



# CER-ETH - Center of Economic Research at ETH Zurich

Economics Working Paper Series

**ETH**

Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

# Forward Guidance for Monetary Policy: Is It Desirable?\*

Hans Gersbach  
CER-ETH  
Center of Economic Research  
at ETH Zurich  
ZUE D7  
8092 Zurich, Switzerland  
hgersbach@ethz.ch

Volker Hahn  
CER-ETH  
Center of Economic Research  
at ETH Zurich  
ZUE D13  
8092 Zurich, Switzerland  
vhahn@ethz.ch

This Version: April 2008

## Abstract

In this paper we assess whether forward guidance for monetary policy regarding the future path of interest rates is desirable. We distinguish between two cases where forward guidance for monetary policy may be helpful. First, forward guidance may reveal private information of the central bank. We argue that vague, non-binding statements may be desirable. Second, forward guidance may be used as a commitment device. In this case, policy forecasts may be desirable in a classic inflation-bias framework but not in a New Keynesian framework.

Keywords: central banks, transparency, commitment, Federal Reserve, policy inclinations, signaling

JEL: E58, D70.

---

\*We would like to thank Alex Cukierman, Stefan Gerlach, Oliver Grimm, Heinz Hermann, Anne Sibert, and participants at the Deutsche Bundesbank/Bank of Finland Conference “Designing Central Banks” in Eltville, 8-9 November 2007, for many valuable comments and suggestions.

# 1 Introduction

There is substantial disagreement among both policy-makers and academics about the merits of forward guidance for monetary policy. Consequently, practice regarding forward guidance varies significantly across central banks and over time. Many central banks divulge nothing about the future actions they are likely to take. As documented by Geraats et al. (2008), the ECB currently uses a traffic-light system with different code words in order to signal its likely decisions in the near future. The Federal Reserve has experimented with different practices. In May 1999 it started publishing a policy bias or policy tilt, but this was discontinued after one year.<sup>1</sup> In 2003 the Fed embarked on a new attempt to issue forward guidance. The central banks of Iceland, New Zealand, Norway, and Sweden are much more explicit and publish numerical values for the future path of interest rates.

In this paper we summarize the arguments for and against the desirability of forward guidance put forward in the literature and assess their validity in the context of various frameworks. We focus on forward guidance through interest-rate projections. Forward guidance can serve two purposes, representing either a commitment device or a means of communication. We point out that there are limits to the communication of private information through forward guidance. If forward guidance represents cheap talk, the precision of the information transmitted by the central bank is limited by credibility problems. If forward guidance is used as a commitment device, a trade-off arises between gains from commitment and losses in flexibility.

The paper is organized as follows: In the next two sections we summarize the main arguments in favor of and against forward guidance. We provide an assessment of these arguments for different scenarios in Section 4. Section 5 concludes.

---

<sup>1</sup>Cf. “The Financial Times”, January 20, 2000, “Fed to No Longer Adopt Policy Bias Toward Rates.” See also Poole (2003).

## 2 Arguments in Favor of Forward Guidance

The main argument in favor of publishing information on future policy interest rates runs as follows:<sup>2</sup> Aggregate spending, e.g. firms' investment spending, is affected by long-term interest rates, which only depend on current policy rates to a negligible extent. However, long-term interest rates are crucially affected by expectations about the future path of policy rates. Thus by publishing forward guidance for its monetary policy the central bank may be more successful in affecting aggregate spending in the desired way.

At a deeper level, the value of the forecasts can be twofold. First, the interest-rate forecasts might reveal information that has not already been disclosed by other means of communication. This information may relate to the central bank's objectives or its assessment of economic shocks and the functioning of the economy. Second, in the face of possible time-inconsistency problems, forecasts might be valuable if they enabled the central bank to affect the public's expectations in a favorable manner. This argument requires the central bank to commit to its policy announcements to some extent. How the central bank can commit to a future course of policy will be taken up in the next section. For the moment we assume that some commitment is possible.

Why might commitment be desirable? Several potential areas have been identified in the literature. First, the classic inflation-bias framework of Kydland and Prescott (1977) and Barro and Gordon (1983) involves the central bank targeting a level of output that exceeds the natural level. As a consequence, the central bank's ex-ante optimal policy is different from its ex-post optimal policy, therefore commitment is desirable. Second, faced with the danger of deflation it may be optimal for a central bank to convince the public that it will adhere to expansionary monetary policy for some time. However, if inflation gains momentum, the central bank has an incentive to renege on its promise and pursue a less expansionary policy than previously announced.<sup>3</sup>

---

<sup>2</sup>See, for example, Rudebusch and Williams (2006) and Woodford (2007). The arguments in favor of and against the publication of forward guidance are neatly reviewed in Geraats et al. (2008). Faust and Leeper (2005) maintain that the most important aspect of central bank transparency is communication about the future path of the policy rate.

<sup>3</sup>See, for example, Krugman (1998).

Third, in the New Keynesian framework presented by Clarida et al. (1999) gains from commitment are also possible. The central bank would benefit from a commitment to vigorous shock stabilization in the future. This cushions the impact of shocks on inflation expectations and thus in turn on current inflation. However, once the public has formed its expectations, the central bank may be reluctant to actually pursue the announced policy. Again there are potential gains from commitment.

### 3 Arguments against Forward Guidance

To put the arguments against forward guidance into perspective, we begin with a discussion of complete contingent commitment. If it were possible to commit to an entire interest-rate path for all future contingencies, the gains from commitment could be reaped without cost. However, this is not a realistic option for a central bank.<sup>4</sup> First, future shocks cannot be described with sufficient precision to announce a shock-dependent interest-rate path.<sup>5</sup> Second, at the time when a contingent interest-rate path is executed, it might be difficult to identify which shock has actually occurred. Third, it may be difficult to agree on a contingent future path for interest rates if monetary policy is conducted by a committee. Fourth, if decision-makers are approaching the end of their term, it is hard to see how they could forecast the future decisions of their successors, especially if they do not know who they will be.

What if the central bank settled for less and provided simple non-contingent policy guidance? Then the first and second objections no longer apply, while the third and fourth remain valid. Moreover, non-contingent forecasts on the central bank's future policy have one additional drawback: central banks may become boxed in and lose some of their flexibility in responding to unforeseen shocks.

Why might deviations from interest-rate projections be costly? First, the central bank needs to explain forecast deviations caused by unforeseen events. Some shocks (for

---

<sup>4</sup>Goodhart (2001) notes that “the idea of trying to choose a complete time path by discretionary choice seems entirely fanciful and counterproductive.” See also Blinder (2004) and Mishkin (2004).

<sup>5</sup>Gabaix (2005) argues that idiosyncratic movements of large firms are central to understanding aggregate fluctuations. This may make it particularly difficult to describe shocks.

example those affecting the natural rate of output) may be very difficult to explain. Then it may be necessary to devote substantial resources to the search for hard-to-find evidence explaining a forecast deviation convincingly. If deviations cannot be made plausible to the public and if forecasts are actually valuable for the conduct of monetary policy in the future, then current forecast deviations may involve future costs because the forecasts will be deemed irrelevant by economic agents. Second, frequent forecast deviations may impair the central bank's prestige. They may induce skepticism about the central bank's competence and may also endanger the re-appointment of monetary-policy committee members.

However, it is important to note that the costs of forecast deviations, while reducing the central bank's flexibility in responding to unforeseen developments, also enable the central bank to pre-commit to a future policy course. If the optimal policy is not time-consistent, this is desirable. Accordingly, forward guidance for monetary policy involves a trade-off between gains from commitment and losses in flexibility.

## 4 Assessment

In this section we compare the costs and benefits of forward guidance on policy interest rates for the scenarios where forward guidance is potentially desirable.

### 4.1 Commitment in an Inflation-Bias Framework

In the framework set out in Kydland and Prescott (1977) the central bank targets an output level that is higher than the level sustainable in the long run. As the central bank cannot commit credibly to a low inflation rate, inflation is inefficiently high. Several ways of alleviating this problem have been proposed in the literature, including delegation of monetary policy to a conservative central banker (see Rogoff (1985)) and reputation-building (see Barro and Gordon (1983)). Forward guidance represents another option for avoiding an inflation bias.

In the Appendix we consider an inflation-bias framework in which a central bank announces future values of the monetary policy instrument. The central bank's forecast

on its future policy serves as a future intermediate target and thus alleviates the central bank's credibility problem.<sup>6</sup> We show that for sufficiently small costs from forecast deviations and thus a low degree of commitment, the gains from commitment make forward guidance desirable. If however these costs are very large, the central bank cannot respond optimally to shocks, so forward guidance is detrimental.

## 4.2 Commitment in a New Keynesian Model

Gersbach and Hahn (2008) examine the trade-off between gains from commitment and losses in flexibility that may be caused by forward guidance in a dynamic New Keynesian framework. They consider four scenarios. First, the central bank publishes a projection about the interest rate in the next period (short-term interest-rate forecast). Second, the central bank announces its interest-rate projection for the next period but one (medium-term interest-rate forecast). Third, the central bank publishes a forecast of inflation in the next period (short-term inflation forecast). The fourth scenario centers on inflation projections for the next period but one (medium-term inflation forecast).

Gersbach and Hahn (2008) show that short-term projections are always harmful. As forecasts concerning the next period do not affect current expectations about inflation in that period, no gains from commitment arise. But in the subsequent period the central bank is boxed in by its announcement and is less willing to respond to shocks in a socially optimal manner.

Medium-term interest-rate and inflation forecasts are potentially more favorable, as the forecasting horizon is extensive enough for inflation expectations to adjust. Gersbach and Hahn (2008) show that gains from commitment never outweigh losses in flexibility where interest-rate forecasts are concerned. By contrast, medium-term inflation forecasts are desirable if the degree of commitment to these announcements is not too high.

---

<sup>6</sup>Other models where the central bank is committed to previous announcements include Cukierman and Liviatan (1991) and Cukierman (2000). Gersbach and Hahn (2006) compare monetary targeting and inflation targeting if the central bank is committed to the respective targets. Rogoff (1985) examines whether interest rates are desirable as intermediate targets.

### 4.3 Commitment in a Liquidity Trap

Many authors have noted that in the presence of deflation or a liquidity trap it may be necessary for the central bank to commit to expansionary policy in the future.<sup>7</sup> This will increase inflation expectations and thus reduce the real interest rate, which is necessary to avoid a deflationary spiral. However, it is unclear whether a commitment to zero interest rates for some time is actually sufficient to increase inflation expectations and thus to induce a low level for long-term real interest rates.<sup>8</sup> Commitment to an unusually high inflation or price-level target<sup>9</sup> maintained for a considerable time (and perhaps achieved by unconventional policy measures) seems more appropriate.

### 4.4 Revelation of Information through Forward Guidance

Forward guidance may also be interpreted as a means of communicating private central-bank information. From a social perspective the question arises whether the central bank should in fact communicate its private information. Though the theoretical findings on the welfare effects of central-bank transparency are not unanimous, we assume for the rest of our discussion that transparency is desirable.<sup>10</sup> The next question is whether forward guidance on the future path of interest rates is an appropriate way of revealing information.

If forward guidance is used to reveal information on the central bank's objectives or the state of the economy, we have to remember that information about future policy decisions and the central bank's estimate of future economic shocks will usually be non-verifiable. Accordingly, an important issue is whether the information will be credible.

Why might forward guidance used to reveal the central bank's private information not be credible? First, if current inflation depends on expected future inflation (as in standard forward-looking models), the central bank has an incentive to choose forward

---

<sup>7</sup>See Krugman (1998), among others.

<sup>8</sup>See Orphanides and Wieland (2000).

<sup>9</sup>For an extensive discussion see Svensson (2006).

<sup>10</sup>Gersbach (1998) first showed that transparency in monetary policy may involve losses in terms of welfare. For surveys of this literature see Geraats (2002) and Hahn (2002).



guidance suggesting that inflation will be on target in the future, as this will have a beneficial effect on current inflation. Second, the central bank may be reluctant to reveal a future inflation path that leads the public to conclude that a financial crisis is likely. Third, the central bank may not be willing to reveal a high weight on the output target or an output target that exceeds the natural level. These credibility problems severely limit the use of forward guidance as a means of disclosing information.<sup>11</sup>

Nevertheless, it is possible for some information to be transmitted. First, forward guidance may represent cheap talk, i.e. the central bank is not committed at all to previous announcements and incurs no costs if it deviates. In this case, a transmission of precise information is impossible if there are incentives for the central bank to misrepresent its information. However, cheap talk could be used to reveal some vague information (see Stein (1989), who applies the mechanism developed by Crawford and Sobel (1982) to central-bank communication).<sup>12</sup>

Second, for the reasons discussed earlier, forecast deviations could be costly, which would make the forecasts credible to some extent. Then two problems would arise. The central bank loses some of its flexibility in responding to unforeseen developments in the future, as it will find it costly to deviate substantially from previous announcements. In addition, signaling costs will occur. Such costs arise because the interest-rate path desired by the central bank may not signal the information the central bank wants to reveal. The central bank thus needs to adjust the interest-rate projection. If it is committed to these projections to some extent, this will lead to suboptimal policy in the future. In this case it would be desirable to announce the private information directly,<sup>13</sup> provided this is feasible.

To sum up, if forward guidance represents cheap talk, then it may convey useful information. However, its precision is limited by credibility problems. If the central bank

---

<sup>11</sup>Although we have assumed that a general adoption of transparency would be socially beneficial from an ex-ante perspective, this does not imply that revealing information truthfully will be in the central bank's interest in every possible situation in the future.

<sup>12</sup>For an interesting discussion of the instances where cheap talk can be used to transmit information see Farrell and Rabin (1996).

<sup>13</sup>For example, the central bank's projections of future shocks will be credible to some extent if future deviations of these shocks from their projected values are costly to the central bank.

is somewhat committed to its forecasts, then a direct publication of the central bank's information would be preferable.

## 5 Conclusions

We have argued that forward guidance regarding the future path of policy interest rates can be either viewed as a means of commitment or as a means of communicating private information. If forward guidance is used to disclose private information and represents cheap talk, imprecise forward guidance, like the ECB's use of code words, may be informative.

If forward guidance is used to create commitment, costs of forecast deviations are a necessary prerequisite for making forward guidance credible to some extent. The central bank then faces a trade-off between gains from commitment and losses in flexibility. We show that in an inflation-bias framework, the gains from commitment are sufficient to make the publication of future interest rates worthwhile, unless the deviation costs are very high. By contrast, in a New Keynesian framework Gersbach and Hahn (2008) show that interest-rate projections are detrimental.<sup>14</sup>

In the Appendix we have shown, for a simple inflation-bias framework, that the desirability of forward guidance depends on the deviation costs and hence on the degree of commitment to forecasts. The different practices of central banks with respect to forward guidance and changes therein can be associated with different degrees of commitment. For example, by attaching large error bands to forecasts, a central bank can attempt to reduce its commitment to forecasts over and against the case where only point forecasts are made public. The ECB's traffic-light system can also be interpreted as a system with a low value in deviation costs. While this enables central banks to retain flexibility, they may also forgo some of the gains from commitment.

It is crucial to note that the socially optimal degree of commitment may not be constant over time. If the future economic development is highly uncertain, i.e. shocks are

---

<sup>14</sup>However, their framework can be used to support the publication of inflation projections.

very large, then the losses from less flexibility in responding to shocks may be severe. Therefore a low level of commitment may be desirable. In a similar vein, there may be times when commitment is particularly valuable, for example in the presence of a liquidity trap. Hence the optimal disclosure practice will vary over time and across central banks. These considerations may explain why different central banks choose very different approaches to forward guidance, and why their communication policies have changed substantially in the past.

# A Forward Guidance and the Classic Time-Inconsistency Problem

## A.1 Set-up

We consider a very simple model with a neoclassical Phillips curve

$$y = y_0 + \pi - \pi^e + \varepsilon, \quad (1)$$

where we use  $\pi$  and  $y$  to denote inflation and output. Inflation expectations are denoted by  $\pi^e$ . Parameter  $y_0$  represents the natural rate of output and  $\varepsilon$  is a normally distributed supply shock with mean zero and variance  $\sigma_\varepsilon^2$ .

The IS curve is given by

$$y = y_0 - (i - \pi^e - \bar{r}) + \mu, \quad (2)$$

where  $i$  is the interest rate chosen by the central bank;  $\bar{r} > 0$  is the natural real rate of interest. Variable  $\mu$  represents a normally distributed demand shock with mean zero and variance  $\sigma_\mu^2$ . It is uncorrelated with  $\varepsilon$ .

Moreover, we assume a quadratic function for social losses

$$L = \pi^2 + a(y - y_0 - \Delta)^2, \quad (3)$$

where  $a > 0$  represents the relative significance of the output target. In the tradition of Kydland and Prescott (1977) and Barro and Gordon (1983), we assume  $\Delta > 0$ . As a consequence the socially optimal level of output,  $y_0 + \Delta$ , is higher than its natural level  $y_0$ .<sup>15</sup>

The central bank publishes a forecast of its policy instrument, i.e. the interest rate  $i$ . We use  $i^P$  to denote this projection. Following Gersbach and Hahn (2008), we introduce a new component into the central bank's loss function. We assume that the central bank faces quadratic costs incurred by forecast deviations. Formally, the central bank's losses can be written as

$$L^{CB} = \pi^2 + a(y - y_0 - \Delta)^2 + b(i^P - i)^2. \quad (4)$$

---

<sup>15</sup>For example, in the presence of distortionary taxation the socially optimal level is higher than the level sustainable in the long run.

If a central bank announces a forecast value  $i^P$ , it faces the quadratic costs  $b(i^P - i)^2$ , which increase in the size of forecast deviations. The size of these costs depends on parameter  $b$  ( $b \geq 0$ ), which can be interpreted as the degree to which the central bank is committed to its forecasts. For  $b = 0$  we obtain the standard case because announcements represent cheap talk when deviations are costless.

The sequence of events is as follows:

1. The central bank announces the forecast  $i^P$ .
2. The public forms rational inflation expectations  $\pi^e$ .
3. Nature chooses the shocks  $\varepsilon$  and  $\mu$ .
4. The central bank chooses the interest rate  $i$ .

## A.2 Solution

We solve the model by backward induction. As a first step, we compute the central bank's optimal choice of  $i$ , for given  $\pi^e$  and  $i^P$ . Inserting (1) into (4) yields

$$L^{CB} = (y - y_0 + \pi^e - \varepsilon)^2 + a(y - y_0 - \Delta)^2 + b(i^P - i)^2.$$

Using (2), we obtain

$$L^{CB} = (-(i - \pi^e - \bar{r}) + \mu + \pi^e - \varepsilon)^2 + a(-(i - \pi^e - \bar{r}) + \mu - \Delta)^2 + b(i^P - i)^2.$$

Maximization with respect to  $i$  gives

$$-(i - \pi^e - \bar{r}) + \mu + \pi^e - \varepsilon + a(-(i - \pi^e - \bar{r}) + \mu - \Delta) + b(i^P - i) = 0.$$

This equation can be easily solved for  $i$

$$i = \frac{\pi^e + \bar{r} + \mu + \pi^e - \varepsilon + a(\pi^e + \bar{r} + \mu - \Delta) + bi^P}{1 + a + b}. \quad (5)$$

Now we turn to the public's inflation expectations as a function of the interest-rate projection  $i^P$ . Using  $i^e = \pi^e + \bar{r}$ , we can solve (5) for the public's inflation expectations as a function of  $i^P$

$$\pi^e = \frac{a\Delta - b(i^P - \bar{r})}{1 - b}. \quad (6)$$

Using (1), (2), (5), and (6), we obtain<sup>16</sup>

$$y = y_0 + \frac{b}{1+a+b}\mu + \frac{1}{1+a+b}\varepsilon, \quad (7)$$

$$\pi = \frac{b}{1+a+b}\mu - \frac{a+b}{1+a+b}\varepsilon - \frac{b}{1-b}(i^P - \bar{r}) + \frac{a}{1-b}\Delta, \quad (8)$$

$$i = \frac{1+a}{1+a+b}\mu - \frac{1}{1+a+b}\varepsilon - \frac{b}{1-b}i^P + \frac{1}{1-b}\bar{r} + \frac{a}{1-b}\Delta. \quad (9)$$

Equation (7) represents the expression for  $y$  given in the main text. By inserting (7), (8), and (9) into (4), taking expected values, and computing the derivative with respect to  $i^P$ , we obtain the first-order condition with the solution

$$i^P = \bar{r} + \frac{2a}{1+b}\Delta. \quad (10)$$

Combining (7), (8), (9), and (10) yields

$$y = y_0 + \frac{b}{1+a+b}\mu + \frac{1}{1+a+b}\varepsilon, \quad (11)$$

$$\pi = \frac{b}{1+a+b}\mu - \frac{a+b}{1+a+b}\varepsilon + \frac{a}{1+b}\Delta. \quad (12)$$

$$i = \bar{r} + \frac{1+a}{1+a+b}\mu - \frac{1}{1+a+b}\varepsilon + \frac{a}{1+b}\Delta. \quad (13)$$

### A.3 Forward Guidance and Welfare

Expected social losses can be computed by inserting (11) and (12) into (3) and taking expected values. We obtain

$$\mathbb{E}L = \frac{(1+a)b^2}{(1+a+b)^2}\sigma_\mu^2 + \frac{a+(a+b)^2}{(1+a+b)^2}\sigma_\varepsilon^2 + \left(1 + \frac{a}{(1+b)^2}\right)a\Delta^2. \quad (14)$$

The first two summands represent the losses incurred by shocks. These terms are increasing in  $b$ . Intuitively, announcing a projection for the future interest rate reduces the central bank's flexibility in responding to these shocks. The third term on the right-hand side of (14) can be split into two components, namely  $a\Delta^2$  and  $\frac{a^2}{(1+b)^2}\Delta^2$ .

---

<sup>16</sup>Note that the interest rate chosen by the central bank, which is given by (9), is decreasing in  $i^P$  for  $b < 1$ . A similar finding has led Rogoff (1985) to the conclusion that an intermediate interest target is not advantageous. However, (5) implies that  $i$  is an increasing function of  $i^P$  for a given level of  $\pi^e$ . The apparently implausible equation (9) can be understood in the following way: An increase in the projected inflation rate can be interpreted as a commitment by the central bank to fight inflation. This reduces inflation expectations, which does not make high interest rates necessary.

First,  $a\Delta^2$  stands for the unavoidable losses caused by the fact that the central bank cannot boost output above its natural rate. Second,  $\frac{a^2}{(1+b)^2}\Delta^2$  are additional losses arising because the central bank produces an inefficiently high rate of inflation in its ultimately futile attempt to boost output above its natural level. These losses could be avoided if the central bank targeted the natural level of output. Interestingly, the term  $\frac{a^2}{(1+b)^2}\Delta^2$  is decreasing in  $b$ . Hence higher levels of  $b$  imply that the central bank can commit more effectively to keeping inflation low. As a consequence, it can overcome the time-inconsistency problem to some extent.

To sum up, the publication of monetary-policy inclinations involves a trade-off. It diminishes the central bank's flexibility in responding to shocks, which is socially detrimental. However, it provides the central bank with a means of committing itself, which may be socially desirable.

It is readily verifiable that

$$\left. \frac{d\mathbb{E}L}{db} \right|_{b=0} = -2a^2\Delta^2 < 0. \quad (15)$$

We thus arrive at the important observation that for sufficiently small values of  $b$  the announcement of policy forecasts is socially desirable. It is relatively easy to see that for high values of  $b$  losses caused by lower flexibility may outweigh gains from commitment. In such cases, announcing information on the future course of monetary policy is harmful.

□

## References

- Robert Barro and David Gordon. Rules, Discretion, and Reputation in a Model of Monetary Policy. *Journal of Monetary Economics*, 12:101–121, 1983.
- Alan Blinder. *The Quiet Revolution: Central Banking Goes Modern*. New Haven, CT: Yale University Press, 2004.
- Richard Clarida, Jordi Gali, and Mark Gertler. The Science of Monetary Policy: A New Keynesian Perspective. *Journal of Economic Literature*, 37:1661–1707, December 1999.
- Vincent P. Crawford and Joel Sobel. Strategic Information Transmission. *Econometrica*, 50(6):1431–1451, November 1982.
- Alex Cukierman. Establishing a Reputation for Dependability by Means of Inflation Targets. *Economics of Governance*, 1(1):53–76, March 2000.
- Alex Cukierman and Nissan Liviatan. Optimal Accomodation by Strong Policymakers Under Incomplete Information. *Journal of Monetary Economics*, 27(1):99–127, January 1991.
- Joseph Farrell and Matthew Rabin. Cheap Talk. *Journal of Economic Perspectives*, 10(3):103–118, 1996.
- Jon Faust and Eric M. Leeper. Forecasts and Inflation Reports: An Evaluation. mimeo, December 2005.
- Xavier Gabaix. The Granular Origins of Aggregate Fluctuations. mimeo, December 2005.
- Petra Geraats, Francesco Giavazzi, and Charles Wyplosz. *Transparency and Governance, Monitoring the European Central Bank 6*. CEPR, London, 2008.
- Petra M. Geraats. Central Bank Transparency. *Economic Journal*, 112:532–565, 2002.



- Hans Gersbach. On the Negative Social Value of Central Banks' Transparency. Working Paper, University of Heidelberg, 1998.
- Hans Gersbach and Volker Hahn. Signaling and Commitment: Monetary versus Inflation Targeting. *Macroeconomic Dynamics*, 10(5):595–624, 2006.
- Hans Gersbach and Volker Hahn. Monetary Policy Inclinations. CEPR Discussion Paper 6761, 2008.
- Charles A.E. Goodhart. Monetary Transmission Lags and the Formulation of the Policy Decision on Interest Rates. *Federal Reserve Bank of St. Louis Review*, 83(4):165–186, July 2001.
- Volker Hahn. Transparency in Monetary Policy: A Survey. *ifo Studien*, 3:429–455, 2002.
- Paul Krugman. It's Baaack! Japan's Slump and the Return of the Liquidity Trap. *mimeo*, 1998.
- Finn Kydland and Edward Prescott. Rules Rather than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy*, 85(3):473–492, 1977.
- Frederic S. Mishkin. Can Central Bank Transparency Go Too Far? NBER Working Papers 10829, National Bureau of Economic Research, Inc, October 2004.
- Athanasios Orphanides and Volker Wieland. Efficient Monetary Policy Design near Price Stability. *Journal of the Japanese and International Economies*, 14(4):327–365, December 2000.
- William Poole. Fed Transparency: How, Not Whether. *Federal Reserve Bank of St. Louis Review*, 85(6):1–18, November/December 2003.
- Kenneth Rogoff. The Optimal Degree of Commitment to an Intermediate Monetary Target. *Quarterly Journal of Economics*, 100(4):1169–1189, November 1985.

Glenn D. Rudebusch and John C. Williams. Revealing the Secrets of the Temple: The Value of Publishing Central Bank Interest Rate Projections. Working Paper Series 2006-31, Federal Reserve Bank of San Francisco, 2006.

Jeremy C. Stein. Cheap Talk and the Fed: A Theory of Imprecise Policy Announcements. *American Economic Review*, 79(1):32–42, March 1989.

Lars E O Svensson. Optimal Inflation Targeting: Further Developments of Inflation Targeting. Working Papers Central Bank of Chile 403, Central Bank of Chile, December 2006.

Michael Woodford. The Case for Forecast Targeting as a Monetary Policy Strategy. *Journal of Economic Perspectives*, 21(4):3–24, 2007.

## Working Papers of the Center of Economic Research at ETH Zurich

(PDF-files of the Working Papers can be downloaded at [www.cer.ethz.ch/research](http://www.cer.ethz.ch/research)).

- 08/84 H. Gersbach and V. Hahn  
Forward Guidance for Monetary Policy: Is It Desirable?
- 08/83 I. A. MacKenzie  
On the Sequential Choice of Tradable Permit Allocations
- 08/82 I. A. MacKenzie, N. Hanley and T. Kornienko  
A Permit Allocation Contest for a Tradable Pollution Permit Market
- 08/81 D. Schiess and R. Wehrli  
The Calm Before the Storm? - Anticipating the Arrival of General Purpose Technologies
- 08/80 D. S. Damianov and J. G. Becker  
Auctions with Variable Supply: Uniform Price versus Discriminatory
- 08/79 H. Gersbach, M. T. Schneider and O. Schneller  
On the Design of Basic-Research Policy
- 08/78 C. N. Brunnschweiler and E. H. Bulte  
Natural Resources and Violent Conflict: Resource Abundance, Dependence and the Onset of Civil Wars
- 07/77 A. Schäfer, S. Valente  
Habit Formation, Dynastic Altruism, and Population Dynamics
- 07/76 R. Winkler  
Why do ICDPs fail? The relationship between subsistence farming, poaching and ecotourism in wildlife and habitat conservation
- 07/75 S. Valente  
International Status Seeking, Trade, and Growth Leadership
- 07/74 J. Durieu, H. Haller, N. Querou and P. Solal  
Ordinal Games
- 07/73 V. Hahn  
Information Acquisition by Price-Setters and Monetary Policy
- 07/72 H. Gersbach and H. Haller  
Hierarchical Trade and Endogenous Price Distortions
- 07/71 C. Heinzl and R. Winkler  
The Role of Environmental and Technology Policies in the Transition to a Low-carbon Energy Industry
- 07/70 T. Fahrenberger and H. Gersbach  
Minority Voting and Long-term Decisions

- 07/69 H. Gersbach and R. Winkler  
On the Design of Global Refunding and Climate Change
- 07/68 S. Valente  
Human Capital, Resource Constraints and Intergenerational Fairness
- 07/67 O. Grimm and S. Ried  
Macroeconomic Policy in a Heterogeneous Monetary Union
- 07/66 O. Grimm  
Fiscal Discipline and Stability under Currency Board Systems
- 07/65 M. T. Schneider  
Knowledge Codification and Endogenous Growth
- 07/64 T. Fahrenberger and H. Gersbach  
Legislative Process with Open Rules
- 07/63 U. von Arx and A. Schäfer  
The Influence of Pension Funds on Corporate Governance
- 07/62 H. Gersbach  
The Global Refunding System and Climate Change
- 06/61 C. N. Brunnschweiler and E. H. Bulte  
The Resource Curse Revisited and Revised: A Tale of Paradoxes and Red Herrings
- 06/60 R. Winkler  
Now or Never: Environmental Protection under Hyperbolic Discounting
- 06/59 U. Brandt-Pollmann, R. Winkler, S. Sager, U. Moslener and J.P. Schlöder  
Numerical Solution of Optimal Control Problems with Constant Control Delays
- 06/58 F. Mühe  
Vote Buying and the Education of a Society
- 06/57 C. Bell and H. Gersbach  
Growth and Enduring Epidemic Diseases
- 06/56 H. Gersbach and M. Müller  
Elections, Contracts and Markets
- 06/55 S. Valente  
Intergenerational Transfers, Lifetime Welfare and Resource Preservation
- 06/54 H. Fehr-Duda, M. Schürer and R. Schubert  
What Determines the Shape of the Probability Weighting Function?
- 06/53 S. Valente  
Trade, Envy and Growth: International Status Seeking in a Two-Country World
- 06/52 K. Pittel  
A Kuznets Curve for Recycling

- 06/51 C. N. Brunnschweiler  
Cursing the blessings? Natural resource abundance, institutions, and economic growth
- 06/50 C. Di Maria and S. Valente  
The Direction of Technical Change in Capital-Resource Economics
- 06/49 C. N. Brunnschweiler  
Financing the alternative: renewable energy in developing and transition countries
- 06/48 S. Valente  
Notes on Habit Formation and Socially Optimal Growth
- 06/47 L. Bretschger  
Energy Prices, Growth, and the Channels in Between: Theory and Evidence
- 06/46 M. Schularick and T.M. Steger  
Does Financial Integration Spur Economic Growth? New Evidence from the First Era of Financial Globalization
- 05/45 U. von Arx  
Principle guided investing: The use of negative screens and its implications for green investors
- 05/44 Ch. Bjørnskov, A. Dreher and J.A.V. Fischer  
The bigger the better? Evidence of the effect of government size on life satisfaction around the world
- 05/43 L. Bretschger  
Taxes, Mobile Capital, and Economic Dynamics in a Globalising World
- 05/42 S. Smulders, L. Bretschger and H. Egli  
Economic Growth and the Diffusion of Clean Technologies: Explaining Environmental Kuznets Curves
- 05/41 S. Valente  
Tax Policy and Human Capital Formation with Public Investment in Education
- 05/40 T.M. Steger and L. Bretschger  
Globalization, the Volatility of Intermediate Goods Prices and Economic Growth
- 05/39 H. Egli  
A New Approach to Pollution Modelling in Models of the Environmental Kuznets Curve
- 05/38 S. Valente  
Genuine Dissaving and Optimal Growth
- 05/37 K. Pittel, J.-P. Amigues and T. Kuhn, Endogenous Growth and Recycling: A Material Balance Approach
- 05/36 L. Bretschger and K. Pittel  
Innovative investments, natural resources, and intergenerational fairness: Are pension funds good for sustainable development?