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2005

Document Version:
Other version

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Citation for published version (APA):

Bengtsson, I. (2005). *Central bank power is a matter of faith*. (pp. 1-18). (Working Papers ; No. 2005:21). http://swopec.hhs.se/lunewp/abs/lunewp2005_021.htm

Total number of authors:

1

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Central bank power is a matter of faith

by

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Keywords:

Central Banking; Focal Points; Inflation; Monetary Policy; Money;
Quantity Theory

JEL Classification:

C70;E31;42;E43;E44;51;E52;E58

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Central bank power is a matter of faith*

Abstract

This paper reconsiders how central banks get involved in the process of determining nominal variables such as market interest rates and inflation rates. It is argued that the traditional story deriving central bank power from its monopoly of issuing base money is flawed. That story - in its various guises - is based on the quantity equation. This equation, however, is only applicable in the hypothetical *only-cash-world*, i.e. in a world where all transactions have to be paid for with central bank issued notes and coins. Nevertheless, the vast majority of economists would agree that, in practice, central banks seem to influence interest and inflation rates. Here, we suggest that the explanation is that central banks have acquired a role as *focal point* for those variables. It is possible because interest setting is a coordination game, in which agents have to predict each other's expectations.

1 Introduction

The descriptions of the ultimate sources of central bank power to influence the economy that you find in macroeconomic textbooks, or in statements of the central banks themselves, lack a conceivable link to actual central bank practices. On the one hand, the monopoly right to issue notes and coins is claimed to be the ultimate source of power while on the other hand, notes and coins play no part of actual central bank practices.

* This paper is prepared from my Ph.D. thesis *Central bank power: a matter of coordination rather than money supply*. Some of the feedback that I have received on various parts of the thesis concerns the material in this paper, and I am thus grateful for remarks and suggestions from Tyler Cowen, Kevin Dowd, Benjamin Friedman, Charles Goodhart and Michael Woodford. Naturally, I am solely responsible for all remaining errors and obscurities. I am also grateful for the financial support from Torsten och Ragnar Söderbergs stiftelser, which enabled me finishing the thesis.

The quantity identity - $PT = MQ$ (or MT) - is supposed to supply the missing link. However, the identity in itself is not sufficient to establish the needed link, it has to be complemented by assumptions about the relations between the variables. In the traditional story the identity becomes the quantity equation when assumptions about three of its variables are added; that money and real production is exogenously determined and that the velocity of money is stable. This leaves the price level as the only endogenous variable, which should make it possible to determine. However, the assumption of a stable velocity is crucially problematic. In a world where there exists other payment techniques than cash payment, the velocity of money is a meaningless concept other than as a residual in the quantity identity. In the hypothetical world where *all payments are made exclusively with cash*, it would be possible to interpret the velocity as a measure on how many times an average note is used during a certain period of time. On the other hand, in the real world where payments are made also by the use of other means, this is no longer true and the only way to interpret the concept of velocity is to define it as PQ/M . With the velocity being the residual that makes the quantity identity hold, the identity is impossible to use to justify claims about a link between money and prices.

1.1 Outline

In the article before you, I will first challenge the conventional story of the sources of central bank power. I will start discussing the growing gap between (a) descriptions about actual central banking and (b) the ultimate reasons that are supposed to make central banking at all possible. While the traditional stories about the ultimate reasons why central banks control interest rates always boil down to the central bank's monopoly of printing notes and coins, actual central banking does not involve money in the sense of notes and coins. A discussion has recently raised the question whether virtual money will replace cash to such a degree that central banks will lose their power to control interest rates. I will comment on this discussion and argue that virtual money, in fact, will not change much but will make it more visible that central banks do not control interest rates. That is, the traditional story is wrong, the monopoly of printing cash does not earn the central bank the power to control interest rates, or inflation.

Secondly, I will outline my hypothesis of the role of central banks in a world with, in practice, no restrictions on capital movement. The hypothesis consists of three interrelated suggestions, firstly that the determination of future price levels is a coordination game that might be determined by a focal point, secondly that the central bank might emerge to fill the role as focal point, and thirdly that central banks derive

their influence over the inflation - if any - from their role as a focal point. To communicate my idea I will point out the similarities between the coordination game of future prices and those coordination situations that Thomas Schelling (1960) used to illustrate the concept of focal points.

2 Theory and practice in central banking

There is an apparent gap between how the ultimate source of central bank power is described and how actual central bank operations are carried out. This is true both for academic accounts and for central banks' own accounts. Let us first look at examples of central banks' own accounts, starting with the Swedish central bank, *Sveriges Riksbank*. The quotation is from the bank's web site¹ and I have indicated *keywords* using italics.

The role of the Riksbank

Inflation is *ultimately* a consequence of the money supply rising faster than demand. As the Riksbank has the exclusive right to issue banknotes, it can control the supply of money. When costs rise and prices move up, the demand for banknotes and coins will grow because a larger amount of money is needed to execute the payments.

If the Riksbank refrains from supplying more money, prices will *ultimately* fall back. Thus it is the Riksbank's construction of monetary policy that *ultimately* determines whether rising costs lead to inflation in the longer run. This is the background to the Riksbank's central role in ensuring that prices remain stable.

In *practice* the Riksbank no longer manages inflation by varying the supply of money. The demand for money is met and it is this demand which the Riksbank influences by adjusting the level of interest rates. High interest rates subdue the demand for money and vice versa. [www.riksbank.se]

One would like to know in what way the discussion about what is *ultimately* true supports the discussion about how central banking is conducted in *practice*. While it is understandable that changes in interest rates may influence the demand for money through some sort of monetary transmission mechanism, it is not as easy to see why the central bank should be able to change market interest rates in the first place. Is it because of its control over the supply of banknotes – a control, which it does not exercise – that the central bank controls interest rates? In that case, how does it happen? In short, I find it difficult to understand in which way the central bank's actual operations are linked to the underlying so-called ultimate reasons.

In a report by The Monetary Policy Committee of the Bank of England available on their web site², the committee outlines the transmission mechanism of monetary policy in a similar way. First stating, without further discussion, that the bank's power ultimately depends on the monopoly of supplying base money.

¹ Full address: <http://www.riksbank.se/frameset.ASP?ID=3562>

² Full address: <http://www.bankofengland.co.uk/montrans.pdf>

A central bank derives the power to determine a specific interest rate in the wholesale money markets from the fact that it is the monopoly supplier of 'high-powered' money, which is also known as 'base money'. [www.bankofengland.co.uk]

Then, in the description of how this is done in practice, the Committee simply presumes that changes in the rate that the central bank charges for lending out base money will lead to changes in other short interest rates. This is, however, not at all self-evident. Considering how little a typical change in a central bank's operative rate influences the profitability of a typical bank, one would rather expect the impact of such changes to disappear among the bank's other operations.

The standard academic explanation suffers from similar problems. The theoretical discussion always involves the central bank in controlling the *quantity of money*. Simply expressed, the popular idea is that with, say, less money, prices must go down for all goods to be sold, or that with more money, prices must go up for all money to be used. Those discussions are seldom accompanied by examples of how the quantity of money could be increased or decreased. In case they are, the examples are tellingly unrealistic, as the (in)famous suggestion that we should imagine a *helicopter drop* of money.³ The wish to speculate about the consequences of a helicopter drop of money must stem from a total absence of realistic examples. In other instances, we are simply asked to "*suppose that the quantity of money suddenly rises*" [Milton Friedman (1992:248)].

The proposition that central bank power is ultimately derived from the control over base money, is intimately associated with the idea that the general level of prices is pinned down by money, as in the quantity equation $MV=PT$, or $MV=PQ$, where T (real transactions) or Q (real production) and V (velocity of money) is exogenously determined. According to this belief, the pattern of real activity in an economy involves a certain demand of real money balances, while the nominal money supply is generally supposed to be determined more or less directly by the central bank's monetary policy. This implies that the price level is determined as the unique level of prices that will make the purchasing power of the money supply equal to the desired level of real balances. Such an account leads quickly to the conclusion that it is important to formulate a monetary policy in order to control the quantity of money in circulation. It is argued that a central bank policy of passively supplying as much money as is demanded, i.e. an endogenous money supply, would mean a nominal money supply that varies in proportion to whatever the level of prices may be, since the demand for real balances is determined by factors on the real side of the economy. If the price level is determined by nothing else

³ Cf. Friedman (1969: 1-50] about the concept of helicopter drops of money.

than the money supply and this supply is adapted to the price level, it would imply that both the money supply and the level of prices are completely indeterminate because there are too many unknown variables, and all pairs of money and price level would be equally possible.

I would like to argue that this reasoning has serious flaws. In particular, the concept of a *determinate price level* is misleading in itself, due to its aggregate perspective. If we study the determination issue from the viewpoint of a Walrasian auctioneer, it is plausible to claim that it is impossible to say that one price level is more consistent with the underlying relative price structure than another. However, since the parable of the auctioneer is a poor representation of the market, one would rather like to study price level determination from the viewpoint of those individual persons and organizations that actually offer and accept prices, what we could call price makers. This would bring us to a very different conclusion: to each individual price maker the nominal price is not an arbitrary choice but rather the opposite, since only one nominal price can be consistent with the product's equilibrium relative price. *The perceived problem of an indeterminate price level in a cashless society is a consequence of the attempt to determine the price level without reference to individual prices.*

If asked, not many economists would disagree with the claim that the price level is nothing but an index of individual prices. Nevertheless, much analysis is carried out as if it were in fact possible to talk about inflation with no regard to actual prices. Consider for example the view that: *“The conclusion is that substantial changes in prices or nominal income are almost always the result of changes in the nominal supply of money.”* [M. Friedman (1992:249)] This statement asserts that the quantity of money will determine the level of prices. We must therefore conclude that the quantity of money also determines individual prices. Assertions such as this are, however, rarely accompanied by an account of (a) how the quantity of money has increased or (b) how individual price setters take this into account when they negotiate or quote prices. Rather, both (a) and (b) are assumed to happen, as in the case of M. Friedman (1992:248).

Starting from a situation in which the nominal quantity that people hold at a particular moment of time happens to correspond at current prices to the real quantity that they wish to hold, suppose that the quantity of money unexpectedly increases.

Why should we “suppose that the quantity of money unexpectedly increases”, perhaps because there has been a *helicopter drop of money*? The lack of realistic suggestions regarding how changes in the supply of money affect price setters suggests in itself that economists who use this jargon are not themselves fully aware of the

meaning of their proposition on an individual level. You *could* of course claim that changes in the quantity of money leads to changes in the price level, but you *could not* back up your claim by referring to some propositions (e.g. stable velocity) about the quantity equation. While the quantity equation can be used to illustrate striking statistics, it can never be used to justify claims about causation, simply because it has the character of a *black box* when it comes to the operational mechanisms.

So, let us try to *understand* what actually happens, i.e. how individual agents make decisions about prices and on what grounds. For example, let us ask the following question: do central banks in fact influence decisions in households or firms on what to buy or sell, by controlling the quantity of outstanding currency? As Charles Freedman (2000) points out, as Benjamin Friedman (2000)⁴ further emphasizes, and as we already have mentioned here, the answer is clearly negative. Central banks do in fact passively supply as much currency as the public wants. Thus, when someone states that central banks control interest rates, or the price level, by controlling the supply of currency, it should be clear that it could not be a statement about actual events.⁵ Rather, the statement is a metaphor, which everybody familiar with the paradigm⁶ knows how to interpret.

Particularly since 1999, we have witnessed a revival of interest in the question of what consequences innovations in information technology may bring to central banking. Will e-money or network money perhaps end the use of currencies or even banks, as we know them? An article by B. Friedman contributed substantially to make these issues hot again⁷ as he aptly described the traditional accounts of the sources of central bank power as fictions.

In truth, the ability of central banks to affect the evolution of prices and output in the non-financial economy has always been something of a mystery. It is not that there are no good accounts of how this influence might arise. There are many. The problem is rather that each such story, while plausible enough at first or even second thought, turns out to depend on one or another of a series of by now familiar fictions: households and firms need currency to purchase goods and services; banks

⁴ In order not to confuse Benjamin Friedman with Milton Friedman, in the following I will identify them by the initials of their first names.

⁵ Cf. e.g. Holmberg (1996) for an example of such a statement.

⁶ Cf. Kuhn (1970) about paradigms in science. In Bengtsson (2003), I argue that the habit to pose issues about money and prices in a quantity-of-money framework is of paradigmatic nature. Students of monetary economics are *trained* to interpret any relation between money and prices in a certain way.

⁷ Although neglected by mainstream monetary economics, the state of frictionless financial markets - the cashless society - has been seriously considered in by a number of economists throughout the 20th century, e.g. by Wicksell (1935[1906], 1936[1898]) and Lindahl (1929, 1930), who analyzed price level determination in a cashless society. Lindahl (1930: 11), for instance, explicitly argues that it is a weakness with the quantity theory that it breaks down under the condition of zero cash holdings. Novel theories about money are also found in free banking literature, e.g. by Hayek (1986) and Dowd (1988). Between 1970 and the end of the century, the presumption that base money is necessary for a determinate price level was challenged by a number of writers belonging more or less to the New Monetary Economics (NME) school of thoughts, most thoroughly in Cowen and Kroszner (1994), where they analyze what they call a *ghost medium of account*. The NME school is also known as the BFH school of thoughts. The label BFH refers to the three original contributors to the school that later also has been called the new monetary economics. They are Black (1970,1987,1995), Fama (1980, 1982, 1983) and Hall (1982). Later contributions are made by e.g. Greenfield and Yeager (1983), Cowen and Kroszner (1987,1994) and Woolsey (1992).

can issue only reserve-bearing liabilities; no non-bank financial institution create credit; and so on. [B. Friedman (1999:322)]

These fictions suggest a link between the monopoly of producing cash and the central bank power that would explain why open market operations work. B. Friedman (1999:323) acknowledged the irrelevance of these traditional stories of central bank power and explains why central bank power is a bit of a mystery.

The easiest way to see why the influence of central banks over non-financial economic activity is such a puzzle is to consider their small size, and the even smaller size of their monetary policy operations, in relation to the economies that they supposedly influence.

Indeed, why should tiny open market operations move much larger markets? You could of course argue that “yes, they are tiny, but they could be much larger if necessary”. That is, rather than moving the market through a pure supply/demand effect, open market operations could be supposed to move the market by signaling potentially very large supply/demand effects.

2.1 Open mouth operations

To illustrate this issue further, let us look at a monetary policy that does not involve base money in practice (although it could be argued that control over base money is the reason why it works). Michael Woodford (2000) provides a comprehensive account of how New Zealand and Canada pursue their monetary policies – *the channel approach* – by paying interest on bank reserves rather than by conducting open market operations on the monetary base. Standing facilities for lending and depositing at rates slightly above or below the central bank’s target rate guarantees both that the market rate will be close to the target rate and that commercial banks will have incentives to clear as much as possible on the interbank market before using the central bank’s standing facilities.

The lending rate on the one hand and the deposit rate on the other define a “channel” within which overnight interest rates should be contained. Because these are both standing facilities (unlike the Fed’s discount window in the U.S.), no bank has any reason to pay another bank a higher rate for overnight cash than the rate at which it could borrow from the central bank; similarly, no bank has any reason to lend overnight cash at a rate lower than the rate at which it can deposit with the central bank. Furthermore, the spread between the lending rate and the deposit rate gives banks an incentive to trade with one another (with banks that find themselves with excess settlement cash lending it to those that find themselves short) rather than depositing excess funds with the central bank when long and borrowing from the lending facility when short. [Woodford (2000:245-246)]

This would seem to explain why the central bank in practice does not have to engage in large transactions, since the banks have incentives to clear as much as possible on the interbank market. According to Woodford (2000), and Graeme Guthrie and Julian Wright (2000), the channel approach to the pursuit of monetary policies indeed seems to work in New Zealand without the central bank having to engage in particularly large transactions. Guthrie and Wright also show that *open mouth operations*

are the actual sources of changes in market interest rates. The expression - *open mouth operations* - is used to describe the phenomenon when market interest rates adjust immediately as soon as the central bank announces changes in interest rates. Another common way to describe the same phenomenon is to say that *the market is doing the central bank's job*. This means that the market adjusts to the target rate of the central bank without the central bank having to carry out actual operations.

The question is now why it works. There are two possible explanations. It could be that the central bank is always right about the market's expectations and adjusts the channel accordingly, or else that financial actors believe that the market rate will adjust to the central bank's target rate – otherwise they would have tried to make a profit from the difference between the market rate and the rates in the channel. Although the first possibility holds some truth, it is doubtful it could provide a reasonable explanation regarding the fine-tuning of the overnight interest rate, as noted by Woodford (2000) and B. Friedman (2000). We are thus left with the fact that financial actors seem to expect the market rate to adjust to the central bank's target rate. The question to be answered is then why they expect this.

2.2 The central bank as *the* major player?

Charles Goodhart (2000) suggests that the reason why market rates adjust to target rates is that, at the end of the day, the central bank can always change market rates in line with its wishes, since it basically could, and would, punish anybody betting against it. Goodhart (2000:190) puts forward the size argument.

What the ability of the central bank ultimately depends upon is the fact that it is the governments' bank, and thus has the power to intervene in (financial) markets without concern for profitability (let alone profit maximization). It can, consequently, force its profit-seeking commercial confreres, in the last resort, always to dance to its tune.

This is a very clear statement about the fundamentals of central banking power and quite far from the naive views of macroeconomic textbooks, or the official accounts of central banks. Not only is Goodhart's claim more down to earth, it possess the additional interesting attribute that Goodhart views his size argument as the actual source of central banking power also under the current circumstances. Thus, although Goodhart (2000:205) argues persuasively that currency will not disappear, he states on several occasions that currency, or the entire monetary base, is superfluous to the power of central banks.

Because it is not profit-maximizing the central bank is always in a position to dictate the finest terms on either the bid, or ask, side of the money market. It can, therefore, set the nominal interest rate for

'e' whether, or not, the system also includes currency and/or banks. Because the other players in the money market, whether banks or not, know that the central bank has the power of the government behind it, it is actually unlikely that the central bank will normally have to undertake a large volume of open market operations to get the market to adjust interest rates in line with its wishes. Open market operations will normally suffice.

If we use B. Friedman's words instead, Goodhart's coupling between central bank operations and market interest rates consists of the possibility that the central bank stands ready to buy or sell as much as it takes to achieve its desired interest rates, and that it can do so because it can absorb whatever losses necessary.

If the threat of using force is taken seriously by financial actors, it makes perfect sense that the central bank normally only has to engage in quite small operations. As B. Friedman (2000) notes, it is obvious that a large enough player can set market rates if he is willing to enter transactions of potentially infinite volume. We just then ask ourselves the following central question: is the central bank large enough?

This question is difficult to answer, since we never observe central banks engaged in very large operations. This is, of course, consistent with Goodhart's argument, but nevertheless, it is no evidence. There are at least two other possibilities: (a) it could as well be that central banks avoid being engaged in large volumes of trade because they know they are not able to force the market to do what they are not ready to follow anyway, and (b) central banks might never need to engage in large trade since the market is happy to have the point of coordination that central banks supply. Actually, I will in fact argue that (a) and (b) are both true.

As just mentioned, we do not have any conclusive observations that could decide whether the central bank could engage in large enough trade. Nonetheless, the observation that it now seems impossible for central banks to keep managed fixed exchange rates seems to speak in favor of my interpretation. The EMS crisis in the early nineties and the turmoil in Asia a few years later underscore this opinion. If we bear in mind that the operative means to defend a fixed exchange rate are the same as those used to defend a target for some interest rate, we should assume that if a central bank can not defend a preferred exchange rate, it is also unable to defend an interest rate target.

In the next chapter, I will argue that (a) the determination of the general level of prices is a coordination game with a solution similar to Schelling's focal points, and (b) that central banks obtain whatever power they have from their role as such focal points. I will start by concluding the obvious, but in discussions of inflation often neglected, fact that the price level is determined by the individual prices and the interest rate by supply and demand.

3 Future prices as a coordination game

A price level is an index of individual prices and to predict future price levels is thus to predict future prices on individual items. At every moment, all prices are fixed and we are thus able to say unambiguously what the price level is right now; it is only a technical problem to construct and measure our index. As we consider an increasingly distant future, increasingly many prices become flexible and our predictions about the price level become increasingly dependent on our forecast of those flexible prices. To forecast those prices is to imagine how the people who set the prices think. They, in their turn, want a prediction of the future price level that is as correct as possible to use as basis for future prices. That is, they need to forecast how *other* price setters think. Now, we clearly see the picture of a coordination game, where I need to predict how you predict that I will act, and so on. David Lewis (1969: 27) has put it in the following way:

I know that, just as I am trying to figure out what you will do by replicating your reasoning, so you may be trying to figure out what I will do by replicating my reasoning. This, like anything else you might do to figure out what I will do, is itself part of your reasoning. So to replicate your reasoning, I may have to replicate your attempt to replicate my reasoning.

In the short run and the moderately long run, it is perhaps not that difficult to figure out what others will do, because many prices are more or less fixed in running contracts and hence anchor the price level. However, for some contracts it must be true that they are the first to be written for a specific future period. The people who negotiate these contracts can only base their expectations of the future price level on predictions about how other price setters will forecast that future price level. To me, this situation looks very similar to the coordination problems, the solution of which Schelling named focal points.

The concept of a focal point, launched by Schelling (1960), appears in a variety of economic contexts. In short, it predicts that a particular equilibrium of a game is selected because it appears to be the ‘natural’ choice of the participants, that is, each agent sees it as a ‘natural’ choice for the others to make. Schelling (1960:54) provides the following example:

When a man loses his wife in a department store without any prior understanding on where to meet if they get separated, the chances are good that they will find each other. It is likely that each will think of some obvious place to meet, so obvious that each will be sure that the other is sure that it is “obvious” to both of them. One does not simply predict where the other will go, since the other will go where he predicts the first will go, and so on ad infinitum. Not “What would I do if I were she?” but “What would I do if I were she wondering what she would do if she were I wondering what I would do if I were she . . . ?” What is necessary is to coordinate predictions, to read the same message in to the common situation, to identify the one course of action that their expectations on each other can converge on. They must “mutually recognize” some unique signal that coordinates their expectations of each other. We cannot be sure they will meet, nor would all couples read the same signal; but the chances are certainly a great deal better than if they pursued a random course of search.

Schelling (1960:57) further states that, although logic is insufficient to coordinate successfully, people often do coordinate successfully.

People *can* often concert their intentions or expectations with each others if each knows that the other is trying to do the same. Most situations - perhaps every situation for people who are practiced to this kind of game - provide some clue for coordinating behavior, some focal point for each person's expectation of what the other expects him to expect to be expected to do. Finding the key, or rather finding *a* key - any key that is mutually recognized as the key becomes *the* key - may depend on imagination more than on logic; it may depend on analogy, precedent, accidental arrangement, symmetry, aesthetic or geometric configuration, casuistic reasoning, and who the parties are and what they know about each other.

If we interpret the determination of inflation as a coordination problem with a possible focal point, my hypothesis is that whatever influence the central bank exercises over inflation, it will be based on the bank's role as a focal point for inflation. That is, the central bank provides a focal point for medium- and long-term inflation in its target rate, and reinforces its credibility with consistent changes in short-term interest rate. It is possible for the bank to control - or more correctly: marginally influence - short interest rates as this market too needs a focal point. Similar to e.g. Woodford (2000: 256), I believe that the short-term interest rate, as well as the inflation rate, lacks an inherent general equilibrium. However, contrary to Woodford, I do not believe that this mean that the market necessarily will coordinate on the central bank's target rate. The actors in the market may choose to do just that, but they may as well choose to coordinate on something else. Thus, rather than choosing to coordinate on the central bank point because nothing else would be rational, I think they coordinate on that point because they believe it to be the best available expectation, and therefore it is indeed more likely than any other to be just that. If financial actors did not believe that the market rate would adjust to the target rate, then each actor would lend/borrow on the market and borrow/lend at the central bank and thereby make a profit. The central bank would potentially face an infinite demand for either borrowing or lending.

3.1 A case for the central bank as focal point

Consider for a moment John M. Keynes' *beauty contest*, where the rules stipulate that you can only win if you vote for the person who receives the most votes in total.⁸ In that case, you would have nothing to gain from making up your own criteria of beauty. You probably have a pretty good idea about which contestants stand a chance to win. Now, if you are playing to win, you would vote for someone who you reckon is a likely winner, regardless of your own preferences. What is 'true beauty' is an irrelevant question, the

only relevant measure of beauty in this case is the others' subjective opinion, or rather, how they think that others will vote. Nevertheless, even without an objective beauty standard, most players will do better than purely random choice. Similarly, I can not argue in the abstract that the central bank is a better point of coordination than any other, but I can argue that if the central bank has previously been right about short-term interest rates, or inflation rates, it would make sense to use the central bank prediction as focal point. Furthermore, in the same sense as one can list particular reasons why the lost and found desk is a reasonable focal point for couples who have lost each other in a store, we can suggest particular reasons why the central bank would be a reasonable focal point for short-term interest rates, or inflation. Since agents have to base their expectations on historical events, a long success record (or at least a long presence in the business) should be important. In this respect, the central bank has an obvious advantage over the vast majority of other forecast agencies. An additional fact that may give the central bank an advantage is that before the removal of strong currency and credit regulations, it had actual power to affect nominal and real variables in the economy. This factor however, should decrease in importance over time. Furthermore, the central bank works hard to stand out from the crowd. It surrounds itself with an air of power and eternity, manifested in impressive buildings in marble and granite, accommodating serious men in dark suits. Moreover, the central bank presents inflation forecasts in an almost ceremonial manner, sometimes manifested by changes in the operative interest rate. In recent years, the Swedish central bank has regularly gone on promotion tours in order to increase its media exposure and enhance the public's recognition of its endeavor to maintain a low and stable inflation rate. Lastly, and perhaps most importantly, the central bank is associated with power and the nation itself, for example the *Bank of England* or *Sveriges Riksbank* in Sweden – the latter directly calling for an association with the concept of *national standard*.⁹ What forecast could be a more natural choice than The National Standard forecast?

3.2 Does it matter if we know that the emperor is naked?

B. Friedman has recently (2000: 271) expressed concern that the market may cease to coordinate on the central bank:

But what if the market loses its presumption that the central bank could, or would, be able to do the job if the market did not simply act on its signals? With nothing to back up the central bank's expressions of intent, I suspect that in time the market would cease to do the central bank's work for

⁸ Cf. Keynes (1936).

⁹ The, somewhat archaic, Swedish word for a national standard is "riksläkare".

it. This prospect is ultimately what the threat posed to monetary policy by the electronic revolution is all about.

One might wonder, however, why “*the market would cease to do the central bank’s work for it*”. The point is that as long as the central bank is successful, there is little reason for any financial actor to cease acting on its signals. Successful, in this context, would mean to be a reliable focal point. This in turn is determined by the faith individual agents has in it. There is no simple mechanism inducing people to coordinate on something else, simply because they realize that the central bank is nothing but a focal point. The game played is of a cooperative nature. To the individual agent, there is nothing to gain from making a different forecast than the market in general: at best, you will miss out on profitable transactions and at worst, you will make non-profitable transactions. Consequently, while one could envisage that the central bank may lose its coordinating function, it is more likely that it will continue to serve as a focal point in a near future, whatever that might be. To this matter, I agree with Goodhart’s (2000: 207) concluding sentence about the possibility that central banks may lose their influence over the economy because of changes in the financial markets that are induced by developments in information technology.

Central banks may bring about their own demise by incompetence; they will be comparatively immune to technological innovation.

4 Conclusions

In many situations in the real world people need to be able to coordinate their actions, sometimes without the possibility to communicate with each other. Surprisingly often, people do succeed to coordinate in situations where there is no choice that is the obviously right one. In the terminology of game theory, there are many Nash-equilibria but no dominant equilibrium. Schelling introduced the concept of focal points to explain how people manage to coordinate in similar situations. The determination of future price levels has many traits in common with the situations Schelling referred to. The price level is an index of individual prices and since some prices are set in *sequential*¹⁰

¹⁰ Regarding sequentiality, we are interested in two types of contracts: (a) *simultaneous* contracts, in which deliverance and payment are completed instantly, at the moment of transaction as in a supermarket purchase, and (b) *sequential* contracts, in which the terms - in particular the price - of the contract are determined instantly while either deliverance, payment or both are completed at a future point. When considering the issue of price level determination, we confine our use of the term *sequential contract* for such contracts with a *predetermined price*, though in reality other kinds of sequential contracts are possible. The important feature of the sequential contract is that it fixes a nominal price for some time, which makes it useful as a guide to future prices - typical examples are wage contracts and utility contracts. Those contracts will necessarily influence inflation, both directly and indirectly as they will be used by others as coordination points of inflation. (The reader should be aware that a fixed price only means that a predetermined price is agreed upon in a contract; obviously, all contracts are possible to renegotiate or breach, if only at a cost.)

contracts, future price levels are partly determined by today's expectations about future price levels. That is, you need to predict what prediction others will make, knowing that they will take into consideration your prediction about their prediction, and so on.

In cases when we are experiencing a stable inflation rate, it is reasonable to believe that price-setting agents have found a focal point to coordinate their expectations about future price levels on. The question is then; what is the focal point?

We have suggested that the central bank is a natural choice as focal point for future inflation. To suggest that central banks are currently serving as focal points for inflation is of course not to argue that they will continue to do so. They might or they might not, other producers of predictions on inflation rates are potential alternatives as focal points. Its possible persistence as an important player for inflation determination rests on its capacity to remain a self-sustaining focal point, i.e. to be reasonably successful. To be successful is to keep the inflation rate close to the target rate, which is a task that the central bank can only achieve if it succeeds in convincing the market that the inflation rate will indeed stay close to the target. Whether or not central banks will continue to accomplish this mission is basically a matter of how good they are at rhetoric; the central bank's control of inflation - or interest rates - is true as long as it is believed.

To view central banks as focal points for short interest rates, and for inflation, helps to understand both the behavior of central banks and the attention the financial markets pay to central bank announcements. Even the almost bizarre speculation about what Mr. Greenspan actually intends with his speeches becomes reasonable. This is not a minor achievement of the model, I think.

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