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Transparency in monetary policy: A general equilibrium approach

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ABSTRACT

We study a general equilibrium model with a central bank (CB) and two groups of agents, producers and workers. The CB maximizes a weighted average of utilities of the two groups. The CB has two possible types, one favoring workers and the other favoring producers. The CB's type is private information. We compare two possible monetary policy regimes, transparent and opaque. For realistic values of parameters, it is shown that workers are better off under the opaque regime, whereas producers are better off under the transparent regime. This result is shown to hold in two cases, when the range of possible monetary transfers is small and when the range of possible monetary transfers is large.

1. Introduction

Just some 15 years ago secrecy surrounding central banks was pervasive.[1] However, several central banks have recently taken steps towards more transparent policies.[2] While the literature on this issue is large, there is no consensus about welfare implications of central bank transparency. The standard approach treats the population as homogenous and thus yields unambiguous conclusions. This paper, on the other hand, addresses the issue of transparency of monetary policy by building a general equilibrium model with heterogeneous agents, and argues that transparency affects the two groups differently.

Let us mention some previous results and highlight the contribution of this paper. An important paper by Cukierman and Meltzer (1986) develops a model in which a central bank maximizes an objective function that is positively related to economic stimulation through monetary surprises and negatively related to monetary growth. The central bank's preference trade-off between these targets changes stochastically over time and is private information. The public observes past monetary growth rates and, based on this, forecasts future monetary growth. They show that when policymaker is free to choose the accuracy of monetary control, she does not choose the most effective available control. It allows her to surprise the public. Faust and Svensson (2001) extend this model and argue that increased transparency is socially beneficial, but complete transparency leads to the worst of all outcomes.

Recent contributions to this literature include Jensen (2002) and Eijffinger and Geraats (2006). The former studies a simple model with forward-looking behavior and points to the trade-off between credibility and flexibility in the optimal degree of transparency. The latter proposes an index of monetary policy transparency that incorporates five different aspects of central banking. Geraats (2002) has a comprehensive review of the literature on central bank transparency. Our work is somewhat related to Gruner's (2002) where the author finds a beneficial effect of uncertainty about the central bank's preferences on inflation and output.

The literature on central bank transparency assumes that the central bank maximizes an ad hoc objective function, which is usually a quadratic function of inflation and output. (Often the central bank's problem is stated as minimization of a similar loss function.) This objective function sometimes coincides with the social welfare function (e.g., see Cukierman, 2001; Gersbach, 2003), but often might differ from it (e.g., see Eijffinger et al., 2000; Hughes Hallett and Viegi, 2003; Walsh, 2007). The former case is related to what Geraats (2002) calls economic transparency (there is asymmetric information with respect to economic data or forecasts), whereas the latter case has to do with what she calls political transparency (there is asymmetric information with respect to the central bank preferences). Even when the central bank's objective differs from that of the society, there is a close link between the two, and the societal welfare function is also assumed to be a quadratic function. A theoretical justification for working with quadratic function of inflation and output is given in Woodford (2003). He uses a second-order Taylor series approximation to the representative household's utility function in the rational

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[1] See Goodfriend (1986) for a general discussion. He first considered the US Federal Reserve's arguments for secrecy, and showed informally invalidity of all of them.

[2] See, e.g., Geraats (2002).

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expectations equilibrium under a given policy and shows that under certain conditions this approximation yields the conventional quadratic function of inflation and output (see Chapter 6).

Woodford himself is cautious about the scope of validity of this approximation. A recent work by Kim and Kim (2003) provides a qualification to this approximation. In addition, some changes in policy may substantially alter this approximation. Finally, it is not clear how and whether this approximation works in an environment with heterogeneous agents. Woodford (2003) points out that there is an important advantage in using a model with explicitly modelled utility maximizing agents: the preferences of households provide a natural welfare criterion. Geraats (2002) argues in the concluding remarks that a fruitful extension of the transparency literature would be micro-founded models since they provide a theoretically consistent welfare measure. The present paper can be considered as a step in this direction. We build a model with explicitly modeled private sector consisting of two groups of agents and a central bank whose preferences are closely related to those of the private agents. Using the egalitarian approach, the social welfare function is a weighted average of utilities of the two groups, where the weights are shares of the groups in the population. The central bank's objective function is also a weighted average of the utilities of these two groups, but, depending on the type, a larger weight is given to one group or the other. The central bank preferences are private information which gives rise to the issue of transparency.

As has been previously pointed out, an important aspect of central bank transparency is political transparency, which is about the preferences of the monetary authority. It is somewhat difficult to justify the assumption that the preferences of the central bank are unknown to the private sector in a model with a representative agent: why would the central banker's preferences be different from those of the homogeneous population? However, in an environment with a heterogeneous population such a difference in preferences can be explained. In the current paper, asymmetric information regarding the central bank preferences arises because of heterogeneity among private agents. The central bank may favour one group more than this group's share in the population warrants.

Conducting monetary policy in the presence of heterogeneous agents seems to be quite different from doing so in the representative agent framework. For example, the Friedman rule of setting the nominal interest rate at zero has been proven to be optimal in a variety of environments with a representative agent. Wallace (1984) has demonstrated that when there is heterogeneity among private agents, the Friedman rule does not have to be optimal, and it is impossible for the monetary authority to find one policy that benefits everyone. Let us comment on the related literature on the redistributive role of monetary policy, which arises only in an environment with heterogeneous population. Erosa and Ventura (2002) provide some evidence for redistributive effects of monetary policy. Bhattacharya et al. (2005) demonstrate in a model with heterogeneous agents that the redistributive effect of monetary policy that deviates from the (non-optimal) Friedman rule may dominate the standard rate-of-return effect. Ireland (2005) argues that there is a need for more careful treatment of optimal monetary and fiscal policies in models with heterogeneous agents and when the government has a redistributional agenda. Shi (1999) and Palivos (2005) theoretically investigate the redistributive role of monetary policy using a turnpike and overlapping generations models respectively. Albanesi (2007) develops a model of distributional effects of inflation in a model with heterogeneous population. In some way, the current paper links this literature to the literature on central bank transparency.

In our model the central bank has two types, each favouring its 'own' group within the population. Similar to Cukierman and Meltzer (1986) we assume the public to be uninformed about the central bank preferences. We make a welfare comparison between two possible regimes. In the transparent regime, the CB announces its future monetary policy. We assume that there exists a commitment mechanism so that the CB will stick to the announced policy. In the opaque regime, the CB does not reveal its policy. We establish that employment is higher in the opaque regime. For realistic values of parameters, it is shown that workers are better off under the opaque regime, whereas producers are better off under the transparent regime. This result is shown to hold in two cases, when the range of possible monetary transfers is small and when the range of possible monetary transfers is large.

The paper is organized as follows. Section 2 gives a brief description of the model. Section 3 describes equilibrium, and Section 4 makes welfare comparison between the two regimes. Section 5 concludes.

2. Model

The model has two large groups of agents. There is a continuum of *workers* of measure $\alpha \in (0,1)$. Each of them is endowed with one unit of time that could be split between labour and leisure. There is a continuum of *producers* of measure $1-\alpha$. Each producer owns a firm. There is also a *central bank* (CB) that transfers money to workers and producers, the same amount to everybody.

The utility functions of workers and producers are as follows:

$$u^w(c, 1-n, m/p) = \ln c + \psi \ln(1-n) + \phi \ln(m/p),$$
$$u^p(c, m/p) = \ln c + \phi \ln(m/p),$$

where c,n,m and p denote consumption, labour, money at the end of the period, and the price of consumption good, respectively.

The CB maximizes a weighted average of the utilities of workers and producers, $\beta u^w + (1-\beta)u^p$, by choosing a monetary transfer M from a closed interval $[1,\overline{M}]$. The weight β is a random variable that can take on two values, β_1 and β_2, with probabilities ρ_1 and $\rho_2 = 1-\rho_1$ respectively. We assume that $0<\beta_2<\beta_1<1$.

There is measure $1-\alpha$ of firms each owned by one producer. A firm hires labour and produces consumption good using a strictly concave production function

$$H(N) = N^\theta, \quad N \geq 0; \quad 0<\theta<1.$$

The timing of events is as follows:

- the value of β is realized and it is the CB's private information;
- in the transparent regime, the CB truthfully announces its monetary transfer M; in the opaque regime, the CB makes no announcement;
- the labour allocation and wage are determined; in symmetric equilibrium every worker supplies labour n and receives wage w;
- having observed w and n, the CB makes a monetary transfer M;
- in symmetric equilibrium, each worker consumes c^w, each producer consumes c^p, and they pay price p; firms receive profits π; at the end of the period, each worker has m^w/p and each producer has m^p/p of real money balances.

3. Equilibrium

Let M_1 and M_2 denote the equilibrium monetary transfers for types β_1 and β_2 respectively under the opaque regime. Under the transparent regime, $M_1 = M_2$. We now characterize equilibrium assuming that M_i are already found. We will find M_i later. Let

$$\tilde{M} = \rho_1 M_1 + \rho_2 M_2, \quad \text{where } \rho_2 = 1-\rho_1.$$

Let $B_i = \beta_i(1+\phi) - \alpha\phi$, $i = 1,2$. We will need the following technical conditions:

$$B_2 < \theta < B_1,$$

$$\overline{M} B_2/\theta \leq \rho_1 + \rho_2 \overline{M} \leq B_1/\theta. \quad (1)$$