the values for a single country are equal to the average and vice versa. Thus, the result will become only interesting if the two countries (group of countries) diverge in some characteristics. In order to focus on economic differences, I assume $\overline{g}_1 - \kappa_1 \lessgtr \overline{g}_2 - \kappa_2$ and $\widehat{\theta}_1 \lessgtr \widehat{\theta}_2$ while all utility parameters are equal across countries. (It is rather trivial to derive economic consequences of different preferences. Moreover, higher or lower preferences for, say corruption, lead to the same effect as a higher initial level of corruption.)

The central bank's objective function in the monetary union (indexed MU) is

$$L^{MU} = c\pi^2 + b \left(z_1 y_1 + z_2 y_2\right)^2 \tag{10}$$

where I assume that inflation is equal across the monetary union. The common central bank is concerned with minimizing common inflation and stabilizing average output in the union. Inflation is then given as

$$\pi^{MU} = \frac{\alpha^2}{c} \left(z_1 \tau_1 + z_2 \tau_2\right) \tag{11}$$

The reaction function of taxation to this rate of inflation (with a similar

expression for τ_2) is

$$\tau_1^{MU} = \frac{b\gamma \left(c \left(\overline{g}_1 - \kappa_1 + \widehat{\theta}_1 \right) - s\alpha^2 z_2 \tau_2 \right)}{c\gamma \left(\alpha^2 + b \right) + \alpha^2 b \left(c\delta^2 + \gamma s z_1 \right)} \tag{12}$$

Because inflation reacts to taxation in the rest of the union positively and contributes to seigniorage in the pegging country, tax rates in the countries are strategic substitutes. The larger the rest of the union, the stronger is this influence. The lower is the own relative weight, the higher taxation will be because the central bank does not react to domestic taxation and thus inflation does not respond as strongly as under monetary autonomy. Therefore, revenue has to come from taxation and τ_1^{MU} is increasing in z_1.

Optimal corruption is $\theta_1^{MU} = \frac{c\gamma\widehat{\theta}_1 + b\delta\left(\left(c + \alpha^2 s z_1 \right)\tau_1 + \alpha^2 s z_2 \tau_2 \right) - cb\delta(\overline{g}_1 - \kappa)}{c\left(\gamma + b\delta^2 \right)}$ with a similar expression in country 2. Solving taxation and corruption simultaneously, the equilibrium tax rate in country 1 is

$$\tau_1^{MU} = \gamma b \frac{\left(\overline{g}_1 - \kappa_1 + \delta\widehat{\theta}_1 \right) \cdot \left[c \left(\gamma \left(\alpha^2 + b \right) + \alpha^2 b\delta^2 \right) + \alpha^2 \gamma b s z_2 \right]}{\left(\gamma \left(\alpha^2 + b \right) + \alpha^2 b\delta^2 \right) \cdot \left[c \left(\gamma \left(\alpha^2 + b \right) + \alpha^2 b\delta^2 \right) + \alpha^2 \gamma b s \right]}$$

$$- \gamma b \frac{s\alpha^2 b\gamma z_2 \left(\overline{g}_2 - \kappa_2 + \delta\widehat{\theta}_2 \right)}{\left(\gamma \left(\alpha^2 + b \right) + \alpha^2 b\delta^2 \right) \cdot \left[c \left(\gamma \left(\alpha^2 + b \right) + \alpha^2 b\delta^2 \right) + \alpha^2 \gamma b s \right]} \tag{13}$$

As before, taxation is increasing in the structural spending gap and initial corruption in the country. However, it is falling in the spending gap and corruption in the other countries. Again, this is because those variables give rise to higher inflation and thus seigniorage. The larger the relative weight z_2 of other countries, the more domestic taxation can decrease because the share of seigniorage for the country increases.

The level of corruption follows as

$$\boldsymbol{\theta}_1^{MU} = \frac{\left(c\left(\gamma\left(\alpha^2+b\right)+\alpha^2 b\delta^2\right)+\alpha^2 b\gamma s\right)\cdot\left[\left(\alpha^2+b\right)\gamma\widehat{\theta}_1-\alpha^2 b\delta\left(\overline{g}_1-\kappa_1\right)\right]}{\left(\gamma\left(\alpha^2+b\right)+\alpha^2 b\delta^2\right)\cdot\left[c\left(\gamma\left(\alpha^2+b\right)+\alpha^2 b\delta^2\right)+\alpha^2\gamma bs\right]}$$

$$+ \frac{\left(\alpha^2 b\right)^2 s\delta\gamma\cdot\left[z_1\left(\overline{g}_1-\kappa_1+\delta\widehat{\theta}_1\right)+z_2\left(\overline{g}_2-\kappa_2+\delta\widehat{\theta}_2\right)\right]}{\left(\gamma\left(\alpha^2+b\right)+\alpha^2 b\delta^2\right)\cdot\left[c\left(\gamma\left(\alpha^2+b\right)+\alpha^2 b\delta^2\right)+\alpha^2\gamma bs\right]} \quad (14)$$

Corruption is increasing in the initial level and decreasing in the spending gap, like in the case of monetary independence. It is additionally increasing in seigniorage revenue (the second term), which in turn is a function of spending gaps and initial corruption in both countries. Hence, corruption levels in member countries are complements.

Comparing the results for monetary union with the results under monetary autonomy leads to the following proposition:

Proposition 2 *If $\overline{g}_2-\kappa_2+\delta\widehat{\theta}_2>\overline{g}_1-\kappa_1+\delta\widehat{\theta}_1$ in an asymmetric monetary union, taxes will decrease, $\tau_1^N>\tau_1^{MU}$, output will increase $y_1^{MU}>y_1^N$ (because taxation is lowered), corruption will increase $\theta_1^{MU}>\theta_1^N$, inflation will increase $\pi^{MU}>\pi_1^N$, and spending will increase $g_1^{MU}>g_1^N$.*

Monetary union will thus not necessarily have beneficial structural effects in the potential member country. If the other member country has a high financial gap and a high degree of corruption, taxation in that country must be relatively high. In this case, inflation set by the common central bank is relatively high, which in turn implies that seigniorage is relatively high for the home country. Thus, the country can "afford" to let corruption increase and lower domestic taxation. An asymmetric monetary union with a strong partner country that is additionally characterized by higher levels of corruption and ambitious spending targets is likely to deteriorate institutional quality in smaller member countries as the effects are increasing in the relative size of the other country. There is hence a convergence between

countries; countries with a high initial level of distortions will increase corruption in the other country while a monetary union with a lower average level of corruption than the home country will have a disciplinary effect on the home country. A monetary union will hence be beneficial for institutional quality only if it is with the "right" partner countries.

Comparing instead the tight peg to the monetary union yields the following results:

Proposition 3 *Taxes will decrease, $\tau_1^P > \tau_1^{MU}$, corruption will increase $\theta_1^{MU} > \theta_1^P$, inflation, and the level of spending, as well as the level of output will increase $\pi^{MU} > \pi_1^P = 0$, $y_1^{MU} > y_1^P$ and $g_1^{MU} > g_1^P$ if a country moves from a tight peg to an asymmetric monetary union with a more distorted partner country.*

Since by definition the peg is accompanied by zero inflation and no seigniorage, it is clear that inflation increases in the monetary union, while taxation will decrease. Due to higher seigniorage revenue, the government will allow corruption to increase, and because of lower taxation output and overall spending will increase. Thus, countries that are considering moving from a unilateral peg to an asymmetric monetary union where they are junior partners risk seeing their institutional qualities deteriorate.

6 Comparison of Monetary Regimes

The simplest result is the rate of inflation which will be lowest by a peg to a very hard currency (with a rate of inflation of zero). Therefore, pegging leads to the lowest inflation.[15] A monetary union between countries with positive rates of inflation will lead to an increase of inflation under monetary union

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[15]A peg an inflationary currency may raise inflation in which case corruption would increase as well. Since corruption is increasing in inflation, a peg to a highly distorted economy is thus also likely to lead to a convergence of corruption, but without the lowering of corruption in the more distorted economy that follows in a monetary union.

$\pi^{MU} > \pi_1^N$ if $\overline{g}_2 - \kappa_2 + \widehat{\theta}_2 > \overline{g}_1 - \kappa_1 + \widehat{\theta}_1$. Thus, whether inflation will increase or decrease is basically a function of the levels of distortions that members bring into the union.

Because seigniorage is lowest under pegging, this also implies that taxation has to be higher under this regime than under national monetary autonomy. Moreover, $\tau_1^N > \tau_1^{MU}$ iff $\overline{g}_2 - \kappa_2 + \widehat{\theta}_2 > \overline{g}_1 - \kappa_1 + \widehat{\theta}_1$ because higher inflation leads to lower taxation under monetary union. Since the output gap, under certainty, is only a function of the level of taxation, it follows that the output is decreasing in taxation. Thus, the highest level of taxation will also lead to the lowest output. Since taxation is higher under the peg than under monetary union or monetary autonomy, it follows that the output gap will increase vis-à-vis both alternatives. That is, entering a monetary union with more distorted countries increases output as inflation increases and thus taxation can decline because of higher seigniorage revenue. Higher seigniorage revenue also leads to higher levels of spending, implying lowest spending under pegging. Moreover, because of lower revenue, corruption will decrease under pegging, but go up under monetary union if it is accompanied by higher inflation.

The effects of changes in taxation and corruption on the level of utility (or losses) for the government are not obvious. An increase in taxation in case of active monetary policy (the national case or monetary union) will lead to an increase in inflation and lower output. It will, on the other hand have a beneficial impact on the fiscal policy, which is further supported by lower corruption (that usually goes hand in hand with an increase of taxation). However, the lowering of corruption as well has a negative impact on utility as it leads to losses in political support from those groups in the economy that have benefited from it before reform. The overall effect on utility thus mainly depends on the relative weights a government assigns to these opposing influences.

It must be kept in mind though that the lowest rate of inflation under

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pegging is mainly driving these results. A very tight peg to a country with a positive rate of inflation might lead to different results if this inflation is higher than under monetary autonomy or monetary union.[16] Countries with relatively low levels of distortions in spending targets and corruption might thus see an increase in corruption if a different monetary regime leads to higher seigniorage revenue.

7   Conclusion

The paper has analyzed a relatively little researched dimension of institutional quality and monetary policy. While the existence of independent and conservative central banks has often been explored in comparison to external anchors for monetary policy, the influence of fiscal policy and corruption and rent-seeking is under-explored. I develop a model that explicitly considers the connection between fiscal policy and monetary policy if corruption and other leakages from fiscal revenue are important. It is shown that a tight peg to a low inflation currency can improve the institutional quality in a country, that is, lower the level of corruption. The government is induced to fight more strongly against leakages and corruption if the revenue from seigniorage is lowered. This, unfortunately, also leads to higher taxation and thus higher output distortions. Which of the regimes is preferred by a government mainly depends on the initial level of distortions and corruption and the relative preference for reducing inflation, stabilizing output and expenditures, and fighting corruption.

Moving to a full monetary union can lead to more or less corruption, depending mainly on the choice of partner countries for the monetary union. Countries with different levels of corruption and spending targets for fiscal policy will experience a convergence in corruption and spending. Thus, lower

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[16]This is a very unlikely case, however, because unilateral pegs are usually to low inflation currencies.

corruption will only result if the country joins a monetary union where is has a relatively little weight and where the other countries have relatively well developed institutions.

These results have obvious implications for countries in a high corruption environment, such as in Africa or the CIS states. Since some of these countries are considering one or the other form of monetary integration with dominant neighbors, the results derived here suggest to be careful. It might be better in some cases to rather peg or continue to peg to currencies like the US-dollar or the euro. It also casts some doubt on the now nearly universal IMF advice that countries chose flexible exchange rate regimes. Such a solution may actually be accompanied by a deterioration of institutional quality which is also one of the aims of international organizations. It should be taken into consideration that these aims need not necessarily go together well.

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