optimal fiscal and monetary policy without commitment

> 'Optimal fiscal and monetary policy' is a policy of choosing taxes and transfers or monetary instruments to maximize social welfare. 'Absence of commitment' refers to inability of a policymaker to make binding policy choices.

Optimal fiscal policy without commitment

Most of the results of optimal taxation literature in Ramsey framework are derived under the assumption of commitment. *Commitment* is usually defined as ability of a government to bind future policy choices. This assumption is restrictive. A government, even a benevolent one, may choose to change its policies from those promised at an earlier date. The first formalization of the notion of time inconsistency is due to Kydland and Prescott (1977), who showed how timing of government policy may change economic outcomes. Furthermore, the equilibrium without commitment can lead to lower welfare for society than when a government can bind its future choices.

An example that clarifies the notion of time inconsistency in fiscal policy is taxation of capital. A classical result due to Chamley (1986) and Judd (1985) states that capital should be taxed at zero in the long run. One of the main assumptions underlying this result is that a government can commit to a sequence of capital taxes. However, a benevolent government will choose to deviate from the prescribed sequence of taxes. The reason is that, once capital is accumulated, it is sunk, and taxing capital is no longer distortionary. A benevolent government would choose high capital taxes once capital is accumulated.

The reasoning above leads to the necessity of the analysis of time inconsistent policy as a game between a policymaker (government) and a continuum of economic agents (consumers). A formalization of such a game and an equilibrium concept is due to Chari and Kehoe (1990). They formulate a general equilibrium infinite-horizon model in which private agents are competitive, and the government maximizes the welfare of the agents. They define an equilibrium concept – sustainable equilibrium – which is a sequence of history-contingent policies that satisfy certain optimality criteria for the government and private agents.

Recent developments in solving for the set of sustainable government policies use the techniques of the analysis of repeated games due to Abreu (1986) Abreu, Pearce and Stachetti (1990). Phelan and Stachetti (2001) extend these methods to the analyse equilibria of the Ramsey model of capital taxation. Their contribution is to provide a method in which the behaviour of consumers is summarized as a solution to the competitive equilibrium, thus significantly reducing the dimensionality of the problem. They provide a characterization of the whole set of sustainable equilibria of the game. Their methods are especially relevant for the environments in which the punishment to the deviator is difficult to characterize analytically.

Benhabib and Rusticchini (1997) and Marcet and Marimon (1994) provide an alternative method to solve policy games without commitment. They use the techniques of optimal control in which they explicitly impose additional constraints on the standard optimal tax problem such that a government does not deviate from the prescribed sequence of taxes. Their methods, while easier to use than those of Abreu (1986), Abreu, Pearce and Stachetti (1990) and Phelan and Stachetti (2001), are efficient only if the worst punishment to the deviating government can be easily determined.

Klein, Krusell and Rios-Rull (2004) numerically solve for equilibria where reputational mechanisms are not operative and characterize Markov-perfect equilibria of the dynamic game between successive governments in the context of optimal Ramsey taxation. For a calibrated economy, they find that the government still refrains from taxing at confiscatory rates.

Optimal monetary policy without commitment

The problem of time consistency also arises in monetary economics. Kydland and Prescott (1977) and Barro and Gordon (1983) analyse a reduced form economy with a trade-off between inflation and unemployment. Consider an economy where the growth rate of nominal wages is being set one period in advance. The government can decrease unemployment by having setting the inflation rate higher than the wage rate, thus reducing the real wage; but inflation is socially costly. Suppose that a monetary authority chooses the inflation rate *after* nominal wages were set in the economy to maximize social welfare. Such a rate would equalize the marginal benefits of reducing

unemployment and the marginal costs of increasing inflation. But now consider wage determination in a rational-expectations equilibrium. In anticipation of the government's policy, agents will choose a positive growth rate of wages to avoid losses from inflation. Therefore, in equilibrium the monetary authority is not able to affect unemployment, but there is positive rate of inflation. This outcome is inefficient since by committing not to inflate *ex ante* the monetary authority could achieve the same level of unemployment but with zero inflation. Therefore, the lack of commitment by the monetary authority will lead to *inflationary bias*, or inefficiently high level of inflation.

Similar effects are present in many other monetary models. For example, Calvo (1978) shows time inconsistency of the optimal policy in a general equilibrium model. Chang (1998) considers a version of Calvo's model to find the optimal monetary policy without commitment. Similar to Phelan and Stacchetti (2001), he uses tools of repeated game theory to describe the best equilibrium in the game between the central bank and a large group of agents.

A substantial amount of work has been done in finding the ways to overcome time consistency problems. One of the first practical proposals is Rogoff's (1985) suggestion to appoint a 'conservative' central banker, whose private valuation of the costs of inflation is higher than the social valuation. Such a banker has less temptation to inflate, and the inflationary bias will be reduced.

Pre-specifying the rules of conduct for monetary policy reduces the discretionary actions a central bank can undertake and improves time consistency. For example, the commonly advocated Taylor rule prescribes that the central bank sets nominal interest rates as a linear function of inflation and the output gap with fixed coefficients (see, for example, Woodford, 2003). On the other hand, it may be desirable to leave some discretion to the central bank, particularly if it has access to information about economic conditions which is impossible or impractical to incorporate into predetermined rules. Athey, Atkeson and Kehoe (2005) consider an example of such an economy where the central bank has private information about the state of the economy, which is unavailable to others. They show that the optimal policy in such settings is an *inflationary cap* that allows discretion to the central bank as long as the inflation rate is below a certain bound.

Following Lucas and Stokey's (1983) analysis, substantial work has been done in determining conditions under which the government can eliminate the time consistency problem by optimally choosing debt of various maturities. Lucas and Stokey themselves point out the fundamental difficulty with this approach in monetary economies since, as long as the government holds a positive amount of nominal debt, it is tempted to inflate in order to reduce its real value. Two recent papers describe some of the conditions under which this problem can be overcome. Alvarez, Kehoe and Neumeyer (2004) consider several monetary models and show that if it is optimal to set nominal interest rates at zero (that is, the optimal monetary policy with commitment is to follow the *Friedman rule*), then the time consistency problem can be solved. By issuing a mixture of nominal and real (indexed) bonds in such a way that the present value of the nominal claims is zero, the temptation for inflation can be removed. Persson, Persson and Svensson (2006) consider a model where the Friedman rule is not optimal, but they still are able to characterize the optimal maturity structure of nominal and indexed bonds that achieve the social optimum with commitment even with time-inconsistent government.

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See also Optimal taxation, Optimal Fiscal and Monetary Policy With Commitment, Monetary Fiscal Policy Overview, repeated games

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Index terms

bonds
central bank
commitment
dimensionality
Friedman rule
infinite-horizon models
inflation
inflationary bias
inflationary cap
Markov-perfect equilibria
nominal interest rates
optimal fiscal policy without commitment
optimal monetary policy without commitment
output gap
Ramsey taxation
rational expectations
sustainable equilibrium
taxation of capital
Taylor rule
time consistency of monetary and fiscal policy