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Non-Benevolent Central Banks[1]

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Abstract

Corruption at central banks induces distorted policies by generating a tendency to increase inflation. An inflation bias arises because the public distrusts central bank's benevolence, not only its commitments. We show that distrust among the public, measured by a high level of expected inflation, can have positive effects because it may sanction a conservative central banker, forcing him to lower realized inflation levels. Giving central banks a high level of independence will fail if this not only insulates central bankers from troublesome political interference but also provides them with the leeway necessary to carry out corrupt transactions.

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1. Introduction

There exists corruption among central banks. This is astonishing and trivial at the same time. It is trivial, because any administrative apparatus can be affected by corruption. If we follow Klitgaard's [1988: 75] classical suggestion that corruption flourishes where agents have monopoly power plus discretion and where accountability is weak, there should be ample opportunity for corruption among central banks. Central banks are commonly given monopoly power over the national currency and they have considerable discretion in how to carry out their task. They decide which goals to follow and how to quantify them, which instruments to use, which monetary targets to set, when to announce their policies and how to select private banks for their open market operations, to name but a few topics at their disposal. Throughout history, although probably at a decreasing level, central banks have exercised these tasks with a remarkable level of secrecy and little accountability. As noted by Greenspan [2002: 5]: “The undeniable, though regrettable, fact is that the most effective policymaking is done out-side the immediate glare of the press. But that notion and others have been used too often in the past to justify a level of secrecy that turned out to be an unnecessary constraint on our obligation to be transparent in conducting the public’s business.” Central bankers can therefore misuse the power they are entrusted with to advance their own goals. And indeed, surveying the international media reveals a variety of instances and allegations of corruption at central banks.

At the same time the existence of corruption among central banks is astonishing in so far as there is hardly any theoretical treatment of this behavior. Models of central banks often involve distrust with regard to the credibility of their announcements, but economic theory always considers them to be devoted to public interest.

While there is no adequate modeling of corruption among central banks, there exists scattered recognition of this issue. For example Hellman et al. [2000] report on a survey of businesspeople in transition economies. These had been asked to assess the impact on their business that arises from central bank mishandling of funds. More than a third of the respondents perceived central bank mishandling of funds to be an obstacle to their business in the following countries: Azerbaijan, Kyrgyzstan, Moldova, Russia, Slovakia and Ukraine. In the recent debate on transparency among central banks there was also recognition of corruption among central bankers. For example, the International Monetary Fund [2000] set up a “Code of Good Practices on Transparency in Monetary and Financial Policies”. Subsection 4.4 relates to “rules to prevent exploitation of conflicts of interest, including any general fiduciary obligation,” and suggests public disclosure of these.

However, both these approaches do not deliver a convincing argument why corruption

among central banks is harmful. The IMF's code of conduct suggests:

> "Without trust in the financial probity and freedom from conflict of interest of the officials and staff of the central bank, the authority and ability of a central bank to perform its functions would be severely hindered. It would affect its effectiveness to interact with the financial institutions under its jurisdiction, and the general public would not trust the impartiality of its operations."

The argument suggests that corruption is primarily harmful because it destroys public confidence. But why should people distrust a corrupt central bank, and is such a distrust actually a bad thing? This study models corruption among central banks and derives three hypothesis: Corruption among central banks is harmful because, first, it brings about policy distortions, i.e. a tendency to increase inflation. Second, this induces a higher inflation bias. Third, distrust among the public, measured by a high level of expected inflation, can have positive effects because it may effectively sanction a (conservative) central banker, forcing him to lower realized inflation levels.

The third hypothesis is in contrast to the standard wisdom of central bank policy, originating from contemporary models with time inconsistency, [Barro and Gordon 1983, Rogoff 1985, Kydland and Prescott 1977, Persson and Tabellini 1990]. This strand of literature posits that inflation arises when central banks cannot commit to pre-specified policies. This brings about an inflation bias, inducing private actors to distrust central bank announcements and to expect high levels of inflation. The central bank, by force of its discretionary optimal policy, plays along with these expectations and realizes a high level of inflation. Expectations of inflation increase inflation, because once expectations exist they are arduous to reverse. These results are derived for central bankers who are representative to the population at large and not devoted to their own self-interest. By investigating self-seeking among central bankers we provide novel insights.

Our hypothesis that corruption among the central bank increases the inflation bias and ultimately the equilibrium level of inflation well corresponds to empirical investigations. Al-Marhubi [2000] provides evidence for corruption increasing inflation in a cross-section of countries for a variety of specifications.[3] He traces this to tax evasion and tax collection costs, which are likely to be higher in a corrupt environment. Corruption also goes along with a larger size of the unofficial economy, bringing about higher demand for the domestic currency.

[3] Also Braun and Di Tella [2000] report a positive association for these variables. However, they argue that inflation causes corruption because it complicates price comparisons and makes it more difficult for principals to control the corruption of their agents.

Both these effects suggest that government revenues can easier be obtained by increasing the money stock (seignorage) rather than by distorting taxation. A higher inflation is therefore optimal so as to increase seignorage. We suggest another reason for the empirical finding: Corruption among the central bank itself.

Our study is organized as follows. Section 2 argues that corruption leads to distorted policies, namely, an excessive money supply. Section 3 introduces this feature into a standard model for central bank policy. Section 4 extends the analysis by determining the role of distrust, that is, the impact of expectations of high inflation. Section 5 discusses extensions, concludes and provides policy recommendations.

2. Corruption and Policy Distortions

Over the years 2000-2002, we screened reports on corruption at central banks. The cases encompass divert incidents. Very often, the behavior induced policy distortions. One apparent distortion, albeit rare, arises with central banks that just print money and embezzle it for their own private purposes, or those of politicians they depend on. Corrupt income for the central banker (or those politicians who control his activities) would directly increase the money supply. In 1979 Erwin Blumenthal, who served as an IMF representative in Zaire and was the central bank's vice governor there, experienced such a case, [Blumenthal 1982]. There was no clear dividing line between the state budget and President Mobutu's personal account. Equally, the central bank was largely regarded the personal property of the President and his cronies. Blumenthal was repeatedly forced to hand out the central bank's money for purely private purposes. Once he rejected payment he was threatened with submachine guns to comply with the orders of an army general. President Fujimori in Peru embezzled gold reserves from the central bank and transferred them to Japan.[4] The loss in the central bank's net equity is likely to bring about attempts to increase income from seignorage, if not to risk bankruptcy and an unstable monetary system.

More subtle forms of corruption take place when central bankers collude with bankers and sell inside information on future monetary operations. As alleged by the media, Francisco Lopes headed the Brazilian Central Bank as a governor for only three weeks. Upon his appointment he devalued the Brazilian currency, the Real, by eight percent. Before the devaluation Lopes gave advance notice about the new exchange rate to several private Brazilian banks enabling them to profit from the "unexpected move". Furthermore, a few days after the devaluation he sold dollars at favorable prices to the same banks. One year later in February

[4] See British Broadcasting Corporation (BBC), May 2, 2001: "Peru probes Fujimori gold claims" and The Finanial Times, May 4, 2001: "Peru to investigate missing Gold".

2000 Lopes was charged for fraud and maintaining a foreign bank account that he neither declared to the tax office nor to the central bank.[5] Legal proceedings are still pending. Again, the potentially corrupt behavior could increase the money supply. Prior to the devaluation, the banks could buy US dollars from the central bank at the fixed exchange rate. After the devaluation they could change their US dollars back into Real at the new, higher exchange rate. It appears plausible that the private bank's desired level of US dollars is unaffected by the devaluation. Therefore, they will tend to sell back all the US dollars. With this transaction further Real is been pumped into the economy.

Central banks can also be "too well connected" to the national banking community. In case of a banking crisis the central bank would be excessively induced to act as a lender of last resort for the whole banking community or willing to bail out a single suffering bank – again resulting in an increasing money supply. Stiglitz [2002], for example, criticizes the IMF (which carries out functions comparable to that of a central bank) for such policies and the fact that its first deputy managing director moved from his senior public sector job to the vice-chairmanship of one of America's largest financial institutions. This criticism does not directly involve the claim of corruption, but it equally entails a conflict of interest and thus suits our analysis. Another case comes from Indonesia, where the central bank was not only "too well" connected to the banking community, suffering from the 1997 financial crisis. The central bank funds were even embezzled by directors of these banks. Parts of the central bank's liquidity credits had been misused for lending to affiliated businesses. Two directors of private banks who are accused of misusing loans fled to Singapore.[6] Our working assumption is therefore that a corrupt income for central bankers or their political superiors goes along with an increasing money supply. Corrupt central bankers are assumed to take a share of the central bank's income from seignorage, inducing them to become interested in increasing seignorage. Honest central bankers who are dependent on corrupt politicians must increase seignorage so as to retain stability. In both cases an increasing money supply is a likely consequence.

There do exist also cases where central bankers profit from decreasing the money supply. For example, they might sell inside information on market operations that reduce the monetary stock. However, an increasing money supply is a better base for making a corrupt income. If the superiors consider all incomes by the central bank to be their personal property they have a direct interest in maximizing seignorage. If those lower in the hierarchy carry out

[5] See British Broadcasting Corporation (BBC), February 2, 1999: "Brazil replaces Central Bank Governor for the 2nd time in a month", April 14, 1999): "Brazilian Senate launches investigation against Central Bank", April 26, 1999: "Ex-bank chief arrested," February 30, 2000: "Brazilian banker charged with fraud," and January 20, 2001: "Brazilian central banker charged."

[6] See Agence France Press (*AFP),* Nov. 14, 2002: "Ex-top Jakarta bankers jailed for life".

corrupt deals, there are two reasons why this is likely to go along with an increasing seignorage. First, it is easier to increase ones share when the whole cake increases. Second, as advanced by Wintrobe and Breton [1986], bureaucrats can supplement their income by unofficial earnings only by colluding with colleagues, because cheating superiors requires mutual trust and cooperation among the subordinates. This is equally true of corrupt agreements, which are arduous to seal and enforce and which are constantly exposed to denunciation, [Lambsdorff 2002]. Some colleagues might be insiders to a central banker's corrupt activities. They might be inclined to denounce the deal if the activity hurts their own interests. Trust among subordinates requires a tight partnership in a corrupt operation. If a central banker takes side payments from decreasing the money supply, he would lower the potential corrupt income of his colleagues and he would lower his agencies income from seignorage. The risk of denunciation would increase therefore and trusted relationships become difficult to establish. An increasing money supply better serves to assure loyalty among subordinates. Let us assume a simple relation between the bribe received by the central banker (B) and the increasing monetary stock:

$$(1) \qquad B = \kappa \cdot \Delta M \,, \quad 0 \le \kappa \le 1 \,.$$

We interpret the parameter κ as the extent of the central bankers corruptibility. For κ approaching 1 the central banker will pocket the complete seignorage – comparable to simple theft. For κ approaching 0 the central banker tends to reject personal benefits from increasing the money supply. We ignore the possibility of a decreasing money supply, assuming a steady growth rate. The close relationship between B and seignorage suggests that our model is also valid for central bankers who strive to increase their agencies budget or that of the state (instead of their personal income) by optimizing seignorage. The relevance of seignorage for the credibility of central bank's commitments has already been mentioned by Barro and Gordon [1983: 602-3], however, no formal analysis is provided there. We assume that bribe taking among the central bank is a riskless activity, allowing us to neglect any costs due to penalties. In real terms for period t, the corrupt income is:

$$(2) \qquad B^{r}_{t} = \kappa \frac{M_t - M_{t-1}}{p_t} = \kappa m_t \cdot \frac{M_t}{p_t} \;; \quad \text{with } m_t = \frac{M_t - M_{t-1}}{M_t}$$

3. The model

A commitment to public welfare may now easily be in contrast to the self-seeking of central bankers. In order to have a theoretical approach to his decision-making, we introduce the corrupt term into the standard social cost function, [Barro and Gordon 1983, Rogoff 1985, Kydland and Prescott 1977, Persson and Tabellini 1990]:

$$(3) \qquad C = (\pi_t - \hat{\pi})^2 + \lambda\left(Y_t^r - k\bar{Y}^r\right)^2 - \kappa m_t \cdot \frac{M_t}{p_t}.$$

Disutilities arise due to deviations of actual values from the desired inflation $(\hat{\pi})$ and desired income $(k\bar{Y}^r)$. The factor λ denotes society's preference for achieving the desired income. These disutilities, measured in monetary units, are dampened by the corrupt income B_t^r. Walsh [1995] took a similar approach by introducing monetary incentives into the standard cost function. In his approach, direct payments by the government to the central banker are subtracted from the social costs. The parameter κ now also signifies the central banker's preference for corrupt income. An increasing κ would then signal lack of ethics and the central banker's willingness to disregard the desired values for inflation and income.

We complement our approach by assuming the standard natural rate model with rational inflation expectations. The model presented here follows the textbook presentation from Jarchow [1998]. A short-term nominal rigidity allows monetary policy to have short-term real effects on employment and income. With respect to the economies demand side, income depends positively on the real money supply, $\gamma Y_t^r = M_t/p_t$, with γ depicting the inverse of income velocity. Taking the total derivative we obtain $d\gamma Y_t^r = dM_t/p_t - M_t dp_t/p^2{}_t$. Setting initial income Y_t^r equal to one, and inserting $\gamma = M_t/p_t$, this yields $dY_t^r = dM_t/M_t - dp_t/p_t = m_t - \pi_t$. Assuming that the change in the national income dY_t^r can be approximated by the term $(Y_t^r - Y_{t-1}^r)$, we obtain

$$(4) \qquad Y_t^r = Y_{t-1}^r + m_t - \pi_t .^7$$

A rise in the nominal growth rate of the quantity of money m_t, and a lower inflation rate π_t raise the present level of income Y_t^r, as determined by the demand side. At the core of the macroeconomic supply side is the labor market behavior of the private agents and firms. This is described by the expectations-augmented Phillips-curve, where a constant inverse ratio between unemployment and GDP is assumed:

$$(5) \qquad \pi_t = \pi_t^* + \theta \cdot \left(Y_t^r - \bar{Y}^r\right).$$

Inflation depends positively on expected inflation and excess income, the level by which income exceeds its natural level ($\bar{Y}^r$). Assuming the desired level of inflation to be zero ($\hat{\pi}$=0) and inserting (5) into (3), we obtain

[7] This function is commonly derived from a logarithmic relationship between income and the real money supply. The linear relationship employed here is more straightforward and facilitates the subsequent analysis of a corrupt incentive within the central bank.

$$(6) \qquad C = \pi_t^2 + \lambda\left(\frac{\pi_t - \pi_t^*}{\theta} - (k-1)\bar{Y}^r\right)^2 - \kappa m_t \cdot \frac{M_t}{p_t}.$$

The last term in (6) should be expressed in units of π_t and Y_t^r. The model started initially from its natural output level, which was set equal to one. Thus we have $Y_{t-1}^r = \bar{Y}^r = 1$. Inserting into (5), we obtain get $Y_t^r - Y_{t-1}^r = (\pi_t - \pi_t^*)/\theta$. Inserting this into (4) we obtain $m_t = \pi_t + Y_t^r - Y_{t-1}^r = \pi_t + (\pi_t - \pi_t^*)/\theta$. Using $M_t/P_t = \gamma Y^r{}_t$ and equally using (5), we obtain $M_t/P_t = \gamma(\pi_t - \pi_t^*)/\theta + \gamma$. Suppressing the time subscript from now on and inserting our findings into (6), we obtain:

$$(7) \qquad C = \pi^2 + \lambda\left(\frac{\pi - \pi^*}{\theta} - (k-1)\right)^2 - \gamma\kappa\left(\pi + \frac{\pi - \pi^*}{\theta}\right)\cdot\left(\frac{\pi - \pi^*}{\theta} + 1\right).$$

The central bank controls π via varying the nominal growth rate of the quantity of money, m. As is standard in the literature, we can determine an optimal central bank policy by assuming that π is determined directly. Assuming π^* to be given, we take the first derivative of (7):

$$(8) \qquad \frac{dC}{d\pi} = 2\pi + \frac{2\lambda}{\theta}\left(\frac{\pi - \pi^*}{\theta} - (k-1)\right) - \gamma\kappa\left[\left(1 + \frac{1}{\theta}\right)\cdot\left(\frac{\pi - \pi^*}{\theta} + 1\right) + \left(\pi + \frac{\pi - \pi^*}{\theta}\right)\frac{1}{\theta}\right]$$

Minimizing costs requires $dC/d\pi = 0$. From this we can derive the central banker's reaction function, dependent on the private agents expected inflation π^*:

$$\pi\left[2 + \frac{2\lambda}{\theta^2} - \frac{\gamma\kappa}{\theta}\left(1 + \frac{1}{\theta}\right) - \frac{\gamma\kappa}{\theta} - \frac{\gamma\kappa}{\theta^2}\right] + \pi^*\left[-\frac{2\lambda}{\theta^2} + \frac{\gamma\kappa}{\theta}\left(1 + \frac{1}{\theta}\right) + \frac{\gamma\kappa}{\theta^2}\right] - \frac{2\lambda}{\theta}(k-1) - \gamma\kappa\left(1 + \frac{1}{\theta}\right) = 0$$

$$(9) \qquad \Leftrightarrow \pi_t = \pi_t^* \frac{2\lambda - \gamma\kappa(2+\theta)}{2\theta^2 + 2\lambda - 2\gamma\kappa(1+\theta)} + \frac{2\theta\lambda(k-1) + \gamma\kappa\theta(1+\theta)}{2\theta^2 + 2\lambda - 2\gamma\kappa(1+\theta)}.$$

Assuming that the central bank is determined to follow an anti-inflationary policy, the growth rate of the quantity of money *m* is equal to zero and there is no seignorage income. The central banker has no news that he could possibly sell to private individuals, nor is there a share of the seignorage to be seized. Let us assume for a moment that private parties trust the central bank's announcements of zero inflation $(\pi^* = 0)$. Our central bank then has an incentive to deviate from this initial announcement by setting π_T (the trick-solution) equal to the last term of equation (9). This last term clearly increases in κ because its numerator increases

and the denominator decreases in κ. Therefore, π_T strictly increases with a higher tendency to achieve a corrupt income. This suggests that the public will increasingly distrust announcements of zero inflation when it observes corruption among the central bank.

The discretionary policy equilibrium requires rational expectations among the public, that is, $\pi^* = \pi$. We denote the resulting level of inflation by π_D. Inserting $\pi^* = \pi$ into (9), we obtain:

$$(10) \qquad \pi_D = \frac{2\lambda(k-1) + \gamma\kappa(1+\theta)}{2\theta - \gamma\kappa}.$$

We now require that the central banker's corruptibility remains below a certain level, $\kappa < \text{Min}(2\theta/\gamma, (\theta^2+\lambda)/(\gamma+\gamma\theta), 1)$. The first term ensures finite (and non-negative) values for π_D. The second term ensures (finite and non-negative) values in equation (9). Above that, it ensures that the second derivative ($dC^2/d^2\pi = 2 + 2\lambda/\theta^2 - 2\gamma\kappa(1+1/\theta)\cdot 1/\theta$) is strictly positive, implying that our equilibrium inflation rate minimizes the cost function. If this condition is violated we obtain excessive levels of corruption that bring about hyperinflation with no stable equilibrium. A large weight given to self-seeking and little weight assigned to policy goals can bring about instability. The central bank employees realize that in this situation they can improve their lot by simply generating more seignorage revenue. It is a distinctive assumption of our model that seignorage can always be increased by raising inflation. This is due to our assumption of a natural rate of income, which fixes the long-term money supply. Put differently, excessive levels of corruption bring about hyperinflation where incentives to further increase inflation survive irrespective of outstandingly high levels of inflation. As long as κ remains within the given range the economy is in a stationary equilibrium where the cost function is minimized.

In the absence of corrupt incentives, ($\kappa = 0$), equation (9) resembles the standard solution for the inflation rate in a discretionary policy equilibrium for an unbound and non-corrupt central bank. Our equilibrium inflation rate (π_D) strictly increases in κ because the numerator increases and the denominator decreases in κ. A stronger preference for corrupt income induces the central banker to further inflate the quantity of money and to realize an increased equilibrium inflation rate. This increased level of inflation induces higher social costs (observe that the public does not profit from the central bankers corrupt income and it would not add this term to equation (3), the social cost function). We have thus discovered an alternative explanation for the existence of an inflation bias: Such a bias arises not only when the public distrusts the central bank's commitments but also when it is skeptical about its benevolence. Even when desired levels of income do not depart from their natural level ($k = 1$), there exist reasons to distrust the central bank's announcements.

4. The Role of Distrust

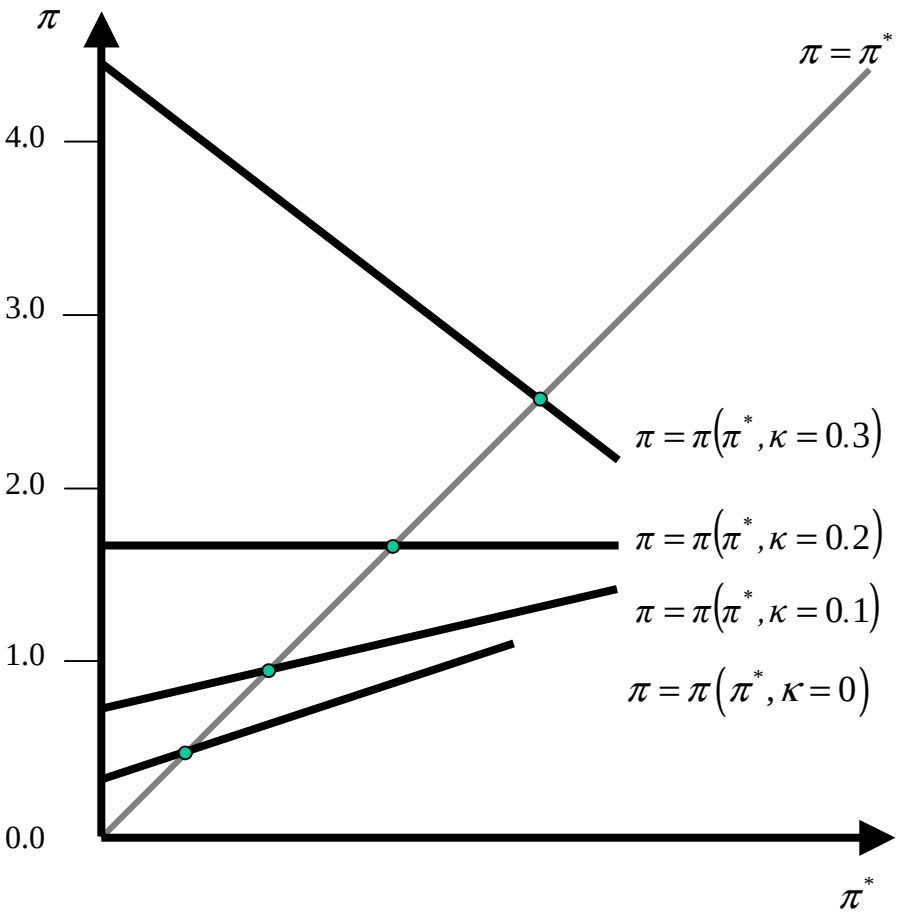
Having determined the equilibrium, what remains to be identified is how corrupt central bankers react to the distrust they are confronted with under circumstances of rational expectations. Distrusting central banks' commitments is commonly deplored. It disallows central banks to achieve a socially optimal trick solution and forces it to capitulate and play along with the inflation bias it faces. Whether this condition still holds for corrupt central banks can be derived from equation (9) for varying degrees of π^*. The impact of π^* depends on the first term of equation (9). We had restricted κ to moderate values, forcing the denominator to be strictly positive. Thus, the value of the nominator, $2\lambda - \gamma\kappa(2+\theta)$, is crucial to this impact. We know from standard models without corruption that the impact of π^* on π is strictly positive. With $\kappa > 0$, this is no longer warranted. In order to find out whether also a negative slope can arise, we must find values for κ that satisfy the following condition: $2\lambda/(2\gamma+\gamma\theta) < \kappa < \text{Min}(2\theta/\gamma, (\theta^2+\lambda)/(\gamma+\gamma\theta), 1)$. Such values for κ can exist only if $2\lambda(1+\theta) < \theta^2(2+\theta) + \lambda(2+\theta) \Leftrightarrow \lambda < \theta(2+\theta)$. Observe that the same condition results by comparison with the first term of the minimum function. We can conclude that a negative slope can arise if λ is sufficiently small, that is, if the central banker is conservative. With the reaction function being negatively sloped the private agents have leverage on actions of the central banker. They can sanction a conservative and corrupt central banker. Their distrust towards the central bank, manifesting itself in expectations of high inflation, forces the central banker to reduce the growth rate of the quantity of money *m* and, therefore, the realized rate of inflation. Such a result cannot be obtained for a populist central banker who has little interest in low inflation. We provide a graphical analysis in Figure 1, depicting a $\pi^*/\pi-$diagram for a conservative and a populist central banker each. A stationary equilibrium in the $\pi^*/\pi-$diagram is always on the diagonal, where private expectations are fulfilled. Alternative lines are added that depict the central banker's reaction function according to (9). The trick equilibria are given by the intersection of the reaction function with the $\pi-$axis, where the expected inflation rate π^* equals zero. The discretionary policy equilibrium is at the intersection of the reaction function with the $\pi=\pi^*-$line. In case I we set $\theta=2$, $\lambda=2$ and $\gamma=5$. The central banker is therefore more conservative and $\lambda<\theta(2+\theta)$ holds. In case II we assume a more populist central banker ($\theta=2$, $\lambda=10$ and $\gamma=5$) and obtain $\lambda>\theta(2+\theta)$. In both cases different values of κ are tested. We consider an incorruptible central banker $(\kappa=0)$, a moderately corrupt central banker $(\kappa=0.1)$ and a highly corrupt central banker $(\kappa=0.3)$. The case of a reaction function parallel to the π^*-axis $(\kappa=0.2)$ is also shown. With an increasing κ the reaction functions move upward. While for a conservative central banker the slope becomes negative at some point, this is not obtained for the populist central banker, where the curves are (almost) parallel.

Why may expectations of increased inflation induce a conservative central banker to lower the inflation rate? This effect can be traced to the corrupt income in equation (3), $\kappa \mathrm{m} \cdot \mathrm{M}/\mathrm{p}$. According to (5), $\pi = \pi^* + \theta \cdot \left(\mathrm{Y}^{\mathrm{r}} - \bar{\mathrm{Y}}^{\mathrm{r}} \right)$, given a certain level of realized inflation (π), expectations of high inflation (π^*) lower income (Y^{r}). This is due to a diminished labor supply that results from expectations of a falling real wage. The reduced income (Y^{r}) has two effects on the corrupt income. First, given a constant (inverse of the) income velocity γ, a lower income reduces the real money supply, $\gamma \mathrm{Y}^{\mathrm{r}} = \mathrm{M}/\mathrm{p}$. The real money supply is the base on which the central bank is generating its seignorage revenue. With a lower money supply there is less to be corruptly gained from proportionately inflating it. The second effect works through the growth rate of money (m_t) itself. According to (4), $\mathrm{Y}^{\mathrm{r}} = \mathrm{Y}^{\mathrm{r}}_{-1} + \mathrm{m} - \pi$, a reduced income (given a certain level of inflation) induces lower growth of the money supply and thus limits the central banker's capacity to obtain corrupt income. These two effects contain the central banker's desire to increase inflation because there is little corrupt income to obtain from doing so. The central banker will be more devoted to public goals. With these public goals becoming more dominant, a conservative banker will behave differently than a populist one. Facing expectations of high inflation, the central banker will be the more inclined to fight inflation the more conservative he is. Expectations of high inflation among the public operate like a sanction, containing the conservative central banker's zeal to obtain corrupt income.

Figure 1

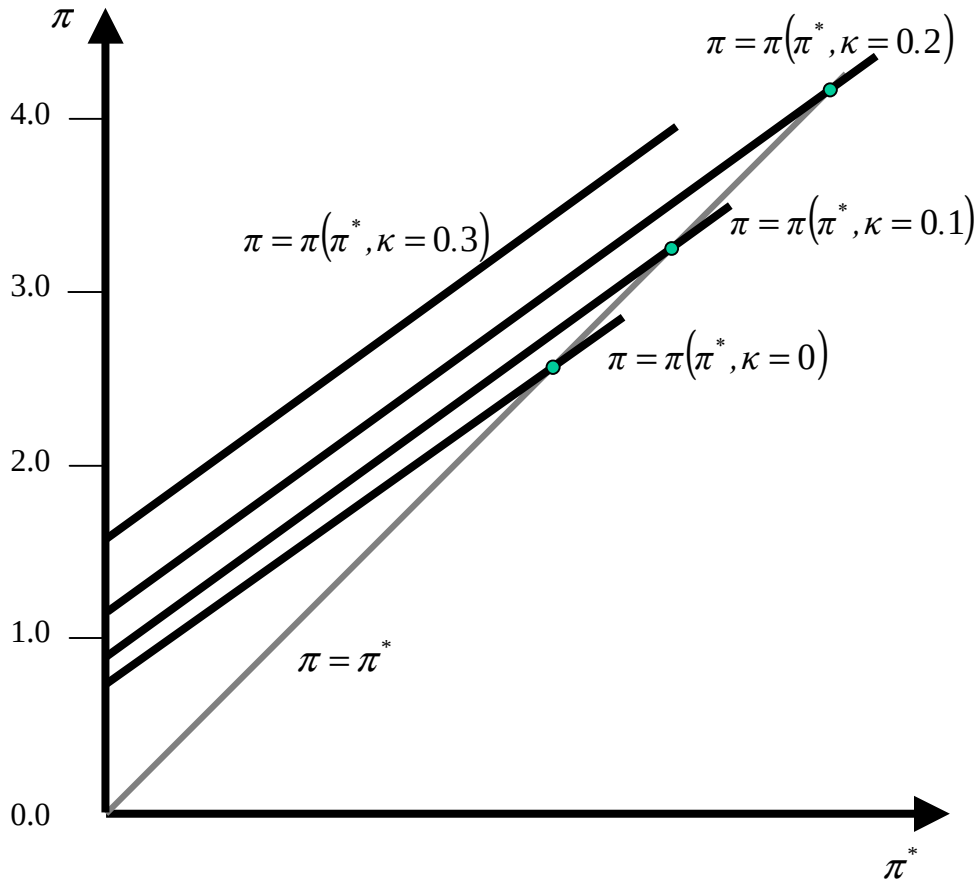
Case I: **The Conservative Central Banker**

$\lambda=2<\theta(2+\theta)$, $\theta=2$, $\gamma=5$, $k=1.5$



Case II: **The Populist Central Banker**

$\lambda=10>\theta(2+\theta)$, $\theta=2$, $\gamma=5$, $k=1.5$



5. Extensions and Policy Recommendations

An inflation bias may not only arise when the public distrusts the central bank's commitments but also its benevolence. We showed that corruption among central banks induces distorted policies, leading to increased inflation. The credibility of anti-inflationary announcements is undermined by corruption among central bankers. Corruption induces distrust concerning central banks' announcements. Even when rejecting the standard assumptions, as is done by Blinder [1997: 13], that the desired level of income is above its natural rate and that central bankers are tempted by short-term employment gains, there can exist an inflation bias.

A trusted central bank is commonly assumed to be a prerequisite to successful monetary policy. Trust in the central bank is regarded to be an important pillar of social capital. But we showed that the adverse effect of corruption does not primarily result from lacking trust among the public but from the policy distortions induced by a corrupt central banker. Distrust among the public, measured by a high level of expected inflation, can have positive effects. If the central banker is sufficiently conservative, expectations of high inflation force him to lower realized inflation levels. To put it in simple terms, trusting the wrong people is not necessarily welfare improving.

An apparent extension to our model relates to money demand. Within the confines of a natural rate model we employed the standard assumption of a constant income velocity. But models of seignorage commonly take for granted that the real money demand decreases with inflation, see e.g. Mulligan and Sala-i-Martin [1997]. We can adjust the model by letting money demand be a decreasing function of expected inflation, that is, we assume $\mathrm{d}\gamma/\mathrm{d}\pi^* < 0$. This relationship can be defended by assuming that currency substitution must be planned well in advance, requiring mutual expectations among the public that others will accept a foreign currency. Private agents therefore choose the relevant currency first and base their decision on expected inflation. At a later stage they adjust money demand so as to keep it proportional to nominal GDP. Once γ is fixed, the central bank can surprise the public with a higher inflation. Since the private sector bases its expectations of inflation on the structural parameters of the model, this modification leaves equations (7) to (10) unaffected. But equation (10) is now more difficult to interpret: γ decreases with the level of expected inflation, which is equal to its equilibrium value. Higher levels of inflation become less likely, because they imply a lower γ, which reduces π_{D}. According to (9), the impact of an increase in π^* on π becomes complex. An increasing π^* lowers γ, which increases the denominator of the first term by more than the nominator. With regard to the first term it becomes more likely that π decreases with π^*. However, the second term in equation (9) increases with a decreasing γ. Our argument (i.e. that expectations of high inflation, can have positive effects) remains valid once π^* is sufficiently large, because in this case the first term dominates the

second term. Numerical simulations comparable to those in figure 1 for different values of $d\gamma/d\pi^*$ largely reproduce our previous results. Our conclusion, i.e. that distrust can lower inflation, therefore survives the modification.

One implication of our results relates to central bank independence. Economists tend to trust central banks, at least more than elected governments. Due to this, central bank independence is often assumed to be a helpful instrument in fighting inflation. Even those who are critical with regard to the effectiveness of independence relate this more to the failure of achieving factual independence rather than its intrinsic problems. Keefer and Stasavage [2002], for example, argue that independence fails to bring about favorable effects where governments can terminate independence at will. But providing central banks with a high level of independence will fail if this not only insulates central bankers from troublesome (and maybe also corrupt) political interference but also employs them with the leeway necessary to carry out corrupt transactions. Some checks and balances on central bank behavior could therefore be helpful in containing corruption and in lowering the inflation bias.

The secrecy that often surrounds central bank operations equally deserves scrutiny. Particularly if this secrecy goes along with the potential to strike illegal deals it induces the public to disbelieve the benevolence of the central bank and to revise its expectations of inflation upward. Concise codes of conduct and substantial legal sanctions are required to make central bankers aware of the risks that malfeasance among their staff can impose on their policy goals. This requires a recognition of vulnerable areas and activities and an identification of conflicts of interest.

References

Al-Marhubi, F. A. (2000), "Corruption and Inflation", *Economics Letters,* LXVI (2), 199-202.

Barro, R.J. and D. B. Gordon (1983), "A Positive Theory of Monetary Policy in a Natural Rate Model", *The Journal of Political Economy,* Vol. 91 (4): 589-610.

Blinder, A.S. (1997), "What Central Bankers Could Learn from Academics – and Vice Versa", *The Journal of Economic Perspectives*, Vol. 11 (2): 3-19.

Blumenthal, E. (1982), "Zaire: Rapport sur sa crédibilité financière internationale", *La Revue Nouvelle, Mensuel sociopolitique et culturel*, Brussels, Belgium, Vol. 77 (11): 360-78.

Braun, M., and R. Di Tella (2000). "Inflation and Corruption", *Harvard Business School, Division of Research, Working Paper* No. 00-053.

Mulligan, C.B. and X.X. Sala-i-Martin (1997), "The Optimum Quantity of Money: Theory and Evidence", *Journal of Money, Credit and Banking,* Vol. 39: 687-715.

Greenspan, A. (2002), "Transparency in Monetary Policy", *Federal Reserve Bank of St. Louis Review*, Vol. 84 (4): 5-6.

Hellman, J., G. Jones, D. Kaufmann, and M. Schankerman (2000), "Measuring Governance, Corruption, and State Capture. How Firms and Bureaucrats Shape the Business Environment in Transition Economies." *World Bank Policy Research Working Paper*, No. 2312.

International Monetary Fund (2000), "Supporting Document to the Code of Good Practices on Transparency in Monetary and Financial Policies. Part 2—Good Transparency Practices for Monetary Policy by Central Banks", Washington D.C.: http://www.imf.org/external/np/mae/mft/sup/part2.htm

Jarchow, H.-J. (1998), *Theorie und Politik des Geldes 1*. 10. ed., Göttingen, Germany: Vandenhoeck & Ruprecht.

Keefer, P. and D. Stasavage (2002), "Bureaucratic Delegation and Political Institutions:When are Independent Central Banks Irrelevant?" *World Bank Policy Research Paper* No. 2356.

Klitgaard, R. (1988), *Controlling Corruption,* Berkeley: University of California Press.

Kydland, F.E. and E.C. Prescott (1977), "Rules Rather than Discretion: The Inconsistency of Optimal Plans", *The Journal of Political Economy*, Vol. 85 (3): 473-492.

Lambsdorff, J. Graf (2002), "Making Corrupt Deals – Contracting in the Shadow of the Law", *Journal of Economic Behavior and Organization,* Vol. 48 (3): 221-241.

Persson, T. and G. Tabellini (1990), *Macroeconomic Policy, Credibility and Politics*, Chur: Harwood Academic Publishers.

Rogoff, K. (1985), "The Optimal Degree of Commitment to an Intermediate Monetary Target", *Quarterly Journal of Economics*, Vol. 100 (4): 1169-1189.

Stiglitz, J. (2002), "Corporate corruption", Comment in *The Guardian,* July 4.

Walsh, Carl E: (1995): "Optimal Contracts for Central Bankers", *The American Economic Review*, Vol. 85 (1): 150-167.

Wintrobe, R. and A. Breton, (1986), "Organizational Structure and Productivity", *The American Economic Review*, Vol. 76 (3): 530-538.

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