Working Paper

The Plaza Agreement and Japan: Reflection on the 30th year Anniversary

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Abstract.
The Plaza Agreement, followed by the Louvre Agreement, is remembered as one of the most significant events in the history of international finance in the post WW-II era. Witness accounts show that Japan was more than willing participant of the Plaza Agreement, being prepared to accept yen appreciation. The objective of the Plaza Agreement, depreciation of the dollar, was achieved mush faster than expected, with less intervention amounts than expected. Hover, the yen appreciated to the level that Japan was not comfortable. The Japanese and US authorities agreed in late 1986 in that the yen has appreciated enough. The Louvre Agreement was struck to stabilize the exchange rates at around "current" level. The Louvre Agreement broke down eventually, but how long it lasted is debatable. There are widely different views among policy makers and academics in Japan on how the Plaza-Louvre Agreements and their impacts on the Japanese economy. Some regard it as a symbolic event that Japan firmly secured a seat in international economic policy coordination that would be led by Group of Five (G5) nations. Some regard it as a trigger for the long run trend of yen appreciation for the next 10 years. Some look back to the Plaza as a bad example of international policy coordination that distorted domestic monetary policy.

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1. Introduction

The Plaza Agreement, followed by the Louvre Agreement, is remembered as one of the most significant events in the history of international finance in the post WW-II era. For Japanese policy makers, economists and media people in Japan, the Plaza Agreement is as important as fixing the yen to 360 yen/dollar in 1949; the breakdown of the Bretton Woods regime in 1971; and the breakdown of the Smithsonian agreement in 1973. However, there are widely different views among policy makers and academics in Japan how the Plaza-Louvre Agreements and their impacts on the Japanese economy. Some regard it as a symbolic event that Japan firmly secured a seat in international economic policy coordination that would be led by Group of Five (G5) nations. Some regard it as a trigger for the long run trend of yen appreciation for the next 10 years. Some look back to the Plaza as a bad example of international policy coordination that distorted domestic monetary policy. There is a bit of *Rashomon* effect.

The rest of this paper is organized as follows: Section 2 will examine exactly what was agreed at the Plaza hotel meeting in September 1985. Section 3 will frame the issue of the exchange rate policy in a slightly broader context of policy coordination that continued as the Louvre agreement in February 1987. Section 4 will examine different lessons learned by different institutions in Japan. Section 5 concludes.

2. What was agreed in the Plaza agreement and Japanese involvement

2.1. Communique and Interventions

The meeting of G5 Finance Ministers and Central Bank Governors (G5M) was called primarily to rectify an overvaluation of the US dollar. The US dollar, in terms of its Real Effective Exchange Rate, REER, appreciated by about 40% from January 1981 to March 1985. The United States was suffering from fiscal deficits and trade deficits. The administration blamed the overvalued US dollar for the latter, and took the initiative to call a G5 meeting of Finance Ministers and central bank Governors. The date was set as September 22, but the prospective meeting was kept confidential. As a usual practice, the G5 deputies (G5D) met in London several days before the meeting and hammered out a draft of agreement with [brackets] to be decided by Ministers and Governors.

Until the Plaza G5M meeting, the existence of G5M was kept confidential. It is a well-known episode (in Japan) that Finance Minister Takeshita played nine holes of golf before going to the airport to catch a PanAm flight (not JAL), so that the press and business people wouldn't suspect that he was suddenly going abroad.

At the outset of the meeting, Treasury Secretary James A. Baker, III, proposed having a communiqué disclosed to maximize the impact of actions that were about to be taken.

The communiqué stated the following:

> "The Ministers and Governors agreed that exchange rates should play a role in adjusting external imbalances. In order to do this, exchange rates should better reflect fundamental economic conditions than has been the case. They believed that agreed policy actions must be implemented and reinforced to improve the fundamentals further, and that, in view of the present and prospective changes in fundamentals, some further orderly appreciation of the main non-dollar currencies against the dollar is desirable. They stand ready to cooperate more closely to encourage this when to do so would be helpful." (Underlines by the author.)

The communiqué itself did not mention "intervention" or targeted level of appreciation of the non-dollar currencies. These were the part of discussion that were kept confidential. The press and academics tried to guess whether there were target exchange rates. It was not known at the time that the G5D produced a non-paper that stated "a 10-12 percent downward adjustment of the dollar from present levels would be manageable over the near term." The existence of the non-paper was revealed later to the press and recorded by Funabashi (1988, p. 17) and Gyohten (2013).

The obligation of interventions to achieve the exchange rate goals were also discussed in G5D. Gyohten (2013) stated that the total amount of interventions were set at 18 billion US dollars in six weeks. Countries would be relieved of their intervention obligation if the necessary currency adjustment was achieved. According to Funabashi (1988), the non-paper draft stated intervention shares were 25% for US, Japan, and Germany, followed by 12.5% for UK and France. With German objection, the US revised the ratios to US and Japan, 30%; followed by Germany, 25%; France, 10%; and the UK, 5%.

In the meeting at the Plaza hotel, Japan was most forthcoming for the policy coordination, and willing to accept a larger degree of appreciation of the yen. Gyohten (2013, p.68) recalled that Finance Minister Takeshita proposed to remove "some" from the phrase "some further orderly appreciation" in the communique so that the intention would become more clear. He also proposed to use "justified" [bracketed alternative in the G5D draft] instead of "desirable" in that sentence. But, both proposals were opposed by others. Minister Takeshita also proposed to take out "when to do so" [which was bracketed in G5D draft], but again the Europeans opposed the deletion. FRB Chair Volcker added "orderly," which was not in the G5D draft, in the same phrase. He must have had a concern of disorderly behavior of the exchange rates, which turned out to be true.

The communique was announced on Sunday, September 22, 1985. The Tokyo market was closed on Monday, September 23, for a national holiday. Interventions were conducted when other markets opened and Tokyo joined on September 24. Ito (1987) reported that on September 24, "the Tokyo market opened at 229.7 and closed at 230.1, while the Bank of Japan reportedly sold 1.3 billion dollars. It was only after the big jump had already taken place that the Bank of Japan started heavy intervention; and the intervention did not seem to cause yen appreciation. (It is possible, however, to say that it prevented a sharp rebound.)" Gyohten (2013, p. 77) stated that in the 7 days that followed the Plaza announcement, Japan sold USD 1.25 billion; surpassing USD 635 million by France, USD 480 million by US; USD 247 million by West Germany; and USD 174 million by UK.

The announcement of communique followed by interventions surprised the market. The dollar weakened against the other four currencies. Within a week, the yen appreciated vis-à-vis the USD by 11.8%; both the German mark and French franc by 7.8%; the British sterling by 2.9%. It was a great success for G5, as the policy goal was almost achieved.

Interventions continued and the trend of the dollar depreciation continued. G10 countries that do not belong to G5 joined in interventions to sell the US dollar. By the end of October, the United States had sold USD 3.2 billion; Japan USD 3.0 billion; Germany, France and UK combined to sell USD 2 billion, and the other G10 countries USD 2 billion. In fact, Gyohten (2013) noted that the total of G10 interventions, USD 10.2 billion, was much smaller than the expected interventions necessary to achieve the goal of dollar depreciation - USD 18 billion.

Table 1 shows the daily intervention amounts (not disclosed at the time, but were disclosed much later) by the US and by the Bundesbank. This shows that the US intervened in the yen market by 1.4 billion, and the DEM by 1.9 billion USD. Germany intervened with 3 billion dollars. (The Japanese authorities have disclosed intervention data for the period after April 1, 1991.)

<Table 1 about here>

Many observers put an emphasis on the role of interventions in moving the exchange rates so quickly after the Plaza Agreement. Anecdotal evidence was mounting that interventions by the monetary authorities had large impacts on the dollar depreciation. The amounts of interventions by G5 countries were not officially announced at the time, but guessed by market participants. Research on the effectiveness of official interventions became popular in the months, if not years, following the Plaza Agreement. However, the problem at the time was that daily intervention figures were not disclosed. Obtaining data for academic purposes was an academic race. (See Dominguez and Frankel (1993a, b) Later, when the daily official intervention data became available in the 1990s and 2000s, the quality of research advanced. (See Sarno and Taylor (2001) and Ito (2003, 2007).) Unfortunately, in Japan, intervention data prior to April 1991 have not been disclosed, so precise analysis of the Plaza interventions is not possible.

Success in the depreciation of the dollar can be attributed to the announcement effect, the intervention effects, and associated monetary policy changes. The Bank of Japan raised the short-term interest rate to help the yen appreciation.

2.2. Achieving the goal

A goal of appreciation of non-dollar currencies was 10-12%, according to the G5D non-paper. The yen was 240 yen per dollar on Friday before the Plaza Agreement. Thus, 10% appreciation meant 216 yen per dollar. This was achieved on September 30. However, the yen appreciation did not stop there. By the end of 1985, the yen approached 200 yen/dollar. Figure 1 shows the time-series of the yen/dollar rate from 1985 to 1987.

<Figure 1 about here>

Ito (1987) divided 24 hours into three segments, Tokyo, Europe and New York, and compared the yen/dollar movements of different periods following the Plaza Agreement. The intraday yen/dollar changes for each segmented (cumulative within the period) were calculated and shown in Table 2.

<Table 2 about here>

Ito (1987) also presented the intra-day (cumulative) change of the yen, the German mark (DEM), and Pound (GBP), vis-à-vis the USD in each of the three major markets. If correlation among the three countries is high, then it means that the origin of news that moved the exchange rates was the US (dollar). If the correlation is low, then any of the three currencies could have had idiosyncratic shocks. So for example, if the yen appreciation was found to be large (from Table 1) but the correlation with DM or the correlation with Pound was low, then it was yen appreciation vis-à-vis all the other currencies.

<Table 3 about here>

The rapid appreciation of the yen immediately following the Plaza Agreement occurred mostly in the markets other than the Tokyo market, partly due to the fact that the day after the Plaza was national holiday in Japan, and the announcement effect took place in the hours before the would-be opening of the Tokyo market that Monday. Ito (1987) wrote:

> "When the first market, New Zealand's Wellington market, opened on Monday, September 23, the yen appreciated by 5 yen to 234 yen/$.The Tokyo market, which would have opened

> next, was closed for a national holiday. The London market put 232 yen/$, and appreciation continued during the New York market session, opening at 231 and closing at 225.5 yen/$. By the time that Tokyo market opened on September 24, the yen had already appreciated by more than 10 yen. The Tokyo market opened at 229.7 and closed at 230.1, while the Bank of Japan reportedly sold 1.3 billion dollars. It was only after the big jump had already taken place that the Bank of Japan started heavy intervention; and the intervention did not seem to cause yen appreciation. (It is possible, however, to say that it prevented a sharp rebound.) Thus, the Bank of Japan's role in the yen appreciation was minimal at this stage. It is safe to say that the initial jump was caused by the "announcement" itself."

Table 2 shows that the one week following the Plaza Agreement was the first wave (I) of yen appreciation. Most of the yen appreciation took place in the New York market. All non-dollar currencies uniformly rose in the New York market. The market was surprised by the change in the US policy, led by Secretary Baker, to "international coordination" for correcting the overvalued dollar. This was the USD event in the New York market. As written in Gyohten (2013), the amount of intervention by the Bank of Japan surpassed the Federal Reserve's. It is possible that the Bank of Japan asked the Federal Reserve to intervene on its behalf in the New York market, but some of the interventions must have been done in Tokyo. Somehow the resistance to yen appreciation was stronger in the Tokyo market.

The second wave of yen appreciation (Period II in Figure 1 and Table 2) occurred from October 25 to November 7. After the first wave, the exchange rate markets became calm and the market participants started to suspect that the aim of the Plaza was achieved. The G5 Finance Ministers meeting in Seoul on the margin of the IMF annual meeting (the weekend of October) did not produce a follow-up statement to the Plaza. This added weight to the view that the dollar had hit the bottom. Ito (1987) wrote:

> "In fact, the exchange rate expectation survey taken among the market participants on October 16 in the Tokyo market confirms this point. The means of the survey show that the yen rate would be 214 in 1 month, 217 in 3 months, and 222 in 6 months."

The Japanese monetary authorities seemed to have judged that the yen appreciation should be sustained. On Thursday, October 24, 1985, Bank of Japan Governor Sumita in a regular press conference announced the Bank would adopt a high interest rate policy, aiming at appreciating the yen from the macro fundamental side. However, the foreign exchange market was not impressed by that announcement alone for the rest of the day and overnight. On Friday, October 25, the Tokyo open (9am) exchange rate was 216.55 yen/dollar. As the short-term interest rate soared in the morning session, the yen appreciated to 214.90 by the close of the Tokyo market. The market missed a cue, or the market did not believe in words, but waited for interest rate action overnight. Yen appreciation continued for the following two weeks, as more market participants became convinced of the new monetary policy. The second wave of yen appreciation occurred in the Tokyo market, suggesting that the market-moving news originated in Tokyo. This was yen appreciation rather than dollar depreciation.

The interest hike was implemented by the Bank of Japan, presumably in the spirit of policy coordination toward pushing the value of dollar lower by narrowing the interest rate spread between Japan and the United States. However, this policy action was not received well by the Ministry of Finance or the US Federal Reserve, according to Gyohten (2013). For the purpose of lowering the US current account deficits, Japan was supposed to stimulate domestic demands, which needed a lower interest rate.

Why was Japan so eager to appreciate the yen, beyond the secretly agreed goal of 10% appreciation? According to Gyohten (2013, pp. 69-70), "As far as [non-dollar] currency appreciation, Japan was most forthcoming. Finance Minister Takeshita expressed [during the Plaza meeting] that Japan could accept yen appreciation up to 200 yen/dollar. Germany stated its position that it does not consider a goal of 10-12% depreciation of the US dollar as its obligation."

Why, then, was Finance Minister Takeshita so eager to accept yen appreciation? Gyohten (2013, pp. 58-59) explained that Finance Minister Takeshita and Secretary James Baker hit it off well in the bilateral meetings which took place months prior to the Plaza: "In June 1985, Secretary Baker visited Tokyo for the G10 Finance Ministers meeting, he laid out his action plan on the exchange rate and macroeconomic policies to Finance [to Takeshita]. The bilateral negotiation continued in July in Paris, in August in Hawaii and became a conclusion in G5D in London."

So, the second wave of the yen appreciation brought the yen to the level just above 200 yen/dollar. The yen stayed there for the following two and half months. Based on Gyohten's account of Takeshita's intention, this must have been a comfortable level.

Even during the calm period, there were many events. The high interest rate policy was abandoned on December 17. The discount rate cut by the Bank of Japan—a reverse of the policy—that would not occur until January 30, 1986 was rumored as early as December 20. Another piece of big news during this period was a drop in oil prices and OPEC's decision on December 8 not to cut the oil supply and tolerate the low oil prices. Oil-importing nations like Japan and Germany should see appreciation of the currency, and oil-exporting nations like the UK should see depreciation. That was exactly what was about to happen. German mark appreciation started in early November to late January. Perhaps, during the calm yen period of November and December, the reverse of the interest rate policy by the

Bank of Japan, which was to put pressure for yen depreciation, was met with the oil price decline, which was to put pressure for yen appreciation. Another possible explanation is that the monetary authorities of Japan made an implicit decision that 200 yen/dollar would be the target, and adjusted the interest rate and communication.

Whether the success of depreciating the dollar in the first and second waves was owed to concerted interventions or market forces has been debated. Feldstein (1986), Volcker and Gyohten (1992: Chapter 8) and Gyohten (2013) pointed out that the dollar had been depreciating because of market forces since February, so interventions might make a difference in speed, but the fundamental force was the market. The Plaza Agreement only maintained and accelerated the already moving ball (the US dollar) in the downhill (market), which, as Gyohten recalls, was an analogy Volcker made. The yen peaked against the USD on February 13 at 262.80 yen/dollar. It was down to 240 yen/dollar just before the Plaza meeting. So in a sense, the trend of yen appreciation continued, with much higher speed, after the meeting. Ito (1987) gave more credit to the role of interventions, as making sure that the markets received correct intention and resolve of the monetary authorities. In fact, interventions were conducted so that the dollar would not appreciate, if not push to depreciate. The case in point was the Bank of Japan intervention on September 24, 1985, when a massive intervention was conducted but the exchange rate did not move during the Tokyo market. Put differently, the massive intervention was needed to prevent turning back to dollar appreciation from the depreciated level on the day before.

Ito (1987) stressed the monetary authorities' communication was important in defending and eventually letting it go the 200 yen/dollar barrier. The Bank of Japan Governor indicated that the yen should be kept at around 200 in his New Years' press conference; this had the effect of raising the yen from 198.55 on January 2 to above 200 on January 3. That was to defend the 200 barrier. However, this was contradicted by Finance Minister Takeshita later in January. Ito (1987) reconstructed news and events from newspaper accounts at the time:

> "Finance Minister Takeshita was in Washington, D.C., on his way home from the London G5 meeting of January 18 and 19. At a press conference in the United States, he reportedly said that he would allow the yen to go below the 200 level. The Tokyo market was informed on Takeshita's remark by a news wire at around 3 PM, 30 minutes before the closing of the market. The yen jumped from 201 to 198 in a matter of 20 minutes; then profit taking brought it back to 199.50 at the closing (3.30 PM). Finance Minister Takeshita came home that evening, long after the Tokyo market was closed, and gave another news conference in Tokyo. He said that "if the exchange rate becomes in the 190s as a natural result of the market movement, it should not be artificially brought back [to more than 200]. Though it varies depending on sectors, the 190s would be acceptable by the industries." (Literal

translation from Nihon Keizai Shinbun, January 25, 1986.) This news conference in Tokyo was in turn reported in the European and New York markets, which were still open. The yen jumped to 198 in the London market and then declined to 196.60 by the closing of the New York market."

Funabashi (1988, p.18) reported that Minister Takeshita had already mentioned 190 could be possible during the Plaza meeting. Takeshita's embracing yen appreciation corroborates with Gyohten's account of the Japanese position in the meeting.

Thus, the third wave of the yen appreciation (Period III in Figure 1 and Table 2) started. The yen appreciated by 10% in the four-week period after the Takeshita statement. Ito (1987) interpreted that it was not a policy driven appreciation, but by letting go of the artificial 200 yen/dollar barrier, the fundamentals of oil price decline appreciated the yen. The yen appreciation of Period III occurred evenly in Tokyo, London and New York. The yen continuously appreciated, as the oil price declined.

2.3. Over-achievement and reverse intervention

The third wave of appreciation brought the yen to the 180s. Breaching 190 finally alarmed the Japanese monetary authorities. The possibility of reversing the direction of intervention, i.e., to buy the US dollar by selling the yen, was mentioned. But the actual "reverse intervention" did not occur until March 18 when the yen appreciated to 175 yen/dollar. Leading up to the reverse intervention, there was one major policy coordination event. On March 6 and 7, France, Germany, Japan, and the United States cut their discount rates by 0.5% in concert. This was the first "coordinated" discount rate cut, which would theoretically achieve aggregate demand expansions, without impacts on the exchange rate. However, right after the coordinated interest rate cut, the yen appreciated suddenly, which led to the reverse intervention of March 18 by the Bank of Japan. The yen appreciated from 179 (on the day of the discount rate cut announcement) to 174.90 in 11 days. However, it was turned around quickly and returned to the 180 level in a week. In that sense, a coordinated interest rate cut was successful in keeping the exchange rate stable, although with a quick fall and rise immediately following the rate cut.

The fourth wave of the yen appreciation occurred from April 16 to May 12. The yen appreciated by more than 17 yen during this period. One of the triggers was the G5 Summit Agreement that did not appear to endorse Japan's reverse intervention (to stop yen appreciation).[2] In the course of the

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[2] The Tokyo Summit of G5 was held on May 4-6. Japan. During the Summit, Japan was reported in the media to have sought coordinated intervention to prevent further dollar depreciation (or yen appreciation), but it was rejected by the United States. In the final agreement, G5 was expanded to G7 to include Canada and Italy; finance ministers and central bank governors of the G7 countries will conduct "multilateral surveillance to make their best efforts to reach an understanding on appropriate remedial measures whenever there are significant deviations from the intended course and recommend that remedial efforts focus first and foremost on underlying policy fundamentals,

appreciation wave, on April 21, the yen broke the post-WWII record high, set at around the time of President Carter's dollar defense in 1978. The short-term interest rate was lowered and reverse interventions continued. Table 2, Period IV shows that yen appreciation took place in the Tokyo and New York markets. Appreciation of the currency occurred to Germany as well as Japan during this period. In that sense, this period is marked by dollar depreciation vis-à-vis yen and mark. The low interest rate in the United States became obvious. The market decided that the implications for the US long-term interest decline was more prominent than in other countries, despite the appearance of a coordinated discount rate cut.

By mid-May, the yen was approaching 160 yen/dollar. This prompted more interventions. However, the yen quickly turned around and depreciated to the level that was prevailing before the Summit, and to the level before the fourth wave of the appreciation. From May 13 to June 2, the yen depreciated by more than 11 yen. Ito (1976) wrote, "Some people attribute this turnaround to Treasury Secretary Baker's testimony in Congress on May 13 stating that the yen had appreciated enough." Gyohten (2013: p. 81) corroborates the view, "Secretary Baker tried to lend support to Japan. In his testimony in Congress he said, 'the decline of the dollar vis-à-vis the yen has already offset the dollar appreciation that had occurred earlier.'" The yen depreciated to 174 yen at the end of May. This is marked by R-regime in Figure 1 and Table 2.

But this yen depreciation turned out to be short-lived. By-mid June, the yen was again approaching 160 yen/dollar. Politicians and exporters started to worry. Gyohten (2013, p. 80) recalled that Prime Minister Nakasone told him that the yen should be brought back to the level of 170 before the Lower House-Upper House double elections on July 6. Reverse interventions were conducted in vain. However, the ruling party won the election by a big margin.

After the landslide victory of the double elections, Prime Minister Nakasone shuffled the cabinet and Mr. Kiichi Miyazawa replaced Mr. Takeshita as Finance Minister on July 22, 1986. Miyazawa had been more critical of yen appreciation. He met Secretary Baker on September 6 in San Francisco to request that the US stop a dollar depreciation policy. The US demanded that Japan adopt a tax cut as economic stimulus. After two months of negotiations, the Miyazawa-Baker agreement was announced on October 31. The agreement included (i) the Bank of Japan lower the discount rate from 3.5% to 3%; (ii) the Japanese government would submit a supplementary budget including public works spending of 3.6 trillion yen; (iii) the Japanese government consider a tax cut (but no details); and (iv) the current yen/dollar rate is consistent with economic fundamentals. The last item was new and instrumental in maintaining the stability of the yen/dollar rate until the end of the year.

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while reaffirming the 1983 Williamsburg commitment to intervene in exchange markets when to do so would be helpful." The agreement was perceived by Tokyo as a measure not particularly helpful to stop yen appreciation.

This agreement was a prelude to the target zone of the exchange rate. Gyohten (2013, p. 91) recalled that "the Finance Minister himself was supportive of the target zone idea." Gyohten (2013) revealed the negotiation toward the Louvre agreement. On January 21, 1987, Finance Minister Miyazawa and Vice Minister Gyohten visited Secretary Baker, Deputy Secretary Richard Darman, and Assistant Secretary David Mulford. In this meeting a confidentially agreement on the target zone was agreed. The target zone was established as 145 – 165, or 150 – 165. In either case, when the yen appreciates to 150, there was a commitment of concerted interventions. The zone for the German mark was proposed to be 1.70 – 1.90. It was also agreed by the US side and Japanese side that the range would not be revealed until the G5 in Paris.

3. Louvre: how it is done and how it is ended

3.1. Louvre Agreement

The United States had looked for ways to reduce its current account deficits. First, the Plaza Agreement was engineered to weaken the dollar to make a necessary adjustment. The effects of the exchange rate realignment did not come swiftly. The United States then pressured Japan and Germany to stimulate their domestic demand—expansionary fiscal policy and monetary policy—to make a boost for the US export to those countries. Funabashi (1988) characterized the Louvre Agreement as the product of the efforts of James A. Baker III, to win from Kiichi Miyazawa, and Gerhard Stoltenberg "substantive stimulus measures in return for a US agreement to stabilize the dollar."

On February 21-22, the Louvre G5/G7 Finance Ministers and Central Bank Governors meeting was held. Some meetings were by G5 only, and others were joined by Canada and Italy. The most famous part of the communique is the following:

> "The Ministers and Governors agreed that the substantial exchange rate changes since the Plaza Agreement will increasingly contribute to reducing external imbalances and have now brought <u>their currencies within ranges broadly consistent with underlying economic fundamentals</u>, given the policy commitments summarized in this statement. Further substantial exchange rate shifts among their currencies could damage growth and adjustment prospects in their countries. In current circumstances, therefore, <u>they agreed to cooperate closely to foster stability of exchange rates around current levels</u>." (Underlines added by the author.)

Gyohten (2013, pp. 106-127) wrote details of the preparation process toward the G5/G7, which later would become known as the Louvre Agreement. It was Secretary Baker's idea and insistence that the exchange rates should be managed in a target zone. From the Japanese side, Minister Miyazawa and

Vice Minister Gyohten negotiated their counterparts with an increasing frequency from January 27 to the Louvre meeting, February 21-22. Many discussions took place regarding the paragraphs containing Japanese policy commitments as well as expressions of the currency paragraph. In short, the target zone idea was led by Secretary Baker, supported by France and Japan, and opposed by Germany and UK. The Japanese side could not commit on a stimulus package or any spending increase as it is in the budget debate time in the Diet, while the US was demanding a clear commitment on domestic demand expansion.

During the preparation for G5M in Paris (to be known as the Louvre meeting), Gyoten (2013, p.114) stated that the Japanese position was the target zone of 150-165. However, the Europeans insisted the Japanese authorities to agree to 145 – 165.[3] The Japanese rejection of the 145-165 range made the US negotiation team frustrated. Without an agreement in G5D for clear language on the language for the level or the range, the G5M meeting would start.

The G5M took place in the Louvre Museum on Saturday, February 21, 1987. The US, Germany, UK, and France proposed to "foster stability of exchange rates around <u>present</u> levels." Japan opposed and it became "around <u>current</u> levels." The difference between "present" and "current" is minimal. However, the Japanese side did not like the implication of "present" to be the closing rate of the day before (i.e., 153.50 yen/dollar.) The Japanese side preferred the "current" which may give a bit more ambiguous time frame.

Gyohten (2013, pp. 94) recalled that the idea of the target zone with plus/minus 2.5% (and 5.0%) was discussed at the dinner, but nothing was signed to that effect. There was no examination of whether the closing rate of the day before was at equilibrium either.

The press and academics were very interested as to whether the target zone was agreed or not and if so, what was the range. The French authorities tended to call it a "reference range." Both Gyohten (2013) and Funabashi (1988) recalled that Japan resisted any expression that might have brought the yen/dollar rate below the 150 threshold. The Japanese position was to defend the 150 yen/dollar as a max for yen appreciation. If the "present" level meant 153.50, then "minus 2.5%" meant 150 yen/dollar, and "minus 5.0%" means 145.825, which was not acceptable as the Japanese negotiation position. So, in a sense the Japanese side was rejecting the 5% range. This was a disappointment for Europeans and the US.

The final agreed text did not have any number for the target level. But implicitly it was agreed that the yen would have the central rate of 153.50 yen per dollar; and the German mark at DM 1.825 per

[3] If the implied zone was 150-170, the Japanese side would have been happier. Gyohten (2013) mentioned that it was the range Prime Minister Nakasone wished.

dollar, as those were the closing rates of the Friday, February 20, before the Louvre meeting. There was no announcement on the range, whether there existed a target zone (or reference range, as the French liked to refer) of plus/minus 2.5%, or 5%. The G5M dinner adjourned without making these things explicit, according to Gyohten (2013).

The Louvre Agreement was supposed to be signed by the G7, but the Italians did not sign the documents, so it was the G6.

3.2. Black Monday and the end of policy coordination

The market and the press was puzzled by the Louvre Agreement. Was there a strong commitment on the part of G7 to defend the range with interventions and policy coordination? As far as the yen/dollar is concerned, it did not take much time for the ceiling of the range to be tested. On March 24, just one month after the Louvre Agreement, the yen/dollar rate went below the 150 threshold. Then, on April 9, the yen/dollar rate went below 145. Hence all the Japanese resistance to language of the agreement at the time of Louvre meeting became fruitless. The yen/dollar rate stayed in the 140-150 range until Black Monday on October 19, 1987. As the US stock market crashed, the US monetary authorities shifted attention to domestic financial stability and started monetary easing. The yen/dollar rate moved below 140 on October 29, and below 130 on December 10. Whatever was agreed to as a range in Louvre turned out to be short-lived.

There was no announcement terminating the Louvre Agreement. People who were involved in the Plaza-Louvre policy coordination have different views regarding how long the Louvre Agreement had impacts on policy. Those who put an emphasis on the target zone (reference range) in the Louvre Agreement regard that the Louvre was de facto terminated in a few months. When the yen/dollar rate dipped below 150, which was the defense line for Japan. Gyohten (2013, p.96) wrote: “The target rate of the Louvre was defeated by the market. The dollar depreciated precipitously and the yen appreciated to 138 yen/dollar on April 27. The Louvre Agreement did not function after all. Deputy Secretary Richard Darman left the Treasury in frustration in April, and Chairman Volcker resigned from the position in August.” (translation by Ito)

Some others suspect that the Louvre Agreement worked until Black Monday in October 1987. Since the yen/dollar rate recovered 150 in July and appeared to stay around the 150 defense line. It was only after the Black Monday that the yen appreciated to the level of 120s, and never see 150 for a long time. Funabashi (1987, p. 211) wrote: “The stock market crash in October had exposed underlying weaknesses in the structure of the policy coordination process. Overwhelmed by the stock market meltdown, the Reagan administration held down interest rates and let the dollar fall once again, in apparent disregard of the spirit of the Louvre Accord.”

However, when coordinated interventions are taken as an evidence of exchange rate policy coordination, it can be said that the coordination continued well into 1988. Figure 2 shows monthly interventions by the Japanese and US authorities in the USDJPY markets and the US and German authorities in the USDDEM market. Joint interventions related to the Louvre Agreement seems to have continued to April 1988, and then again in November and December 1988 for the yen market to prevent too much appreciation of the yen.[4]

<Figure 2>

Actors also exited from the stage. James Baker's last day as Treasury Secretary was August 17, 1988. On the Japanese side, Kiichi Miyazawa's last day as Finance Minister was December 9, 1988. Interventions to support the dollar (or prevent too much yen appreciation) continued sporadically until December 12, 1988, according to the disclosed intervention data of the Federal Reserve. Between January and December 1988, the US authorities sold the yen to buy USD 2.783 billion.

I believe these interventions are based on the US's own policy initiatives rather than coordinated intervention based on the Louvre Agreement. However, the US cooperated with its Japanese counterparts in slowing down the speed of yen appreciation, if not reversing the direction, until December 1988. In 1989, the yen started a depreciation phase, so there was no need for intervention, and moreover, the important actors, Secretary Baker and Finance Minister Miyazawa, stepped down.

Figure 3 shows the nominal yen/$ rate (red broken line) and the real effective exchange rate of the yen (black solid line) for a longer time series. There have been several sustained yen appreciation spells in the post-Bretton Woods period. The appreciation in 1978 took the yen/dollar from 240 in January to 176 in October (27% in 9 months). The appreciation in 1985 took the yen/dollar from 260 in February 1985 to 153 in July 1986 (41% in 18 months).

<Figure 3 about here>

4. Three Lessons

4.1. Some Advance to Remember and Some Advance to Forget

The Plaza/Louvre experiences left profound and long-lasting impacts on the Japanese policy makers and US-Japan economic relations. Economic conditions in Japan drastically changed in the 1990s, but memory of the Plaza was there—and maybe still "is" 30 years later—for all policy makers: Some advance to remember and some advance to forget.

Three lessons stand out as to what the US and Japan learned from the Plaza-Louvre currency/policy

[4] The daily intervention amounts for this period are disclosed by the US and Germany. The Japanese daily intervention amounts are disclosed for the period starting April 1991. Ito and Yabu (2015) estimated the monthly intervention by the Japanese Ministry of Finance using a reliable proxy variable in the budget.

coordination exercises. First, the Bank of Japan learned that the pressure to lower the interest rate in the name of international coordination may force an error in monetary policy. Second, the Japanese government collectively learned that the thesis of accepting appreciation does not substitute for trade conflicts. Trade conflicts have to be fought with or without currency policy coordination. But, the market learned that the US can use a threat of yen appreciation as a weapon against Japan in trade negotiations. Third, the Ministry of Finance learned that any international currency coordination, such as a target zone, is not possible.

4.2. Blame the Plaza/Louvre for creating a bubble

As stock prices and land prices declined precipitously in the 1990s, the growth rate declined and business activities were subdued. The average growth rate was at around 5% in the second half of the 1980s, despite the yen appreciation after the Plaza Agreement and despite the eventual failure of policy coordination around the exchange rates and macroeconomic policies after Black Monday. Stock prices and land prices rose three-times to four-times in Japan between 1985 and 1989. With the benefit of hindsight, it was a typical financial bubble, that is, asset prices continued to rise, because investors believed that prices would continue to rise. Transaction prices deviated from their fundamental values.

Stock prices and land prices started to decline in 1990. The growth rate dropped to the range of 1-2% after 1992. Construction companies, developers and non-bank financial institutions started to suffer from lowering prices of real estate, and stopped interest payments to larger banks. Any securities companies that expanded the trading floor and the size of proprietary trading started to suffer from increasing costs and decreasing revenues. The financial system in Japan as a whole had suffered from a mounting deterioration of asset values, non-performing loans and capital deteriorations. According to proper accounting, financial institutions were losing capital quickly, but the loss of capital was hidden by many tactical moves during the mid-1990s. However, the smaller financial institutions started to fail in 1995. Hokkaido Takushoku Bank, one of the twenty "city banks," and the Yamaichi Securities, on of the big four Securities firms and a few other smaller financial institutions failed in November 1997, setting of a fll-fledged banking crisis.

From 1997 to 2003, the Japanese government and the Bank of Japan were busy with crisis management. Financial policy priority was given to limiting an immediate crisis from spreading to the rest of the economy, to rehabilitate the weakened financial institutions, and to strengthen the system. The Financial Supervisory Agency was newly created to manage an on-going crisis and to strengthen financial sector supervision. They arranged the first and second rounds of capital injection to major banks to mitigate bank vulnerability. The financial crisis eroded confidence in the Japanese economy at large. The growth further slowed down (resulting in negative growth in 1998), and deflation (negative inflation rate) had set in.

The Bank of Japan learned from the 1985-1989 episode that the domestic interest rate policy was distorted by the Ministry of Finance, which put a higher priority on international policy coordination—first to accept yen appreciation and then to prevent yen appreciation—than domestic price stability. Forcing the Bank of Japan to keep the interest rate low to prevent yen appreciation caused high inflation in 1973-74 (see Ito (2013)) and an asset price bubble in 1985-89. Policy coordination with the Ministry of Finance, not to mention international coordination, spelled disaster. When the Bank of Japan gained legal independence in 1998, it quickly dissociated from the Ministry of Finance. Any suggestion from outside on monetary policy, including the suggestion of adopting inflation targeting, was regarded as a threat to independence (Ito (2004)). The Bank of Japan thought that adopting the inflation targeting of 2% would require strong unconventional policy, which in turn might produce a financial bubble that is not accompanies by CPI inflation—just like in the second half of the 1980s. The memory of the Plaza made the Bank of Japan reject such a proposal.

4.3.The yen and US-Japan trade conflict

The Plaza Agreement can be also framed in the US-Japan trade conflicts. These trade conflicts started to flare up in the first half of the 1980s. The voluntary restraint of automobiles started in 1981. The MOSS (market-oriented sector specific) talk started in 1985. The US was demanding Japan open its markets in electronics, telecommunication, medical and medical equipment, and forestry products. The USTR used Section 301 against Japanese semiconductor makers. In June 1985, the Semiconductor Industry Association (SIA) filed a Section 301 petition with the Office of the United States Trade Representative (USTR). The Japanese government and semiconductor makers thought the basis of SIA complaints were weak, but it still had to deal with the complaint and threat of trade sanctions. Thus, it was likely that one of the reasons for Japan's forthcoming attitude toward accepting yen appreciation was to lessen the pressure on trade conflicts.

According to Funabashi (1988, pp.88-89) Prime Minister Nakasone made up his mind that he would be ready to accept yen appreciation in order to address the trade imbalance problem. Unless the problem is tackled comprehensively involving the exchange rate—rather than sector specific approach, the trade conflict would not be solved. In a sense, accepting the exchange rate was expected to lessen the sector-specific issues and lead to a harmonious US-Japan relationship.

The yen appreciation beyond the agreed target in the Plaza and, again, in the Louvre, eliminated some of the Japanese exporters' competitive edge. Then, the exchange rate policy to avoid trade conflicts became the conflict itself. The United States began to use yen appreciation as a threat to force Japan to swallow US demands on Japanese imports of US products. US demanded first "market access" for government and quasi-government procurement in the 1980s, and then "voluntary imports" of US automobiles in the early 1990s. Japan and many economists on both sides of the Pacific regarded US demands and its unilateral approach, culminating in Super 301, as a violation of the GATT/WTO. Japan started to say “no” to US unreasonable demands. In the height of US-Japan trade conflict—roughly from 1988 to 1994—the US frustration led the market to believe that the US would engineer yen appreciation as a weapon. Whenever the negotiation deadlocked or broke off, the currency market pushed the yen higher.

Recall Figure 2, which shows the nominal yen/$ rate and the real effective exchange rate of the yen. The peak of the yen (in nominal yen/$) prior to 2010 was 81 yen/dollar in April 1995. The yen appreciated very quickly from 90 yen/dollar on March 30 to 81 yen/dollar on April 19 (10 percent in 20 days). The yen stayed between 81 and 87 until the end of June. This episode of yen appreciation is often associated with the ongoing automobile conflict between the United States and Japan. During this period the USTR announced that it would impose a 100% tariff on Japanese exports of luxury cars to the US if Japan did not agree to numerical targets of US-made auto parts; increasing the use of US-made auto parts for production in the US, and increasing US auto imports to Japan. The Japanese side refused to accept numerical targets but agreed to expand production and use of US-made auto parts in the US.

McKinnon and Ohno (1997) were the authors of a thesis that the US-Japan trade disputes played a large role in the yen’s appreciation since 1971. The yen appreciation did not correct the bilateral trade imbalance, but it did produce the Japanese stagnation and deflation of the 1990s. What they call a policy trap is a circular argument that yen appreciation causes deflation in Japan, which shrinks imports, resulting in a widening of the US-Japan trade imbalance. The trade imbalance infuriates the US, which then puts pressure on the yen to appreciate. They believe the floating exchange rate tends to produce inflation and deflation. Japan is a case in point.

In the longstanding US-Japan trade conflicts of the 1960s, the Japanese government, led by the Ministry of International Trade and Industry (MITI), took the view that, although protection of domestic industries and promoting exports to the US is important, some sort of compromises are needed from time to time.

4.4. New International Monetary Regime

In Japan, the Ministry of Finance is in charge of the exchange rate policy and foreign exchange intervention. The Ministry holds the special account where almost all official foreign reserves are held. The Ministry issues the short-term Treasury bills (see Ito (2007) for details) to obtain yen liquidity and intervene to obtain foreign assets—presumably overwhelmingly in the US dollar—as a result. The special account for foreign reserves has foreign currency assets while domestic Treasury bills are the liabilities.

What officials at the Ministry of Finance learned from the Plaza/Louvre agreements was the impossibility of international coordination to target a specific level or a narrow range in management of the yen/dollar exchange rate. Of course different officials have different opinions. I would summarize a newly emerged conventional wisdom as follows. First, international coordination is difficult. Second, the market tends to overrun the exchange rate policies by the monetary authorities. In the deep market like the yen/dollar exchange market, private capital flows are much bigger than what the monetary authorities could mobilize. Third, when the markets overshoot or misalign by a wide margin with some herd behavior or speculative long/short, there may be a role for an intervention and announcement of ad hoc policy coordination to correct the situation. The Plaza Agreement was such a case, later reversing the yen appreciation trend at around 120 in December 1988, and again at around 81 yen in April 1995.

The Europeans succeeded in introducing the euro in 1999, fixing the intra-EMS exchange rates. The stability of EMS became the top priority. The exchange rate vis-à-vis the USD or JPY became less important. In 1992, the UK pound dropped out from the EMS and would not return to the mechanism. Thus, from the mid-1990s, Japanese yen along with British pound came to be the major currencies after the US dollar and the euro. These four currencies may fluctuate freely for an indefinite future.

5. Conclusion

The Plaza Agreement of September 1985 was the beginning of a brief period of policy coordination among the G5. It was led by Treasury Secretary Baker, but Japan was a very willing participant. Finance Minister Takeshita was willing to commit to appreciation more than 10-12%. The objective of depreciating the dollar by 10-12%, from 240 yen/dollar, was achieved with less than expected intervention amounts. However, the yen appreciation did not stop at 10-12%. It appreciated to 200 yen/dollar by the end of 1985. It rose to 190 yen in January, and to 160 yen/dollar by the summer of 1986. At this point Japan became anxious to stop further yen appreciation. The US also thought the exchange adjustment had been achieved, but it wanted Japan and Germany to stimulate the domestic economy so that US-Japan and US-Germany trade imbalances would be reduced.

The Louvre Agreement was planned to set a reference range (or a target zone) in which G7 currencies were to be stabilized. Finance Minister Miyazawa was attracted to the idea of a target zone, but the US and Japan could not agree to the ceiling (max appreciation) of the Japanese yen. Hence, the communique did not reflect a strong language or commitment for keeping the exchange rate within the range.

For many reasons, including Black Monday, rotations of actors, and the market overwhelming the reference range, the Louvre Agreement was short-lived. By the spring of 1988, any commitment to intervene, if it had any to begin with, disappeared.

Institutional memories differ among the Bank of Japan, MITI, and the Ministry of Finance over what happened in the Plaza-Louvre attempt of international policy coordination to stabilize the exchange rate and to stimulate the domestic economy. The Bank of Japan began to oppose coordination with the Ministry of Finance, let alone international coordination. They regard that the low interest rate was forced upon them to prevent too much yen appreciation, and the low interest rate in the second half of the 1980s spawned the bubble, which subsequently popped to create nonperforming loans and financial instability. The Ministry of International Trade and Industry grew stronger and opposed the US demands for numerical targets for imports from the US. They de-linked the trade dispute from currency policy. The Ministry of Finance abandoned a hope for exchange rate coordination among the major currencies. It started to accelerate liberalization of domestic and external finance to make the yen internationalized. The Plaza was an event that will be remembered by many countries and many institutions in Japan, but lessons differ from one country to another and one institution to another.

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Figure 1. Daily Yen/Dollar & DM/Dollar and rate, 1985/01/01 – 1987/12/31

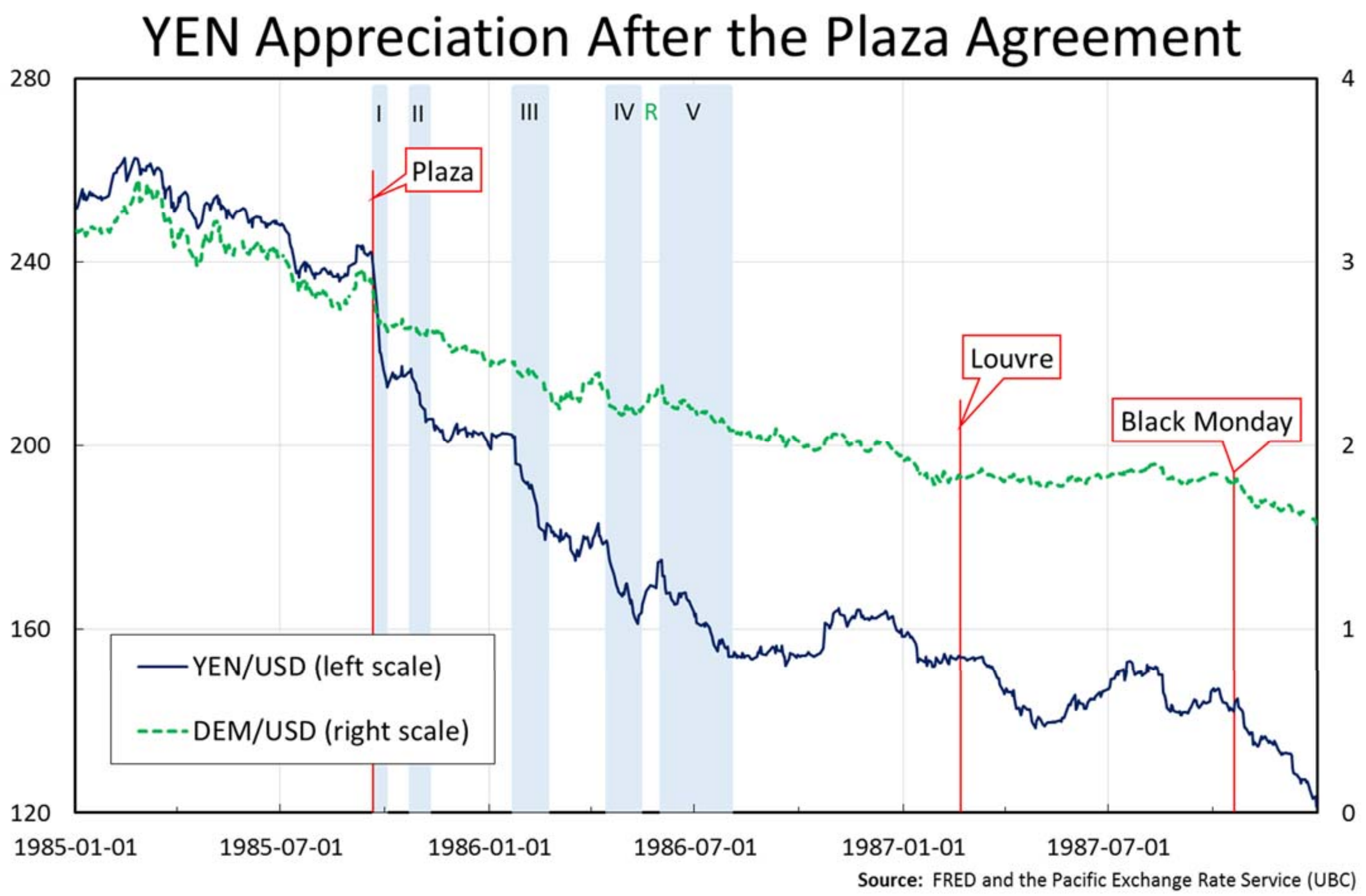
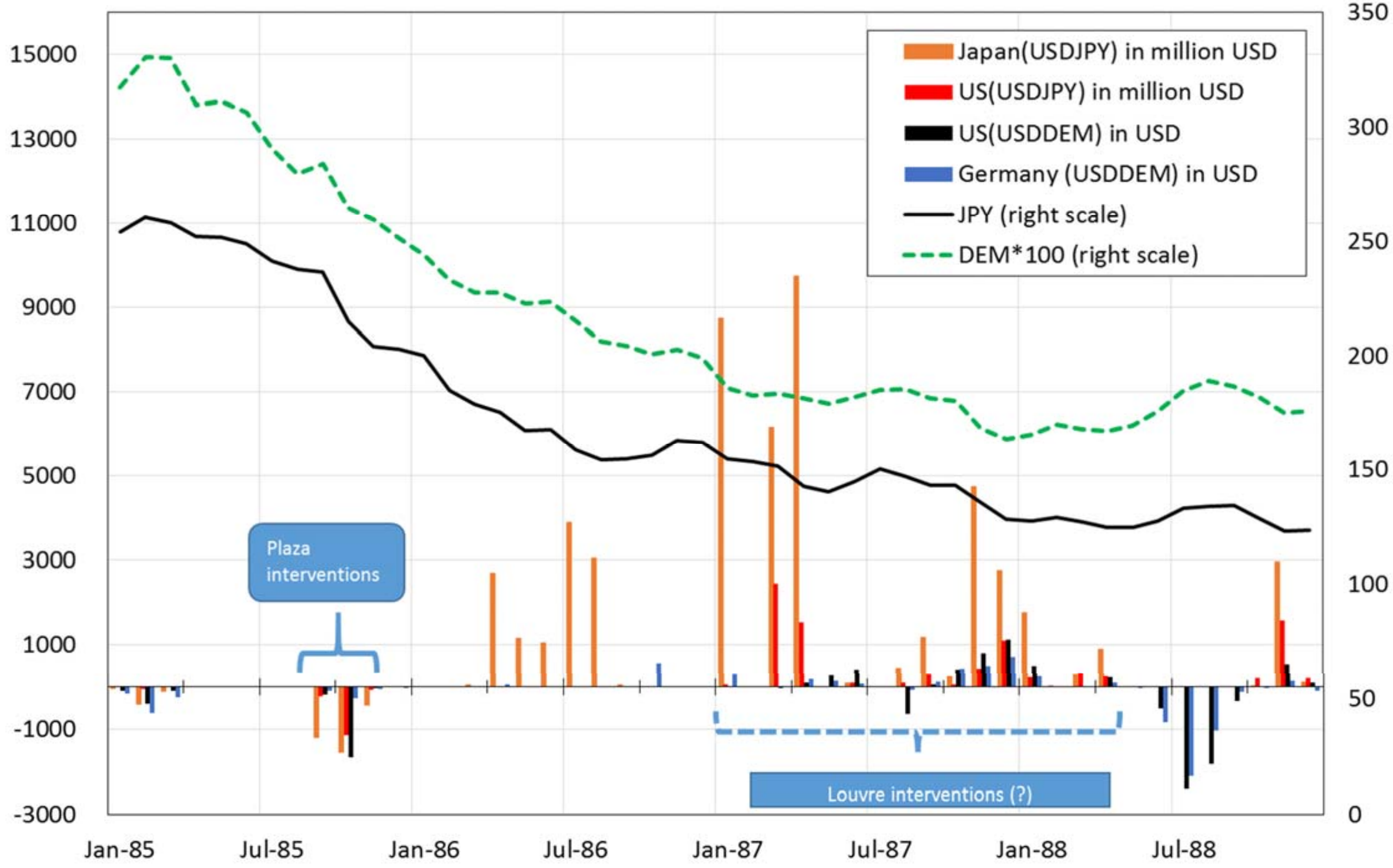


Figure 2. Interventions and the exchange rate (Monthly, January 1985 – December 1988)



Source: Ito and Yabu (2015) and FRED

Figure 3: Nominal bilateral (USDJPY) and Real Effective Exchange Rate of the yen, 1973/01-1999/12

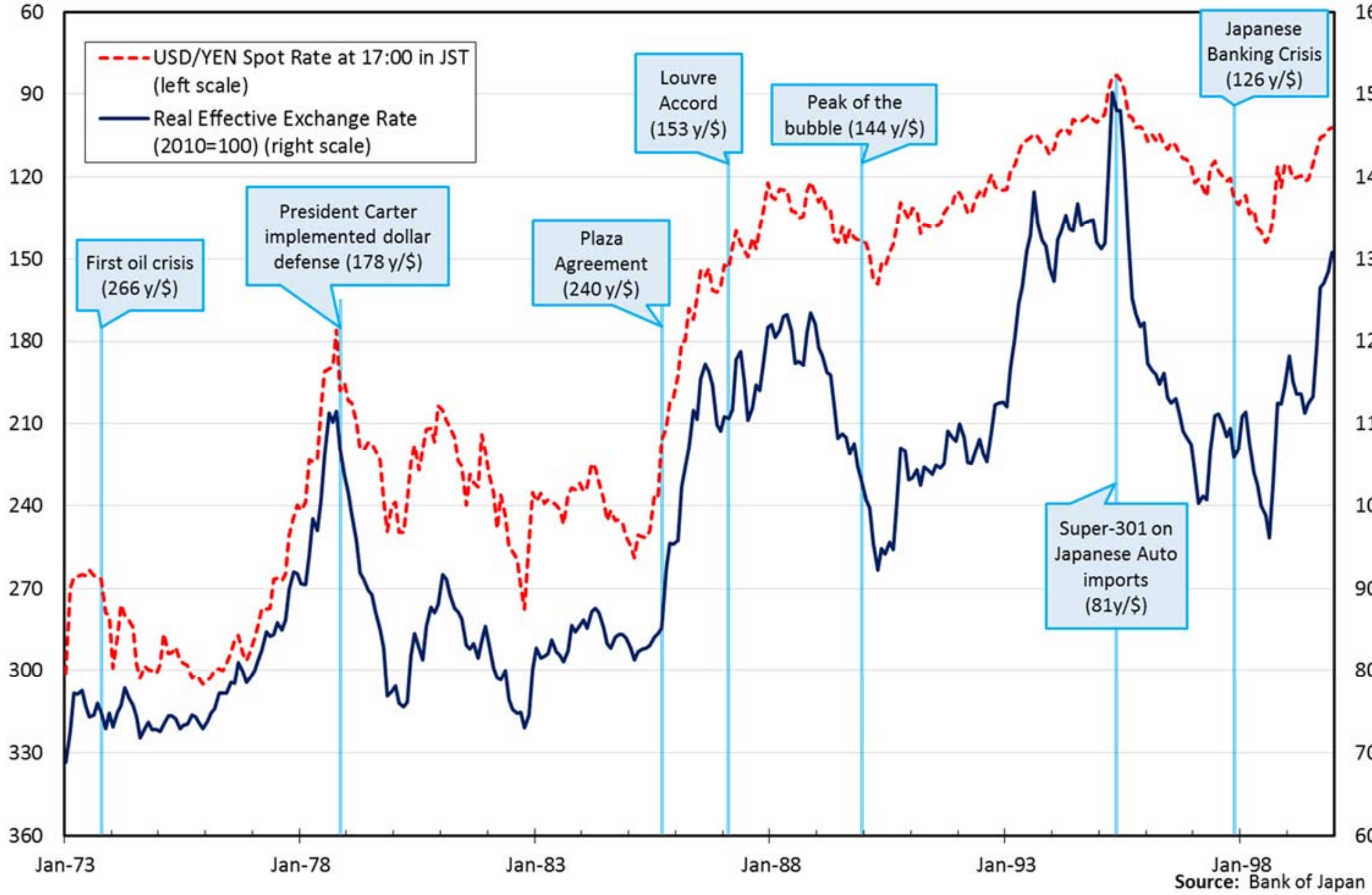


Table 1. Daily interventions by the US and Germany: September 23, 1985 – December 11, 1985

Interventions after the Plaza agreement					
	US intervention		German intervention		
	USDJPY	USDDEM	USDDEM	Yen/dollar	DEM/USD
1985-09-23	-70.00	-79.00	-22	231.90	2.7320
1985-09-24	-127.00	0.00	-126	229.80	2.7158
1985-09-25	0.00	0.00	-223	226.90	2.6802
1985-09-26	-10.00	0.00	-148	220.30	2.6616
1985-09-27	-17.00	-15.00	-59	220.10	2.6779
1985-09-28	0.00	0.00	0		
1985-09-29	0.00	0.00	0		
1985-09-30	0.00	-90.00	-86	216.50	2.6789
1985-10-01	0.00	0.00	0	215.00	2.6523
1985-10-02	0.00	0.00	-112	214.10	2.6490
1985-10-03	-3.00	0.00	-78	212.79	2.6199
1985-10-04	-35.00	-15.00	0	213.45	2.6343
1985-10-05	0.00	0.00	0		
1985-10-06	0.00	0.00	0		
1985-10-07	-132.20	-75.00	-64	215.45	2.6505
1985-10-08	-20.00	0.00	-101	216.00	2.6472
1985-10-09	-153.10	-166.50	0	214.80	2.6482
1985-10-10	-10.00	-255.10	0	215.40	2.6564
1985-10-11	-100.00	0.00	-201	214.65	2.6580
1985-10-12	0.00	0.00	0		
1985-10-13	0.00	0.00	0		
1985-10-14	0.00	0.00	-109	#N/A	
1985-10-15	-25.00	-196.65	-197	215.45	2.6624
1985-10-16	-67.00	-797.00	-465	217.30	2.6849
1985-10-17	-110.25	-60.00	-345	215.15	2.6483
1985-10-18	0.00	0.00	0	215.15	2.6377
1985-10-19	0.00	0.00	0		
1985-10-20	0.00	0.00	0		
1985-10-21	-151.20	0.00	-45	215.70	2.6379
1985-10-22	0.00	0.00	-114	216.10	2.6445
1985-10-23	-20.00	0.00	-30	215.90	2.6381
1985-10-24	-211.70	-50.00	-171	216.70	2.6503
1985-10-25	-50.00	0.00	0	214.90	2.6535
1985-10-26	0.00	0.00	0		
1985-10-27	0.00	0.00	0		
1985-10-28	0.00	0.00	0	213.50	2.6428
1985-10-29	0.00	0.00	-5	212.43	2.6221
1985-10-30	-50.00	-10.00	0	211.50	2.6234
1985-10-31	0.00	-27.00	0	211.55	2.6192
1985-11-01	0.00	0.00	0	209.00	2.6021
1985-11-02	0.00	0.00	0		
1985-11-03	0.00	0.00	0		
1985-11-04	0.00	0.00	0	207.90	2.5975
1985-11-05	0.00	0.00	0	208.00	2.6139
1985-11-06	0.00	0.00	0	205.25	2.5999
1985-11-07	-77.20	-25.00	0	205.60	2.6281
1985-11-08	0.00	0.00	-246	205.85	2.6234
1985-11-09	0.00	0.00	0		
1985-11-10	0.00	0.00	0		
1985-11-11	0.00	0.00	0	#N/A	
1985-11-12	0.00	0.00	-42	205.85	2.6234
1985/11/13 - 12/10	0.00	0.00	0		
1985-12-11	0.00	0.00	-129	203.90	2.5429
Total	-1439.65	-1861.25	-3118		

Data: FRED

Note (1) U.S. Intervention: In Market Transactions in the JPY/USD (Millions of USD), Millions of USD.

Note (2) U.S. Intervention: In Market Transactions in the DEM/USD (Millions of USD), Millions of USD.

Note (3) German Intervention: Bundesbank Purchases on the Dollar/D-Mark (Millions of DEM), Millions of DEM.

Note (4) Japanese monetary authorities have not disclosed daily intervention data of prior to April 1, 1991.

Table 2.

Decomposition of the Yen / Dollar Changes

Regime [a]	Dates			Total change [b]	Accumulated yen changes [c] Decomposition into market of Tokyo	Europe	New York
G5	1985 Sep 20	to	1985 Sep 23	-7.75	(Closed)		-7.75
I	Sep 23	to	Sep 30	-14.95	-0.85	-1.425	-12.675
Q	Oct 01	to	Oct 24	0.12	4.225	-1.525	-2.005
II	Oct 25	to	Nov 07	-10.745	-7.70	-1.80	0.055
Q	Nov 08	to	Dec 17	-3.675	-0.12	-0.305	-4.30
Q	Dec 18	to	1986 Jan 23	-0.30	-0.41	-0.78	-0.825
III	1986 Jan 24	to	Feb 19	-21.10	-7.775	-6.84	-7.415
Q	Feb 20	to	Apr 15	-2.40	0.64	-4.125	1.21
IV	Apr 16	to	May 12	-17.45	-6.91	-1.385	-6.095
R	May 13	to	Jun 02	11.70	5.50	2.92	5.90
V	Jun 03	to	Jul 31	-21.25	-6.78	-5.665	-7.155
Q	Aug 01	to	Sep 26	0.985	2.135	-5.85	3.28

a. The regime names I, II, III, IV, and V stand for waves of yen appreciation; R for reversing period; and Q for a relatively calm spell.

b. Total change is defined as the change from the NY closing of the last day of the preceding regime to the last day of the current regime with two exceptions: The G5 regime is the change from the NY closing on Sep. 20, Friday, to the NY opening of Sep. 23, Monday. Note that the Tokyo market was closed on Sept. 23, due to a banking holiday. The total change in the first regime is defined as the change from the opening of the NY market on Sep. 23 to the NY close of Sep. 30.

c. The daily change in the Tokyo market is defined as the yen/dollar change from the NY close of the preceding business day to the Tokyo close of the day. The daily change in the European market is defined as the yen/dollar change from the Tokyo close to the NY opening of the day. The daily change in the NY market is defined as the yen/dollar change from the NY opening to the NY close of the day. The accumulated changes in a regime are the sum of the daily changes in the respective regime. Due to country-specific banking holidays, the 4 market changes do not add up to the total change of the regime.

Ito, Takatoshi, (1987), "The Intra-Daily Exchange Rate Dynamics and Monetary Policies after the Group of Five Agreement," ***Journal of the Japanese and International Economies***, vol. 1, 1987: 275-298.

Table 3:

Contemporous Correlation of Exchange Rate Intradaily Changes
YEN, DM, UK

Regime	Dates				Tokyo Yen	Tokyo DM	Europe Yen	Europe DM	New York Yen	New York DM
I	1985 Sep 23	to	1985 Sep 30	DM	0.84		0.93		0.72	
				UK	0.36	0.55	-0.51	-0.33	0.74	0.97
Q	Oct 01	to	Oct 24	DM	0.75		0.61		0.96	
				UK	0.65	0.80	0.27	0.65	0.56	0.63
II	Oct 25	to	Nov 07	DM	0.52		0.69		0.92	
				UK	0.20	0.70	0.63	0.72	0.85	0.94
Q	Nov 08	to	Dec 17	DM	0.42		0.59		0.76	
				UK	0.41	0.32	0.48	0.57	0.70	0.83
Q	Dec 18	to	1986 Jan 23	DM	0.44		0.63		0.93	
				UK	0.34	0.69	0.34	0.27	0.74	0.87
III	1986 Jan 24	to	Feb 19	DM	0.81		0.71		0.78	
				UK	0.28	0.07	0.06	0.32	0.31	0.43
Q	Feb 20	to	Apr 15	DM	0.40		0.76		0.50	
				UK	0.29	0.33	0.52	0.53	0.40	0.50
IV	Apr 16	to	May 12	DM	0.82		0.84		0.88	
				UK	0.81	0.85	0.58	0.84	0.70	0.88
R	May 13	to	Jun 02	DM	0.73		0.77		0.87	
				UK	0.11	0.61	0.72	0.82	0.78	0.87
V	Jun 03	to	Jul 31	DM	0.47		0.76		0.58	
				UK	0.28	0.05	0.11	0.10	0.85	0.36
Q	Aug 01	to	Sep 26	DM	0.85		0.82		0.75	
					0.31	0.30	0.41	0.47	0.37	0.39

Note:

Changes in Yen/$, DM/$, and UK/$ in the specific market everyday are measured in the same manner as in Table I. The correlation matrix is then calculated for each regime and each market.

Ito, Takatoshi, (1987), "The Intra-Daily Exchange Rate Dynamics and Monetary Policies after the Group of Five Agreement," *Journal of the Japanese and International Economies*, vol. 1, 1987: 275-298.