

FOREIGN EXCHANGE INTERVENTION POLICY: WITH OR WITHOUT TRANSPARENCY? THE CASE OF JAPAN

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ABSTRACT. This paper examines different aspects of transparency in the foreign exchange policy. More precisely, it analyses how transparency evolved over the last decades in Japan and how market participants reacted to the changes in transparency. For this, we create a dataset capturing the main features of the central bank policy and market perception from 1991 to 2004. Our results suggest that Japanese authorities adopted several changes in their policy, sometimes practicing transparency and sometimes ambiguity. These changes had contrasted impact on market perception: frequent statements revealing the preferences of the central bank regarding the exchange rate level confused the markets, while those designed to confirm an actual intervention reduced uncertainty. These results suggest that, in general, actual interventions should still be considered, provided that the authorities talk to the market and intervene in an appropriate way.

JEL Classification: E58; F31; G15.

Keywords: Foreign Exchange Market; Central Bank Interventions; Transparency; Rumours.

RÉSUMÉ. Cet article analyse différents aspects de la transparence des politiques de change. Il se concentre plus précisément sur l'évolution du degré de transparence de la politique de change japonaise au cours de ces dernières années et sur son impact sur la perception des agents. Pour conduire l'analyse, une base de données caractérisant la nature de la politique d'intervention et la perception du marché sur la période 1991-2004 a été créée. Les résultats montrent que différentes stratégies furent adoptées au cours du temps. Ces stratégies ont un impact contrasté sur la perception du marché. Il apparaît en particulier que les discours dévoilant les préférences des autorités en terme de taux de change (interventions orales) introduisent de la confusion dans le marché. À l'inverse, les discours visant à confirmer une intervention réelle (*i.e.* transaction sur le marché des changes) sont accompagnés de moins d'incertitude. Ces résultats suggèrent que les interventions sont un instrument utile pour les banques centrales, à condition que les autorités interviennent et parlent au marché de manière appropriée.

Classification *JEL* : E58 ; F31 ; G15.

Mots-clefs : Marché des changes ; interventions de banque centrale ; transparence ; rumeurs.

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■ INTRODUCTION

Deviations from fundamentals and/or excess volatility are well-known features of floating exchange rate regime. As they may have disruptive effects on the real economy, they often justify corrective actions from the foreign exchange authorities, namely *central bank interventions*. These actions can take different forms. In particular, central bank (henceforth CB) policies often oscillate between “*transparency*” and “*ambiguity*” (Chiu, 2003) meaning that some interventions are conducted in a visible and clear manner (e.g. public interventions) while others are opaque (e.g. secret interventions).

On a theoretical point of view, the outcome of a policy often depends on the way of intervening (e.g. coordination channel, signalling channel). According to the signalling channel, typically, pieces of CB private information (e.g. general macroeconomic developments and their future monetary policy) are “*signalled*” to the market through interventions. The signal may induce traders to reshape their beliefs in accordance and in turn influence the path of the currency. Of course, this will only happen if the operation is transparent, in the sense that it is clearly perceived and understood by market participants. Yet, transparency turns out to be hard to achieve in practice. As noticed by Winkler (2002), transparency is the outcome of a complex process which depends on both sides of the market: the CB needs to send a sufficient amount of information and market participants need to properly understand the message. Transparency, for instance, does not mean flooding market with information.

Because transparency is a critical and complex notion, numerous studies have attempted to clarify its meaning and to examine whether more transparency enhances the effectiveness of policy, especially for monetary policy (see Winkler, 2002 and Geraats, 2002). For exchange rate policy, the scientific contributions are scarce. Chiu (2003) and Enoch (1998) are two notable exceptions. The former discuss *pro* and *cons* of increased transparency. The latter proposes a useful classification of transparency in foreign-exchange policy based on different time periods (*i.e.* *ex ante*, real time, *ex post* transparency).

The aim of the paper is to analyze the nature of the Japanese intervention’s policy over the 90s and the early 2000s (*i.e.* the way interventions were conducted) and its impact on the financial environment. Japan is an interesting case study for two main reasons.² First, it is the only industrialised country which has kept intervening actively and unilaterally in recent years, and it has done so both actually and orally.³ Second, the Japanese authorities made several changes in their intervention policy (Ito, 2003, 2007). In fact, after a period of large

2. Japan released historical data in 2001 on interventions between April 1991 and March 2000. Since then, the data have been updated, such that historical data from April 1991 onward are available. Our study covers almost the entire period for which official data have been published (April 1991-September 2004). The period from October 2004 onward is not covered due to limitations in the data on communication policy and market rumours.

3. Most central banks, such as the Fed and the ECB, have become increasingly reluctant to intervene and have shifted towards the use of communication policy to manage their exchange rates.

and visible interventions, recent operations have been conducted in secret (Beine and Lecourt, 2004).

This paper addresses two questions: How transparent was the foreign-exchange intervention policy of the Japanese Ministry of Finance (MoF) over the period 1991-2004? And, did the changes in transparency affect market perception? For this, we create a dataset based on newswire services releases, capturing all the communication by policymakers in Japan over the period 1991-2004, and all the intervention rumours which are assumed to depict the perception of the market. Because we aim at making this analyse as comprehensive as possible, we adopt a purely descriptive approach. This provides us with more flexibility to detail the strategies adopted by the Japanese authorities over years.⁴

The main findings of the empirical analysis are twofold. First, in line with previous studies (Ito, 2003; Ito and Yabu, 2007, Gnabo *et al.*, 2008), we find that the transparency achieved by the Japanese intervention policy displays a great deal of variability over time, with two regime changes in policy over the period. Interestingly, these changes are mainly related to institutional factors (changes at the head of the MoF) and not to specific developments of the exchange rate. Second, we find that the way the intervention policy is realized in terms of transparency can have different effects on market perception: frequent statements revealing the preference of the CB regarding the exchange rate level tend to confuse the market (measured by the number of rumours in the market), while those confirming or commenting an intervention reduce uncertainty. These results suggest that, in general, actual interventions on the market should still be considered, provided that the monetary authorities talk to the market and intervene in an appropriate way.

The paper is structured as follows. Section 2 provides a description of the data. Section 3 addresses the evolution over time of the intervention policy and transparency managed by the MoF. The effects of transparency policy in terms of market rumours are presented in Section 4, and Section 5 concludes.

■ DATA

Our identification procedure involves newswire reports from Reuters and Dow Jones between 1991 and 2004. According to Oberlechner and Hocking (2003), the wire services are the most important sources of information, and this information often consists of market participants' perceptions and interpretations, which are provided to traders. Newswire reports from Reuters and Dow Jones are more comprehensive than newspaper reports (such as the

4. It is worth noting that Gnabo *et al.*, (2008) and Beine *et al.* (2007) use the same set of data to econometrically investigate specific issues related to the Japanese policy. Using econometric specifications has many advantages as well as some disadvantages. In particular, it sometimes requires restricting the scope of the study in order to keep tractable model. Gnabo *et al.*, (2008), for instance, focus exclusively on the link between the foreign-exchange policy and the occurrence of rumours. Likewise Beine *et al.* (2007) concentrate on factors facilitating the detection of secret interventions. Our objective in this study is to provide a global overview of the Japanese policy. In accordance, this descriptive approach should be viewed as a complement to econometric works.

Wall Street Journal or the *Financial Times*); moreover they report and disseminate all major market news in a timely fashion, usually very soon after a public announcement (Frenkel *et al.*, 2004; Oberlechner and Hocking, 2003).

Using newswires enables us to study not only the actual and oral interventions, but also all the rumours that played a significant role in the foreign exchange market. These reports were assembled using an online database, Factiva, which offers a wide choice of search tools and interesting search features. Our sources were restricted to the Dow Jones and Reuters reports, which are considered, with Bloomberg (whose data are unfortunately not available on Factiva), as the main information providers to traders (for details regarding the data collection and the classification scheme see Gnabo and Lecourt, 2005).

Data on transparency

Transparency in economic policy usually refers to the absence of information asymmetries between policymakers and the private sector (Geraats, 2002). As monetary authorities generally have priority access to information about their future monetary or exchange rate policies, this definition of transparency suggests that the monetary authorities pass information to the market faithfully and precisely. One question that emerges from this definition is whether "*more is better*" with respect to information. Indeed, to enjoy direct benefits from this extra information (that is, to make better-informed decisions) the receiver must understand it properly. The quality of information (*i.e.* its degree of clarity) is therefore expected to play a key role to achieve transparency (Winkler, 2002). In the context of foreign exchange operations, transparency should obviously involve several aspects. Here, we distinguish between the three types of transparency defined by Enoch (1998): *ex ante* transparency where the CB gives, directly or indirectly, some details on its future intentions (for example the fact that a future intervention is possible because the exchange rate level does not reflect fundamentals, or because the excessive volatility is judged undesirable); real time transparency where the CB's actions are visible to the market at the time they take place; and *ex post* transparency where the CB confirms and/or explains its interventions after the event. TABLE 1 gives some details about the key elements which enable these three types of transparency to be distinguished for intervention policy.

For *ex ante* transparency, we consider the communication policy as well as the procedure of intervention. Communication policy is acknowledged to play a significant role in enhancing the effectiveness of monetary policy, with or without policy action (see, *inter alia*, Amato *et al.*, 2002; Kohn and Sack, 2003; Ehrmann and Fratzscher, 2005). However, to the best of our knowledge, there have been very few attempts to investigate the role of this instrument in exchange rate policy. Most studies focus on the effects of "*oral interventions*" on the exchange rates (Fatum and Hutchinson, 2002; Jansen and de Haan, 2005; Beine *et al.*, 2008; Fratzscher, 2004). Both Fatum and Hutchinson (2002) and Jansen and de Haan (2005) analyse the impact of statements made by officials after the introduction of the Euro. Focusing on the three major CBs (the BoJ, the Fed and the BCE), Beine *et al.* (2008) investi-

Table 1 - Features identifying the three types of transparency

| Type of transparency | Identifying features |
|----------------------|--|
| <i>Ex ante</i> | Official statements giving some details about future exchange policy (on the level or the volatility of the exchange rate) Official statements indicating clearly the possibility of a future intervention, that are in fact followed by an intervention The practice of clustering interventions (reported interventions) |
| Real time | Visibility of interventions, as measured by news reports of the intervention Amount invested in the intervention operation The fact that the intervention was coordinated rather than unilateral |
| <i>Ex post</i> | Official speech of confirmation, or comments on the intervention operations Disclosure of the official intervention data |

gate the coordination between statements and actual intervention to see whether interventions are more effective when they are officially confirmed. At last, Fratzscher (2004) considers statements as an independent tool and estimates their effects on the exchange rate.

According to this literature, communication policy can be measured by official statements. To do this we identify two components of communication policy. First, *policy statements* inform the market of the authorities' point of view on the appropriate level or volatility of the exchange rate. Thus, they give pieces of information about their exchange rate objectives or future exchange rate policy. Second, *threats of intervention* reveal the CB's strategy and clearly indicate the possibility of a future intervention (TABLE 2 provides illustrations of policy statements and threats of intervention).

By revealing its exchange rate's target to the market (*policy statements*), the CB makes future action more understandable and potentially more efficient. Concerning the threats, we refine the analysis in identifying those that were really followed by an intervention. We term *false threats* (others are named *true threats*), statements announcing an intervention in the near future that finally not happens. Speeches of this kind cannot be considered as an element of transparency because they introduce confusion into the market.⁵ In line with the literature on transparency, which usually considers the openness of a CB (the quantity of information provided to the public) as an element of transparency but also attaches great importance to its honesty (the quality of this information), we measure the quality of such announcements by calculating the proportion of overall threats which turn out to be true (speeches are considered as an element of transparency in this case).⁶

5. While there might be some rational for not intervening in specific cases (e.g. if the market has already responded to the statement), the repeated use of false threats may negatively affect the central bank credibility and then the effectiveness of the policy in medium and long term.

6. We consider that a threat is followed by an intervention if at least one official intervention is conducted during the three following days.

Table 2 - Examples of Reuters and Dow Jones newswires on statements from officials

| Type of statement | Newswire report |
|---|---|
| News indicating the authorities' views of the exchange rate, exchange rate policy statements | |
| Statements on the level | <i>"Yen Rise Excessive, Doesn't Reflect Fundamentals"</i> (Kuroda) (Reuters, 23/03/1999) |
| Statements on volatility | <i>"Forex Volatility Undesirable"</i> (Kato) (Reuters, 9/06/1997) |
| News indicating the possibility of an intervention, threats | |
| Threat of intervention | <i>"Time for Effective Intervention Approaching"</i> (Sakakibara) (Reuters, 17/08/1998) |
| News confirming an intervention, confirmation speech | |
| Confirmation by an official | <i>"Minister of Finance's Sakakibara confirms BOJ Forex Intervention"</i> (Reuters, 14/06/1999) |

Sources: Reuters and Dow Jones reports.

Unlike previous studies, we consider an additional element of *ex ante* transparency that is the practice of intervention clustering. The underlying idea is that inertia or regularity in the intervention procedure is a way for the authorities to indicate their exchange rate target more clearly. Typically, if the central bank keeps intervening at the same level, say 105 JPY/USD, the market might gradually learn/infer the authorities' target. Conversely, one-off intervention might only indicate a potential over/under valuation of the currency.⁷ Here, we define a sequence of interventions as a period of at least three days with reported interventions in one direction (purchases or sales) possibly including two days with no intervention (Fatum and Hutchinson, 2003).⁸

To measure *real time* transparency, we use the news report of an intervention as a proxy for the visibility of interventions in real time. The intervention is considered "*reported*" if the news which usually comes just after the intervention operation clearly states that the CB has intervened. We restrict the definition by considering only news firmly reporting an intervention.⁹ This enable us to avoid cases where a CB may have tried without success to conduct a secret intervention involving in that case a news report (Beine *et al.*, 2007). The distinction between official and reported interventions enable us to deduce the part played by secret

7. This conjecture is supported by a close scrutiny of newswire reports emanating from the market. For instance, on July 2002 market participants made the following comments: "Looking at the BOJ's [Bank of Japan] interventions yesterday and the day before yesterday, it's quite obvious the BOJ is ready to buy the dollar if it falls below 124 yen, said a portfolio manager at a European asset management firm" (Reuters).

8. Contrary to Fatum and Hutchinson (2003), clusters of intervention are only composed of reported intervention. That is, we do not consider secret intervention. The motive is that only interventions perceived by the market can help participants to infer the central bank's strategy.

9. Interventions reported by newswire employing the words "rumours", "talks", "suspected", "suspicious", "believed" and "covert intervention" are not classified as transparent in real time. See TABLE 3 for illustrations.

interventions.¹⁰ An intervention is considered secret if it was not clearly reported to market participants on the day it was carried out. Any divergence between reported and official intervention activity is evidence of non-transparent intervention policy: the market is not having received all the pertinent information about intervention at the time it occurred.¹¹

Even if the CB does not formally announce or confirm its intervention operation, it may deliberately conduct the operation in a visible manner. For this, the CB has three main strategies at its disposal: i) to conduct the intervention on the market through visible channels; ii) to intervene in a concerted way with other CBs, that is for several CBs to intervene simultaneously in support of (or against) the same currency; and iii) to implement large-scale intervention operation.

Concerning the first strategy, a CB can use more or less transparent channels to conduct its transactions in the market. The authorities can indeed deal directly and openly with major domestic commercial banks in order to achieve high visibility (Lecourt and Raymond-Feingold, 2006). Inversely, they can use particular channels such as acting through other domestic CBs, through major foreign banks, or through brokers or the recent electronic brokerage systems (EBSs) to remain undetected. In the second strategy, the CB implicitly rejects hiding its operations from market participants by choosing to coordinate with another CB. In considering the interventions of the three major CBs (Bank of Japan, Federal Reserve and the Bundesbank), Beine and Lecourt (2004) show that the proportion of secret interventions is actually much lower for coordinated operations than for unilateral interventions. They note that this result is not entirely due to the magnitude of the sales or purchases, as modest coordinated operations after 1987 were systematically detected by market participants.¹² The fact of intervening in a coordinated way could also signify that the CB is choosing to increase its visibility and credibility and then to boost the signalling effect. As a matter of fact, in a survey of their beliefs about foreign exchange intervention sent to 52 exchange rate authorities, Neely (2008) found that large and coordinated interventions are more likely to be detected by the market.

Like Beine *et al.* (2008), we focus on a key element of *ex post* transparency: official statements aimed at confirming or/and commenting an intervention, and hence at clarifying the CB's policy. Another important element of *ex post* transparency is the disclosure of official intervention data. If the CB has a consistent practice of disclosing its intervention data indeed, it enables the market to know exactly what intervention policy the CB has conducted (especially concerning the amount invested in the operation) and hence to better grasp its

10. The data for official interventions by the Bank of Japan are publicly available on the website of the Ministry of Finance and include the day when the interventions took place as well as the extent of each intervention operation.

11. On the subject of secret interventions see Dominguez and Frankel (1993), Osterberg and Wetmore-Humes (1993), Humpage (1999) and Beine and Lecourt (2004).

12. We reached the same conclusion using our database: of 132 secret interventions over the total period, only 3 were undertaken in a coordinated way, while of 103 secret interventions over the recent period, none were coordinated.

future intervention policy.¹³ It is worth noting that this practice might truly improve transparency only if the time span between an intervention and its release to the public is not too long, or if the policy is stable over time.

Data on rumours

In this paper we use not only data on transparency but also data on market rumours. Rumours of central bank's interventions (CBIs) are particularly interesting for two main reasons. First, according to the signalling channel (Mussa, 1981), the perception of market participants is the main way in which interventions affect the exchange rate. Rumours are likely to influence the exchange rate if market participants firmly believe in them and mistakenly "*detect a signal where none was sent*" (Schwartz, 2000). Moreover, rumours can bring uncertainty to the market and create disturbances if market participants are unsure of their accuracy.

Second, empirical studies on CBI have shown that intervention policies can have different effects on the exchange rate on the day and a few days after they are carried out (Hung, 1997). Relying on these results, the literature usually estimates the quality of an intervention policy by its success in moving the exchange rate level in the desired direction or in reducing the volatility. However, these policies may also have indirect effects by favouring the dissemination of rumours. Consequently, the question of whether a more or less transparent policy enhances or reduces rumours on the market is key to characterising an optimal intervention policy (Chiu, 2003).¹⁴

In this study we define a rumour as a *news report* that announces that a CB might have intervened or is likely to intervene in the foreign exchange market. In fact, as noticed by Oberlechner and Hocking (2003), "*Rumours bear a close resemblance to news since, like news, they provide explanations for meaningful events, and they may be positive or negative*". However the information content of the rumours is not immediately confirmed and a doubt is likely to persist up to a certain point in time (Schindler, 2007).

From the definition, we make a first distinction between rumours of future interventions, called *anticipative rumours* and those of past interventions. In the first category, those induced by market analyses are distinguished from those resulting from official statements (see TABLE 3). The underlying idea is that some agents may observe some regularity in the CB's approach such as a clustering in the operations, the defence of specific exchange rate threshold (the so called "*line in the sand*") or a tendency to intervene when macro-economic data are released. This learning process may enable them to infer the authorities' intervention tactics and to anticipate future actions. Anticipative rumours may also arise from official

13. This also enables researchers to study the impact of the central bank intervention on exchange rate dynamics (see, *inter alia*, Jurgensen, 1983; Dominguez and Frankel, 1993; Edison, 1993; Bonser-Neal and Tanner, 1996; Baillie and Osterberg, 1997a; 1997b; Dominguez, 1998; Galati and Melick, 1999; Beine *et al.*, 2002).

14. Introducing the debate between transparency and ambiguity, Chiu (2003) comments that: "*Without disclosure, the market keeps guessing when and how the central bank will intervene. Will such market guesses add to market volatility, or will some degree of uncertainty be helpful in deterring destabilizing speculation?*".

statements when threats of intervention are issued. Therefore, if officials are credible, their statements may induce rumours on the market. If not, they are simply disregarded.

Once the intervention has occurred, it could be reported to the market by news reports. However, their inaccuracy across time and across currencies is well known and well-documented (see, *inter alia*, Klein, 1993; Frenkel *et al.*, 2004; Chang, 2004; Fischer, 2004). So a certain degree of uncertainty may prevail as long as an intervention is not officially confirmed either by a speech or by the disclosure of the data. In this study we have paid particular attention to discriminating between news reports according to their degree of uncertainty and whether they turn out to be true or false. We have distinguished *reported interventions* when the report is firm (*i.e.* the market is almost certain that an intervention has taken place) and "*perceived interventions*" (when the reports are highly uncertain and interventions can only be guessed at). Reported interventions are in turn divided into *true reports* (when an official intervention really takes place on the day of the report) and *false reports* (when the market mistakenly believes that a CB has intervened). False reports can occur when large trades are observed on the market or when market participants observe some jumps in the exchange rate developments. It is worth noting that this distinction is made *a posteriori* (*i.e.* after the data are disclosed). Confronted with the newswire report, market participants are unable to distinguish the two types of reports. Likewise, perceived interventions can be divided into "*misperceived*" (false) and "*well-perceived*" (true) reports (see TABLE 3). Because they do not provide clear information to the market, false and uncertain reports of intervention (*i.e.* misreported interventions and perceived interventions) are considered as rumours.

Table 3 - Examples of Reuters and Dow Jones newswires on rumours of intervention

| Type of rumour | Newswire report |
|---|---|
| Reported interventions (fairly certain news about the Bank of Japan's interventions) | |
| False reports | BOJ buys dlrs at around 103.95-104.00 yen in Tokyo (Reuters, 23/05/1994) |
| True reports | BOJ seen buying dlrs at around 104.00 yen in Tokyo (Reuters, 11/08/1993) |
| Perceived interventions (uncertain news about the Bank of Japan's interventions) | |
| Misperceived | Dlr Up on rumor of Bank of Japan Intervention (Dow Jones, 29/05/1995) |
| Well-perceived | Early Frankfurt: Dlr Surges on Rumored BOJ intervention (Dow Jones, 15/08/1995) |
| Anticipative rumours (market expectations of an intervention) | |
| General | BOJ may intervene in Asian forex market wednesday (Dow Jones, 20/07/1999) |
| From statements | Fears the BOJ might intervene again resurfaced after Finance Minister officials Eisuke Sakakibara and Haruiko Kuroda reiterated that Japan would take action to curb yen strength. (Reuters, 30/06/1999) |
| From market analyses | Dollar sits tight in nervous Tokyo, wary of BOJ. (...) The Bank of Japan stepped into the market last week at around the current level and traders believe the Japanese authorities could easily intervene again (Reuters, 4/06/2002) |

Sources: Reuters and Dow Jones reports.

■ INTERVENTIONS AND TRANSPARENCY

The evolution of *ex ante*, real time and *ex post* transparency

The intervention policies of the Japanese MoF have undergone several shifts in terms of both intervention and communications since 1991. Ito (2003, 2007) and Ito and Yabu (2007), in a well documented description of the MoF's intervention policy during the 1990's, explain that the arrival of Dr Sakakibara at the Ministry of Finance in June 1995 involved a radical change in policy. As suggested by these authors, we will therefore consider the Japanese intervention policy in three separate periods: a pre-Sakakibara period (January 1991-June 1995); a Sakakibara period (June 1995-December 2002)¹⁵ and a more recent post-Sakakibara period (January 2003-September 2004).

The break between these periods is mainly evident in two factors: a political shift in the MoF and a shift in the frequency of CBIs. FIGURE 1 graphs the evolution of the JPY/USD exchange rate and the MoF's intervention policy during this time. Two regime changes in the FX policy are easily detected: one in June 1995 from small-scale frequent interventions to large-scale infrequent interventions, and the other in 2003 to frequent large-scale interventions. Most interventions were conducted when the Japanese yen was appreciating against the US dollar. This is especially remarkable regarding the third period during which the BoJ pursued an aggressive intervention policy.¹⁶

TABLES 4 to 6 provide some statistics on the variables capturing the three types of transparency for the three periods.¹⁷

TABLE 4 and FIGURE 1 enable parallels between the evolution of the MoF's intervention policy and the associated real time transparency policy during the three periods to be drawn.

During the first period – the pre-Sakakibara period – the MoF intervened frequently, both unilaterally and in a coordinated way (11% of the interventions were coordinated with the Federal Reserve), in its attempts to reinforce and then to tackle the continuous appreciation of the yen (*“leaning against the wind”*), with repeated operations on the market (166 interventions over the period with an average of 41 interventions per year). However the transactions evolved only modest amounts of yen, at an average of \$463 million per intervention. This strong activity on the market was accompanied by rather low visibility, since 17% of the interventions were undertaken secretly.

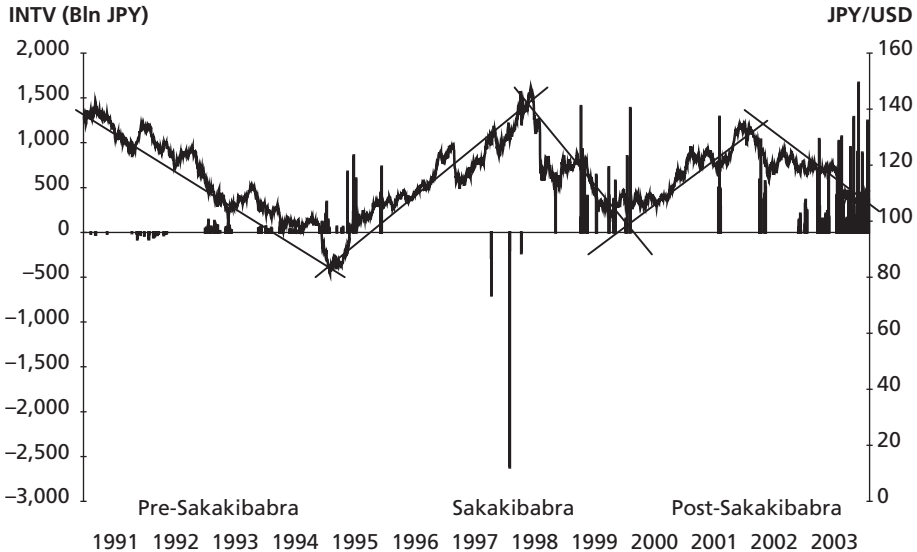
The arrival of Dr Sakakibara at the MoF in June 1995 clearly changed the intervention policy. During the Sakakibara period operations were conducted in a visible manner: intervention

15. Sakakibara left his position as Finance Minister for International Affairs in July 1999. His successor, Haruhiko Kuroda, followed roughly the same policy until the end of his term in January 2003. Therefore, the overall period June 1995 to January 2003 is usually identified as the Sakakibara-Kuroda period.

16. As reported by Ito and Yabu (2007), more than 85% of the Japanese interventions aimed at depreciating the yen. The underlying reason for this pattern is that the Japanese government is more keen on stabilising the exchange rate when the yen is appreciating because Japanese business cycles are mainly determined by exporting conditions.

17. Annual statistics on these variables for the whole period are given in APPENDIX 1.

Figure 1 - Evolution of the JPY/USD exchange rate and interventions of the MoF



Note: In the middle stands the Sakakibara period (June 1995-December 2002). The amount of the intervention is coded as positive for sales of JPY against USD (vertical black line) and negative for sales of USD against JPY.

operations were much less frequent (only 49 interventions during the 1,954 days of the period),¹⁸ but the amounts invested were much more substantial, with an average value of \$4.565 billion. The contrast between this period and the previous one is clearly marked, signalling the shift in tactics introduced by Mr Sakakibara: the first period can be characterised as small-scale frequent interventions while the Sakakibara period is characterised by large-scale infrequent interventions.¹⁹ In fact, the approach adopted by the new Minister of Finance was based on the signalling effect, relying more on the timing and visibility of operations than on secrecy to surprise the market. Consequently, the great majority of these operations were clearly perceived in real time by the market, with 98% of the interventions being reported by the market. Paradoxically, whereas the interventions were conducted in a visible manner, one of the means of intervening with higher visibility – intervening in a concerted way in order to boost the signalling effect – was not much used (only 12% of the interven-

18. As suggested by Chiu (2003), a central bank that is both active (making frequent interventions) and transparent in its foreign exchange operations runs the risk of revealing its tactics. She concludes that there is an inverse relationship between the frequency of interventions and the transparency of such operations.

19. Mr Sakakibara consciously changed the Ministry's tactics, as can be seen from his own writing: "[T]he change in intervention philosophy and technique [was introduced]. For this, all I had to do was to make a decision and convince the Vice Minister and the Minister of [its desirability]. For one, the frequency of interventions was reduced substantially, and per-intervention amount was increased, in order to push up the level [of the dollar vis-a-vis the yen]" (Sakakibara, 2000, p. 120).

Table 4 - Statistics on real time transparency

| | No. of official interventions (a) | No. of reported interventions (b) | % of reported interventions (c) | % of secret interventions (d) | No. of coordinated interventions (e) | % of coordinated interventions (f) | Average value of interventions (bn US\$) (g) |
|----------|-----------------------------------|-----------------------------------|---------------------------------|-------------------------------|--------------------------------------|------------------------------------|--|
| Period 1 | 166 | 138 | 83.13 | 16.87 | 18 | 10.84 | 0.463 |
| Period 2 | 49 | 48 | 97.96 | 2.04 | 6 | 12.24 | 4.565 |
| Period 3 | 128 | 25 | 19.53 | 80.47 | 0 | 0.00 | 2.430 |

(a) Number of days on which the Bank of Japan intervened.

(b) Number of days on which there was a report of interventions on the day of an official intervention.

(c) (b) as a percentage of (a).

(d) 100 minus (c).

(f) Number of coordinated interventions divided by the number of official interventions.

(g) The average value of interventions includes dollar purchases and the absolute value of dollar sales and excludes days where there were no interventions.

Table 5 - Statistics on *ex post* transparency

| | No. of official interventions (a) | No. of official confirmations (b) | % of official interventions (c) | Disclosure of the data (d) |
|----------|-----------------------------------|-----------------------------------|---------------------------------|----------------------------|
| Period 1 | 166 | 10 | 6.02 | no |
| Period 2 | 49 | 39 | 88.63 | no (until 2001) |
| Period 3 | 128 | 1 | 0.78 | yes |

(a) Number of days on which the Bank of Japan intervened.

(b) Number of days on which there was an official confirmation speech on the day of an official intervention.

(c) (b) as a percentage of (a).

Table 6 - Statistics on *ex ante* transparency

| Total number of days (a) | No. of exchange policy statements (b) | % of exchange policy statement days (c) | No. of threats of intervention (d) | % of threat of intervention days (e) | % of true threats (f) | No. of clustered interventions (g) |
|--------------------------|---------------------------------------|---|------------------------------------|--------------------------------------|-----------------------|------------------------------------|
| Period 1 | 1103 | 97 | 8.79 | 8.61 | 58.94 | 17 |
| Period 2 | 1954 | 331 | 16.93 | 17.34 | 17.69 | 4 |
| Period 3 | 450 | 31 | 6.88 | 19.55 | 64.77 | 2 |

(c) (b) as percentage of (a).

(f) Percentage of threats of intervention which were true (i.e. followed by an intervention on the same day).

(g) A cluster is defined as a row of at least three reported interventions with a maximum of two days without reported interventions between them.

tions were concerted). One possible explanation lies in the fact that some CBs (such as the Fed) had become more reluctant to employ this approach.

The era of visible intervention – few interventions with large amounts – came to a sudden end in 2003 with the departure of H. Kuroda: intervention operations again became very frequent (with a total of 128 interventions over the two years 2003-04, and a peak of 83 intervention days in 2003), running at almost twice the rate of interventions between June 1995 and 2002. Furthermore, the size of the interventions was reduced by almost half compared to the previous period, with an average value of \$2.43 billion. This shift in the visibility of the intervention policy again involved a considerable increase in secret interventions, which represented 80% of the total in 2003-04, with 78% of the secret interventions occurring in 2003.²⁰

When a CB conducts its intervention operations in a visible manner – by intervening occasionally with large amounts and/or in a coordinated way – it should formally confirm its interventions. Hence, real time and *ex post* transparency should be closely connected. As is shown in TABLE 5, the Japanese authorities changed their confirmation policy in the 1990s: the two periods when the actual operations were conducted in a rather discreet manner in real time – the pre-Sakakibara and the recent period – are characterised by very few confirmation speeches (6% and less than 1% respectively of the operations were confirmed soon after their launch during these two periods).

However, during the Sakakibara period, when interventions were conducted in a visible manner in real time, and especially during the period 1997-2002, the authorities made a practice of systematically confirming their operations immediately after they occurred. More than 88% of the operations were confirmed in this way.²¹ Another signal of *ex post* transparency is the release of the official intervention data: it was during this period (more precisely in 2001) that the MoF started to publish the details of the intervention operations (including the date, amounts and currency pairs) on its website, with a delay of three months.²² Surprisingly, the sudden change in transparency policy in 2003-04 did not call into question this data disclosure. This puzzle – secret interventions and, at the same time, disclosure of the intervention data – can be explained in part by the desire of the authorities to keep the operations secret at the time they intervened in order to increase their effectiveness, whereas the disclosure of the interventions data on the BoJ website occurs a few months later. Such interpretation is underpinned by Vitale (1999)'s theoretical model. According to this model, secret interventions are more efficient than public ones when the sign of the transaction is

20. According to Beine and Lecourt (2004), one possible explanation of this shift in the transparency policy in the recent period lies in the disagreement between the Japanese authorities and other central banks (especially the Fed) about the opportunity to manipulate the exchange rate by intervening on the exchange rate market.

21. Between 1997 and 2002, only one intervention out of 36 was not confirmed by an official speech on the day of the intervention and all the coordinated interventions were systematically confirmed thereafter.

22. Given the significant degree of inertia in the Japanese policy, this information might provide relevant insights to the market although it is old of up three months.

not consistent with the fundamentals. In the case of Japan, Beine and Bernal (2007) provide empirical supports to Vitale's approach. More precisely, they find that the Japanese authorities tended to conceal their inconsistent operations.²³ The policy based on the disclosure of official intervention data after a short delay and the use of secret operations have naturally various drawbacks. In particular, discreet transactions initiated by the CB are more difficult to maintain undetected. Indeed, as the market is aware *a posteriori* (with the disclosure of the official intervention data) that it has been "deceived", it becomes more concerned about and pays greater attention to CB activities (Beine *et al.*, 2007). In turn, the policy may result in a decrease in the central bank's credibility and in a resurgence of uncertainty and rumours. If real time and *ex post* transparency are easily interpretable, *ex ante* transparency is not so obvious. The underlying question is whether this type of transparency (measured by verbal interventions – speeches about the exchange policy or, more precisely, threats of intervention) and the practice of intervention clustering is used by the Japanese authorities to give visibility to its future intentions or, on the contrary, to introduce confusion to the market. A notable feature of the intervention policy conducted by the Japanese authorities is the frequent use of verbal interventions. TABLE 6 shows that the statements they issued to inform the market about exchange rate policy, and the threats of intervention were quite infrequent in the first period, but relatively frequent during the second and third periods.

However, if we look at the evolution of the true threats of intervention (TABLE 6.), that is those which were followed by an intervention on the same day or the following day, we see that the evolution described above is reversed: the percentage of true threats was large during the first and last periods (58% and 64% respectively of the threats of intervention were followed by an actual intervention) but very small in the second period (with only 17% of threats being carried out).²⁴

How can we explain this evolution in the use of intervention threats? According to the signalling channel, interventions affect exchange rates when they are used by CBs as a means of conveying some inside information (*i.e.* information known to CBs but not to the market) about fundamentals to the market. If this signal is expected by the market, through intervention threat statements, it may leave exchange rates completely unaffected. In that case, what are the real motives for the use of intervention threats? In fact, threats can be used by the authorities as a means of keeping the market alert to potential further intervention operations, and then playing with the fears of the market. The Sakakibara period was characterised more by a policy of "oral statements" than by actual interventions; threats of intervention were frequently used as a substitute for real action. Furthermore, it seems surprising that the last period is characterised by the highest proportion of both true threats and secret interventions. It might be expected that, in this period, oral interventions such as

23. The total scale of intervention is disclosed at the end of each month. However precise data on the date of each intervention, with the amount spent per day, is only made available with a time delay of three months.

24. For example, in 1998 threats were issued on 74 days, an historical high, but only four actual interventions took place.

threats would not be used (since the idea of a secret intervention is that it is unpredictable). This inconsistent and ambiguous policy achieved the voluntary or involuntary result (possibly due to institutional friction) of increasing the climate of uncertainty and potentially market rumours.

If we also consider the practice of intervention clustering as an element of *ex ante* transparency, in the sense that it is easier for the market to perceive the CB's strategy or objectives when it practices frequently repeated, rather than one-off, interventions, the first period was when clustering was used most frequently, with 17 long sequences of days or weeks of repeated intervention.

An index for the evolution of the three types of transparency

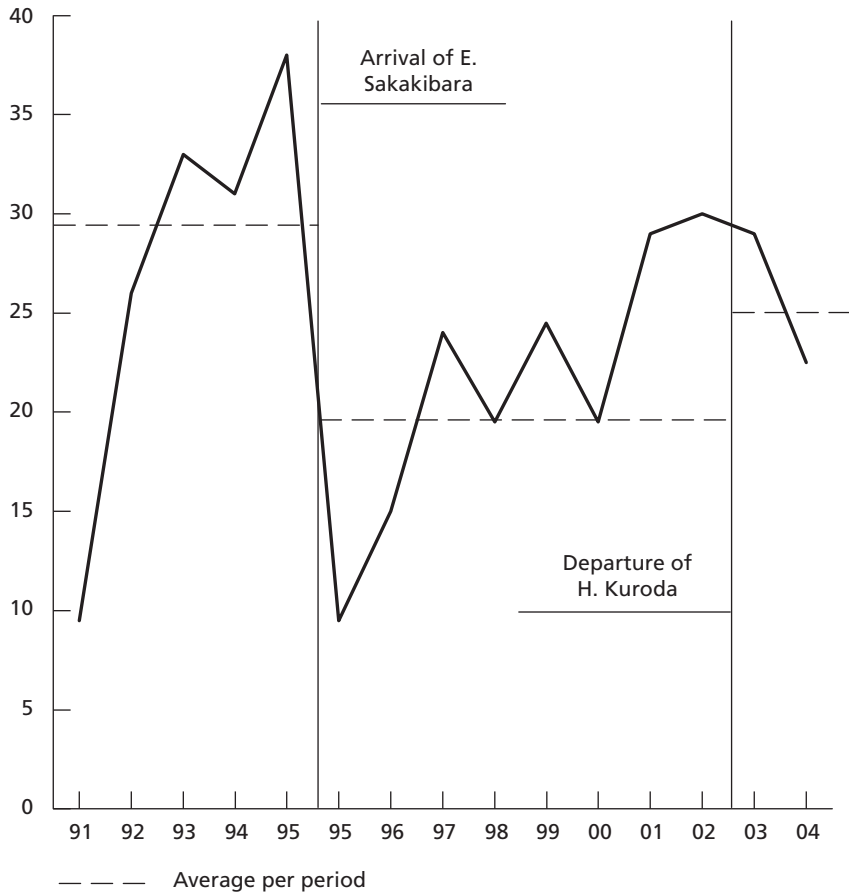
In order to distinguish which type of transparency dominated each of the three periods, we present an index aimed at both synthesising all the elements representative of each type of transparency and capturing their evolution over time. This index does not introduce any new elements into our discussion of transparency, but enables us to identify more clearly the main tendencies of the Japanese transparency policy.

Concretely, this index consists in putting each of the variables described in TABLE 1 in ascending order by year, assigning to this ranking numbers from 1 and 15, and then summing the ranks of all the variables used to measure each type of transparency (see APPENDIX 2). For example, during the year 1996 the Japanese authorities provided very little information to the market through statements. Only 7 statements were issued. That is the lowest number in the whole sample period (1991-2004). Thus, this period receives the rank 1. At the other extreme, in 1999 the authorities talked to the market a lot and provided a lot of information about their view of the exchange rate. During this period 98 statements were issued, the highest number for any single year, and so 1999 receives the rank 15. Unlike Eijffinger and Geraats (2002),²⁵ our index of transparency relies on a ranking of the different variables presented in the previous section and not on a subjective rating. In sum, the highest ranking is given to the year with the highest transparency according to the different criteria. FIGURES 2 to 4 show the evolution of this index for *ex ante*, real time and *ex post* transparency respectively over the total period.

Two main conclusions emerge from these figures. First, the transparency of the Japanese intervention policy displays a great deal of variability over time. This suggests that the policy-makers shifted exchange policy regimes several times during the 1990s. The second conclusion is that there are clear differences in transparency policy between the three periods.

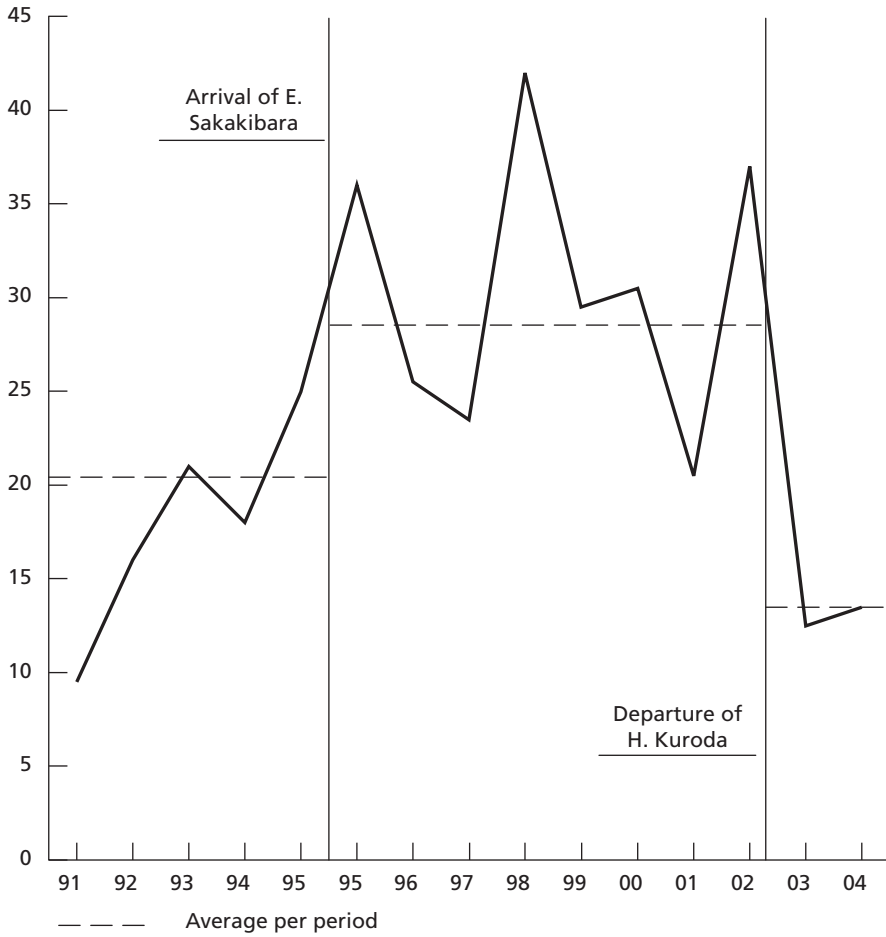
25. Eijffinger and Geraats (2002) used an index of transparency consisting of variables which reflected various aspects of transparency in monetary policy. These components were (i) political transparency (ii) economic transparency (iii) procedural transparency (iv) policy transparency and (v) operational transparency. For each of them three criteria are taken into account. For example formal objectives, quantitative targets and institutional arrangements were considered to measure political transparency. A subjective score (0, 1/2 or 1) was given to each criterion. Once established, this score was sent to central banks. Finally, they used the banks' responses to reassess the scores and aggregate them into the index.

Figure 2 - *Ex ante* transparency index



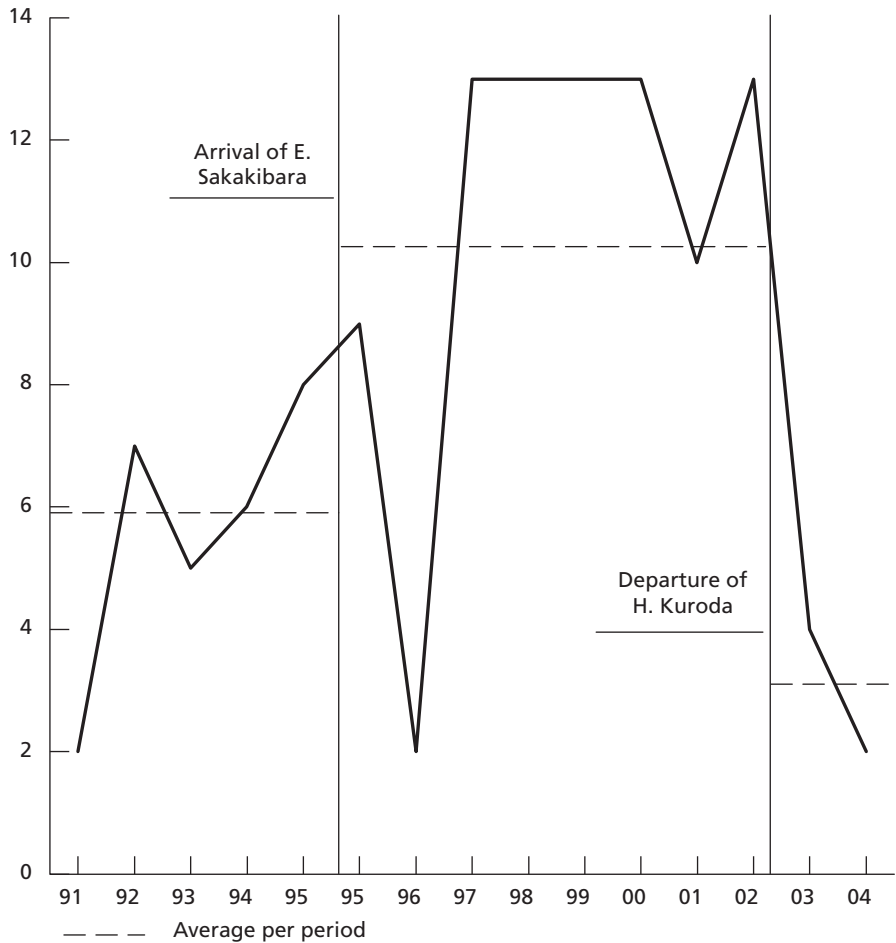
Note: Criteria: (i) Statements; (ii) Percentage of true threats; (iii) Intervention clusters.

Figure 3 - Real time transparency index



Note: Criteria: (i) Percentage of interventions reported; (ii) Percentage of interventions coordinated; (iii) Average value of interventions.

Figure 4 - Ex post transparency index



Note: Criterion: (i) Percentage of interventions confirmed by a speech.

Real time and *ex post* transparency clearly dominated the Sakakibara period. Especially after 1997, the authorities tried to be as visible as possible in their interventions and had a constant practice of confirming operations.

The first period was characterised by a higher *ex ante* transparency policy, with frequent use of verbal interventions (statements about the exchange rate or true threats of intervention) and clustering, although the intervention operations were conducted in a rather low visibility way and rarely confirmed.

By contrast, the recent period can be defined as an “opaque” intervention policy (whatever type of transparency is considered) typified by the large percentage of secret interventions.

Interestingly, the three indexes do not strictly follow the same path. For instance, the real time and *ex post* transparency indexes reach their maximum during the Sakakibara period, while *ex ante* transparency index falls during this period. As suggested previously, this may indicate the existence of substitution effects. That is, the authorities tend to adopt balanced and complex strategies, which consist in promoting specific forms of transparency at a certain point in time, instead of improving or reducing the overall level of transparency. This approach is consistent with some theoretical arguments assessing the effectiveness of intervention. Typically, the signalling channel requires interventions to be clearly perceived and not anticipated by the market to affect the exchange rate.

We will now analyse whether this variability in the transparency of Japanese intervention policy enhanced or reduced rumours on the market.

■ THE EFFECT OF TRANSPARENCY POLICY ON MARKET RUMOURS

What are the expected effects of a transparent policy in terms of market rumours? As political authorities have priority access to information concerning their future monetary or exchange rate policies, they could faithfully and precisely pass that information to the market. The disclosure of information should, *a priori*, reduce speculation and hence rumours about the government’s actions, thereby working to stabilise foreign exchange markets. This would be helpful when the aim of the authorities is to reduce uncertainty. But conversely, when the communication policy is not consistent with the monetary or exchange rate policies, it may stimulate market rumours and increase uncertainty.²⁶

TABLES 7 and 8 present, respectively, the number of anticipative rumours of intervention and the number of intervention reports over the three sub-periods identified above. The number of rumours and the average per period are reported to allow comparisons across time.²⁷

TABLE 7 clearly shows that there were a considerable number of anticipative rumours over the three periods and particularly during the third period (with anticipative rumours on 18% of days). The distinction between rumours from market analysis and rumours from statements enables us to refine the analysis, and reveals two elements. First, anticipative rumours stemming from market analysis were more frequent during periods 1 and 3 (that is, periods characterised by an intervention policy which was not very visible either in real time or *ex post*, but which display, like period 1, *ex ante* transparency). During this period, the Japanese authorities frequently intervened in a clustered way, so promoting a profusion of anticipative

26. This question of the conditions under which communication may be undesirable has been analysed at a theoretical level with respect to monetary policy (see, *inter alia*, Geraats, 2002; Morris and Shin, 2002; Amato, Morris and Shin, 2002).

27. The statistics on rumours for each year over the total period are given in APPENDIX 3.

rumours. As we have already mentioned, the large number of anticipative rumours in the third period can be explained by the inconsistent policy practised by the authorities that consists of 1) intervening secretly and at the same time using intervention threats; 2) intervening secretly and later disclosing the official intervention data (with a delay). By contrast, anticipative rumours decreased strongly in period 2, which was characterised by real time and *ex post* transparency, but low *ex ante* transparency. This means that the sporadic intervention procedure adopted over this period (few isolated interventions rather than numerous clustered interventions) enabled the criteria for market expectations to be reduced.²⁸

Second, anticipative rumours resulting from official statements (either verbal interventions about the exchange rate or direct threats of intervention) increased during the second period. We have already pointed out that Sakakibara frequently used threats of intervention without really acting. This was accompanied by the resurgence of uncertainty that was characterised by a large number of anticipative rumours.

TABLE 8 offers an insight into the manner to which intervention operations have been perceived by the market over the three periods. Not surprisingly, market participants made more mistakes about the CB's presence in the market when intervention operations were conducted with low visibility and rarely confirmed. This was clearly the case during the first period, with 6.18% of false reports²⁹ and at a lower scale during the third period qualified as no transparent (with 2.17% of false reports).

However, the most interesting feature of TABLE 8 is the rather poor quality of information in the market, since most of intervention reports remained uncertain (there were numerous true or false rumours on the market as: "*Asia Forex Rumors of Japan MoF Yen-Selling Lift Dlr*" (Reuters December 3, 2003) or "*I've been hearing rumours that the authorities are conducting stealth intervention because they want to keep the dollar at around 120 yen until the end of March,*" said a dealer at a major Japanese bank in Tokyo". (Reuters, March 27, 2003) but almost no firm reports). In 2003 and 2004 well-perceived interventions, *i.e.* true rumours, occurred on 9.55% of days, compared to 0.35% of days in the two previous periods (taken together).

The number of false reports should be reduced when intervention policy is practiced in a visible way. That was the case during the Sakakibara period since there were only false reports on 1.99% of days, compared to 6.18% of days during the pre-Sakakibara period. In fact, this figure stayed relatively high, whereas the real time and *ex post* transparency indices improved sharply. This is due to the year 1995, where a peak in false reports is clearly evi-

28. These results are consistent with Sakakibara's willingness to surprise the market: "The market was accustomed to interventions, because they were too frequent. The interventions were taken as given. Most interventions, including joint interventions, were predictable, so that interventions, even joint ones, had only small, short term effects, and could not change the sentiment of the market" (Sakakibara, 2000 from Ito and Yabu, 2007).

29. In order to compare the number of false reports in each period, we report the percentage of days on which false reports appeared on the overall eligible days (days without official interventions).

Table 7 - Statistics on anticipative rumours

| Total number of days (a) | No. of days with anticipative rumours (b) | % of anticipative rumour days (c) | No. of days with anticipative rumours from market analysis (d) | % of anticipative rumour from market analysis (e) | No. of days with anticipative rumours from statements (f) | % of anticipative rumour from statements days (g) |
|--------------------------|---|-----------------------------------|--|---|---|---|
| Period 1 | 1103 | 11.78 | 115 | 10.42 | 27 | 2.44 |
| Period 2 | 1954 | 16.78 | 186 | 9.51 | 221 | 11.31 |
| Period 3 | 450 | 18.66 | 58 | 12.88 | 33 | 7.33 |

(b) Number of days with anticipative rumours, whether these arise from market analysis or from statements (both types of rumour may occur on the same day).

(c) (b) as percentage of (a).

(d) Number of days with anticipative rumours arising from market analysis.

(e) (d) as percentage of (a).

(f) Number of days with anticipative rumours arising from statements.

(g) (f) as percentage of (a).

Table 8 - Statistics on intervention reports

| No. of days with false reports (a) | % of false report days (b) | No. of days with perceived interventions (c) | % of perceived intervention days (d) | No. of days with mis-perceived interventions (e) | % of mis-perceived intervention days (f) | No. of days with well-perceived interventions (g) | % of well-perceived intervention days (h) |
|------------------------------------|----------------------------|--|--------------------------------------|--|--|---|---|
| Period 1 | 58 | 6.18 | 2.26 | 14 | 1.26 | 11 | 0.99 |
| Period 2 | 38 | 1.99 | 2.2 | 43 | 2.2 | 0 | 0.00 |
| Period 3 | 7 | 2.17 | 12.22 | 12 | 2.66 | 43 | 9.55 |

(a) Number of days with false reports

(b) (a) as percentage of the total number of days of the period without an intervention (TABLE 7 column (a) minus TABLE 5 column (a)).

(c) Number of days with perceived interventions (whether mis- or well-perceived).

(d) (c) as percentage of TABLE 7 column (a).

(e) Number of days with misperceived interventions.

(f) (e) as percentage of TABLE 7 column (a).

(g) Number of days with well-perceived interventions.

(h) (g) as percentage of TABLE 7 column (a).

dent in TABLE A3.1 (APPENDIX 3).³⁰ One interpretation is that market participants did not immediately perceive the radical change in intervention policy, with fewer interventions and more real time and *ex post* transparency that occurred with the arrival of Sakakibara in the MoF in June 1995. Consequently, the market continued to speculate on the MoF's actions. But after few months (from 1996 to January 2003), the number of false reports fell dramatically.

In summary, two main threads of evidence emerge from the MoF's intervention policy of between 1991 and 2004:

- first, when market participants did not have clear information about what was being done or had been done (namely real time and *ex post* transparency) they speculated on the authorities' activities. False or uncertain reports then emerged onto the market;
- second, providing information to the market on exchange rate targets or future interventions, namely *ex ante* transparency, induced anticipative rumours. Some of these rumours were intentionally provoked by the authorities through threats of intervention.³¹

■ CONCLUSION

The literature on monetary policy has paid a lot of attention to define the notion of transparency and to investigate its impact on the effectiveness of policies. The literature on the exchange rate, by contrast, has almost disregarded this feature although it may be critical. To bridge this gap, this paper has focused on the experience of Japan, a country that has intervened aggressively along the past decades with radical changes in the nature of its policy, in order to examine how transparent the intervention policy of the Japanese MoF was over the period 1991-2004 and to explore the effect of changes in transparency on market perception.

To do this we used a comprehensive database (constructed from Reuters and Dow Jones news reports) capturing official statements on the exchange rate and procedures of intervention. These were used as measures of transparency. This database also contains market rumours about the Japanese intervention policy that is anticipative rumours and intervention reports (firm or uncertain reports) which are assumed to depict the perception of the market.

In line with previous studies in literature (Ito, 2003; Ito and Yabu, 2007, Gnabo *et al.*, 2008), we find that the transparency achieved by the Japanese government's intervention policy displays a great deal of variability over time, with two regime changes in policy over the period: the qualified "Sakakibara" period 1995-2002 seen as a period of high transparency in contrast with the first subperiod (1991-1995), with infrequent large-scale interventions systematically confirmed; a recent period (2003-2004) defined as "opaque" in the intervention policy,

30. There were 14 false reports between 1996 and 2002, compared to 24 between June 1995 and December 1995 (see APPENDIX 3).

31. One explanation could be that the authorities try to induce a two way risk when there is a strong speculative trend. By doing so, they expect to break the trend without challenging their credibility by actually stepping into the market.

as evidenced by the large percentage of secret interventions. Interestingly, these regime changes are mainly related to institutional factors (changes at the head of the MoF) and not to specific developments of the exchange rate. This result is important because it means that these regime changes should be taken into account in empirical studies testing the effects of BoJ's interventions on the exchange rate dynamics.

Another important result concerns the effect induced by a transparent FX intervention policy. The authorities in charge of the FX policy may decide to intervene at any time, generating uncertainty climate and volatility in the market. But we find that the way of intervening can have different effects on market perception. When the FX exchange authorities intervene with a maximum of visibility (infrequent large-scale intervention systematically confirmed by an official speech), it enables the market to better understand the authorities' signal and it reduces uncertainty (measured by the number of false or uncertain reports of intervention in the market). But when the authorities intervene orally by revealing their preference concerning the exchange rate level, it generally confuses the market, resulting on the emergence anticipative rumours. These results suggest that, in general, actual interventions on the market should still be considered as an effective tool, provided that the monetary authorities talk to the market and intervene in an appropriate way.

J.-Y. G. & C. L.³²

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APPENDIX 1

Table A1.1 - Transparency statistics for each year 1991-2004

| Year | Real time transparency | | | | | | | | | | Ex post transparency | | | | | | | Ex ante transparency | | | | | | |
|------|---|--------------------------------|---|---|--|--|--|---|---|--|------------------------------|---|--|--|---|--|--|----------------------|--|--|--|--|--|--|
| | (a) No. of official interventions | (b) Total number of days | (c) No. of interven- tions reported | (d) % of interven- tions reported | (e) % of interven- tions kept secret | (f) No. of coordinated interventions | (g) % of interventions coordinated | (h) Average value of interventions (bn US\$) | (i) No. of official confirmations | (j) % of interventions confirmed | (k) Disclosure of data | (l) No. of exchange policy statements | (m) % of days with exchange policy statements | (n) No. of threats of intervention | (o) % of days with threats of intervention | (p) % threats which were carried out | (q) No. of clustered interventions | | | | | | | |
| 1991 | 4 | 197 | 3 | 75.00 | 25.00 | 0 | 0 | 0.125 | 0 | 0.00 | no | 15 | 7.61 | 2 | 1.02 | 0.00 | 0 | | | | | | | |
| 1992 | 23 | 257 | 13 | 56.52 | 43.48 | 3 | 13.04 | 0.240 | 2 | 8.70 | no | 22 | 8.56 | 16 | 6.23 | 43.75 | 1 | | | | | | | |
| 1993 | 48 | 261 | 42 | 87.50 | 12.50 | 5 | 10.42 | 0.487 | 1 | 2.08 | no | 26 | 9.96 | 28 | 10.73 | 50.00 | 5 | | | | | | | |
| 1994 | 55 | 261 | 48 | 87.27 | 12.73 | 5 | 9.09 | 0.372 | 3 | 5.45 | no | 18 | 6.90 | 26 | 9.96 | 57.69 | 8 | | | | | | | |
| 1995 | 36 | 127 | 32 | 88.89 | 11.11 | 5 | 13.89 | 0.759 | 4 | 11.11 | no | 16 | 12.60 | 23 | 18.11 | 86.96 | 3 | | | | | | | |
| 1995 | 7 | 132 | 7 | 100.00 | 0.00 | 3 | 42.86 | 3.385 | 3 | 42.86 | no | 4 | 3.03 | 12 | 9.09 | 16.67 | 0 | | | | | | | |
| 1996 | 5 | 260 | 5 | 100.00 | 0.00 | 0 | 0.00 | 3.055 | 0 | 0.00 | no | 7 | 2.69 | 5 | 1.92 | 20.00 | 1 | | | | | | | |
| 1997 | 3 | 259 | 3 | 100.00 | 0.00 | 0 | 0.00 | 2.747 | 3 | 100.00 | no | 35 | 13.51 | 40 | 15.44 | 7.50 | 1 | | | | | | | |
| 1998 | 3 | 259 | 3 | 100.00 | 0.00 | 2 | 66.67 | 7.833 | 3 | 100.00 | no | 79 | 30.50 | 74 | 28.57 | 5.41 | 0 | | | | | | | |
| 1999 | 13 | 261 | 13 | 100.00 | 0.00 | 0 | 0.00 | 5.175 | 13 | 100.00 | no | 98 | 37.55 | 94 | 36.02 | 22.34 | 0 | | | | | | | |
| 2000 | 4 | 261 | 4 | 100.00 | 0.00 | 0 | 0.00 | 7.056 | 4 | 100.00 | no | 28 | 10.73 | 31 | 11.88 | 22.58 | 0 | | | | | | | |
| 2001 | 7 | 262 | 6 | 85.71 | 14.29 | 0 | 0.00 | 3.819 | 6 | 85.71 | yes* | 35 | 13.36 | 28 | 10.69 | 28.57 | 1 | | | | | | | |
| 2002 | 7 | 260 | 7 | 100.00 | 0.00 | 1 | 14.29 | 4.648 | 7 | 100.00 | yes | 45 | 17.31 | 55 | 21.15 | 25.45 | 1 | | | | | | | |
| 2003 | 83 | 259 | 18 | 21.69 | 78.31 | 0 | 0.00 | 2.162 | 1 | 1.20 | yes | 15 | 5.79 | 58 | 22.39 | 65.52 | 2 | | | | | | | |
| 2004 | 45 | 191 | 7 | 15.56 | 84.44 | 0 | 0.00 | 2.894 | 0 | 0.00 | yes | 16 | 8.38 | 30 | 15.71 | 63.33 | 0 | | | | | | | |

(a) Number of days on which the Bank of Japan intervened.

(b) Number of trading days for which data were collected (excluding weekends).

(c) Number of days on which interventions were reported.

(d) (c) as a percentage of (a). (e) 100 minus (d).

(f) Number of days on which the Bank of Japan intervened in coordination with another central bank.

(g) (f) as a percentage of (a).

(h) The average value of interventions, including dollar purchases and the absolute value of dollar sales, for days on which interventions occurred.

(i) Number of days on which an intervention was officially confirmed by a speech the same day.

(j) (i) as a percentage of (a). (l) Number of days on which official statements expressing views on the exchange rate level or volatility was issued.

(m) (l) as a percentage of (b). (n) Number of days on which statements threatening an intervention were issued.

(o) (n) as a percentage of (b). (p) Number of days on which statements threatening an intervention were followed by an actual intervention in the three following days, as a percentage of (n).

(q) Number of sequences with a clustering of reported interventions.

* From June

APPENDIX 2

The construction of the transparency index

This appendix details the procedures used to construct the index presented in TABLE 8, as well as two others indices used to test the robustness of the results. All the constructions adopt the underlying principle that each variable contributes equally to the index.

The main index was constructed by arranging each of the variables in TABLE 1 in ascending order by year and assigning rank orders from 1 and 15 to the years. Thus the years with the lowest and the highest transparency, according to each criterion, were ranked 1 and 15 respectively. For example, only 7 statements were issued by officials in 1996, compared with 98 in 1999 (see APPENDIX 1)³³. This means that the authorities decided to provide less information to the market, and so reduced the transparency of their policy. These two years are respectively the least and the most transparent, according to this criterion, and so they were ranked 1 and 15 respectively. If two (or more) years had the same value we averaged the rank so as to keep the overall weight of each variable in the index the same. For example, if 1996 and 1999 both had the same value, and that this value was ranked 3, each year was ranked $3.5 = ((3+4)/2)$. This procedure was repeated for each of the transparency variables, and the ranks assigned to each of the variables in a year were then summed. This enabled us to aggregate data of very different types (for example, percentages and raw numbers) and to give each of them the same weight (the sum of each variable or criterion is 120). The raw data is shown in APPENDIX 1, and the ranks and sums in TABLE A2.1.

Table A2.1 - The construction of the first transparency index

| | No. of official statements | % of true threats | Clusters of interventions | Ex ante | Reports of Interventions | % of interventions coordinated | Average value of interventions | Real time | % of interventions confirmed | Ex post |
|-------|----------------------------|-------------------|---------------------------|---------|--------------------------|--------------------------------|--------------------------------|-----------|------------------------------|---------|
| 1991 | 5 | 1 | 3.5 | 9.5 | 4 | 4.5 | 1 | 9.5 | 2 | 2 |
| 1992 | 7 | 10 | 9 | 26 | 3 | 11 | 2 | 16 | 7 | 7 |
| 1993 | 8 | 11 | 14 | 33 | 7 | 10 | 4 | 21 | 5 | 5 |
| 1994 | 4 | 12 | 15 | 31 | 6 | 9 | 3 | 18 | 6 | 6 |
| 1995 | 10 | 15 | 13 | 38 | 8 | 12 | 5 | 25 | 8 | 8 |
| 1995 | 2 | 4 | 3.5 | 9.5 | 12 | 14 | 10 | 36 | 9 | 9 |
| 1996 | 1 | 5 | 9 | 15 | 12 | 4.5 | 9 | 25.5 | 2 | 2 |
| 1997 | 12 | 3 | 9 | 24 | 12 | 4.5 | 7 | 23.5 | 13 | 13 |
| 1998 | 14 | 2 | 3.5 | 19.5 | 12 | 15 | 15 | 42 | 13 | 13 |
| 1999 | 15 | 6 | 3.5 | 24.5 | 12 | 4.5 | 13 | 29.5 | 13 | 13 |
| 2000 | 9 | 7 | 3.5 | 19.5 | 12 | 4.5 | 14 | 30.5 | 13 | 13 |
| 2001 | 11 | 9 | 9 | 29 | 5 | 4.5 | 11 | 20.5 | 10 | 10 |
| 2002 | 13 | 8 | 9 | 30 | 12 | 13 | 12 | 37 | 13 | 13 |
| 2003 | 3 | 14 | 12 | 29 | 2 | 4.5 | 6 | 12.5 | 4 | 4 |
| 2004 | 6 | 13 | 3.5 | 22.5 | 1 | 4.5 | 8 | 13.5 | 2 | 2 |
| Total | 120 | 120 | 120 | 360 | 120 | 120 | 120 | 360 | 120 | 120 |

33. For the sake of clarity we consider the number of statements by period in the example. However, we normalised it by the number of days in each period for the ranking.

To control the sensitivity of the results and to take into account the magnitude of the differences between years we constructed another index. This index measures the contribution of each year. That is to say that the contribution of the year i for the variable x is:

$$Index_{x_i} = 100 * \left(\frac{X_i}{\sum_{i=1}^N X_i} \right) \text{ where } N=15.$$

The results are reported in TABLE A2.2. The key features noted for the first index remain unchanged.

Table A2.2 - The construction of the second transparency index

| | No. of official statements | % of true threats | Clusters of interventions | Ex ante | Reports of Interventions | % of interventions coordinated | Average value of interventions | Real time | % of interventions confirmed | Ex post |
|-------|----------------------------|-------------------|---------------------------|--------------|--------------------------|--------------------------------|--------------------------------|--------------|------------------------------|--------------|
| 1991 | 4.04 | 0 | 0 | 4.04 | 6.16 | 0 | 0.28 | 6.44 | 0 | 0 |
| 1992 | 4.54 | 8.48 | 4.35 | 17.37 | 4.64 | 7.66 | 0.54 | 12.84 | 1.32 | 1.32 |
| 1993 | 5.29 | 9.69 | 21.74 | 36.72 | 7.18 | 6.12 | 1.09 | 14.39 | 0.32 | 0.32 |
| 1994 | 3.66 | 11.19 | 34.78 | 49.63 | 7.16 | 5.34 | 0.83 | 13.34 | 0.83 | 0.83 |
| 1995 | 6.68 | 16.86 | 13.04 | 36.59 | 7.30 | 8.16 | 1.70 | 17.15 | 1.69 | 1.69 |
| 1995 | 1.61 | 3.23 | 0 | 4.84 | 8.21 | 25.17 | 7.56 | 40.95 | 6.52 | 6.52 |
| 1996 | 1.43 | 3.88 | 4.35 | 9.65 | 8.21 | 0 | 6.83 | 15.03 | 0 | 0 |
| 1997 | 7.17 | 1.45 | 4.35 | 12.97 | 8.21 | 0 | 6.14 | 14.35 | 15.22 | 15.22 |
| 1998 | 16.18 | 1.05 | 0 | 17.23 | 8.21 | 39.16 | 17.50 | 64.87 | 15.22 | 15.22 |
| 1999 | 19.92 | 4.33 | 0 | 24.25 | 8.21 | 0 | 11.56 | 19.77 | 15.22 | 15.22 |
| 2000 | 5.69 | 4.38 | 0 | 10.07 | 8.21 | 0 | 15.77 | 23.97 | 15.22 | 15.22 |
| 2001 | 7.09 | 5.54 | 4.35 | 16.98 | 7.04 | 0 | 8.53 | 15.57 | 13.04 | 13.04 |
| 2002 | 9.18 | 4.94 | 4.35 | 18.47 | 8.21 | 8.39 | 10.38 | 26.99 | 15.22 | 15.22 |
| 2003 | 3.07 | 12.70 | 8.70 | 24.47 | 1.78 | 0 | 4.83 | 6.61 | 0.18 | 0.18 |
| 2004 | 4.44 | 12.28 | 0 | 16.72 | 1.28 | 0 | 6.47 | 7.74 | 0 | 0 |
| Total | 100 | 100 | 100 | 300 | 100 | 100 | 100 | 300 | 100 | 100 |

The transparency of Japanese intervention policy during the three periods, as measured by these two indices, is presented in TABLE A2.3.

Table A2.3 - The average scores of each period on both indices of transparency

| | Ex ante | Index 1 Real time | Ex post | Ex ante | Index 2 Real time | Ex post |
|----------|---------|----------------------|---------|---------|----------------------|---------|
| Period 1 | 9.2 | 17.9 | 5.6 | 2.87 | 12.83 | 0.83 |
| Period 2 | 7.4 | 30.6 | 10.7 | 14.31 | 27.69 | 11.96 |
| Period 3 | 7.5 | 13.0 | 3.0 | 20.60 | 7.18 | 0.09 |

APPENDIX 3

Table A3.1 - Statistics on rumours for each year 1991-2004

| | Anticipative rumours | | | | | | | | | | Reports of intervention | | | | | | | | | |
|------|--------------------------------|--------------------------------------|---|--------------------------------|--|---|---|--|--|--|--|--|--|---|--|--|--|--|--|--|
| | (a) Total number of days | Days with anticipative rumours | (b) % days with anticipative rumours | (c) anticipative rumours | Days with anticipative rumours from market analysis | (d) % days with anticipative rumours from market analysis | (e) Days with anticipative rumours from market analysis | (f) % days with anticipative rumours from statements | (g) Days with false reports of intervention | (h) % of days with reports of intervention which are false | (i) Days with mis-perceived interventions | (j) % days with mis-perceived reports (k) | Days with well-perceived interventions (l) | (m) % days with well-perceived reports (n) | | | | | | |
| 1991 | 197 | 7 | 3.55 | 6 | 3.05 | 3 | 1.52 | 0 | 0.00 | 0 | 0.00 | 1 | 0.51 | | | | | | | |
| 1992 | 257 | 26 | 10.12 | 22 | 8.56 | 7 | 2.72 | 9 | 3.50 | 5 | 1.95 | 7 | 2.72 | | | | | | | |
| 1993 | 261 | 30 | 11.49 | 25 | 9.58 | 9 | 3.45 | 18 | 6.90 | 4 | 1.53 | 1 | 0.38 | | | | | | | |
| 1994 | 261 | 35 | 13.41 | 32 | 12.26 | 4 | 1.53 | 22 | 8.43 | 4 | 1.53 | 0 | 0.00 | | | | | | | |
| 1995 | 127 | 32 | 25.20 | 28 | 22.05 | 4 | 3.15 | 9 | 7.09 | 1 | 0.79 | 2 | 1.57 | | | | | | | |
| 1995 | 132 | 18 | 13.64 | 16 | 12.12 | 2 | 1.52 | 24 | 18.18 | 8 | 6.06 | 0 | 0.00 | | | | | | | |
| 1996 | 260 | 16 | 6.15 | 13 | 5.00 | 4 | 1.54 | 5 | 1.92 | 3 | 1.15 | 0 | 0.00 | | | | | | | |
| 1997 | 259 | 38 | 14.67 | 20 | 7.72 | 19 | 7.34 | 1 | 0.39 | 9 | 3.47 | 0 | 0.00 | | | | | | | |
| 1998 | 259 | 72 | 27.80 | 28 | 10.81 | 59 | 22.78 | 5 | 1.93 | 9 | 3.47 | 0 | 0.00 | | | | | | | |
| 1999 | 261 | 80 | 30.65 | 48 | 18.39 | 61 | 23.37 | 2 | 0.77 | 11 | 4.21 | 0 | 0.00 | | | | | | | |
| 2000 | 261 | 29 | 11.11 | 18 | 6.90 | 18 | 6.90 | 0 | 0.00 | 1 | 0.38 | 0 | 0.00 | | | | | | | |
| 2001 | 262 | 31 | 11.83 | 12 | 4.58 | 26 | 9.92 | 1 | 0.38 | 2 | 0.76 | 0 | 0.00 | | | | | | | |
| 2002 | 260 | 44 | 16.92 | 31 | 11.92 | 32 | 12.31 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | | | | | | | |
| 2003 | 259 | 61 | 23.55 | 37 | 14.29 | 30 | 11.58 | 3 | 1.16 | 11 | 4.25 | 26 | 10.04 | | | | | | | |
| 2004 | 191 | 23 | 12.04 | 21 | 10.99 | 3 | 1.57 | 4 | 2.09 | 1 | 0.52 | 17 | 8.90 | | | | | | | |

(a) Number of trading days for which data were collected (excluding weekends).

(b) Number of days on which anticipative rumours occurred.

(c) (b) as a percentage of (a).

(d) Number of days on which anticipative rumours arose from market analyses.

(e) (d) as a percentage of (a).

(f) Number of days on which anticipative rumours arose from statements.

(g) (f) as a percentage of (a).

(h) Number of days on which false reports of intervention occurred.

(i) (h) as a percentage of (a).

(j) Number of days on which reports of interventions are misperceived.

(k) (j) as a percentage of (a).

(l) Number of days on which reports of interventions are well-perceived.

(m) (l) as a percentage of (a).

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