

## THE CAUSES OF DEFLATION AND SOME SELECTED PROBLEMS IN JAPANESE ECONOMY<sup>1</sup>

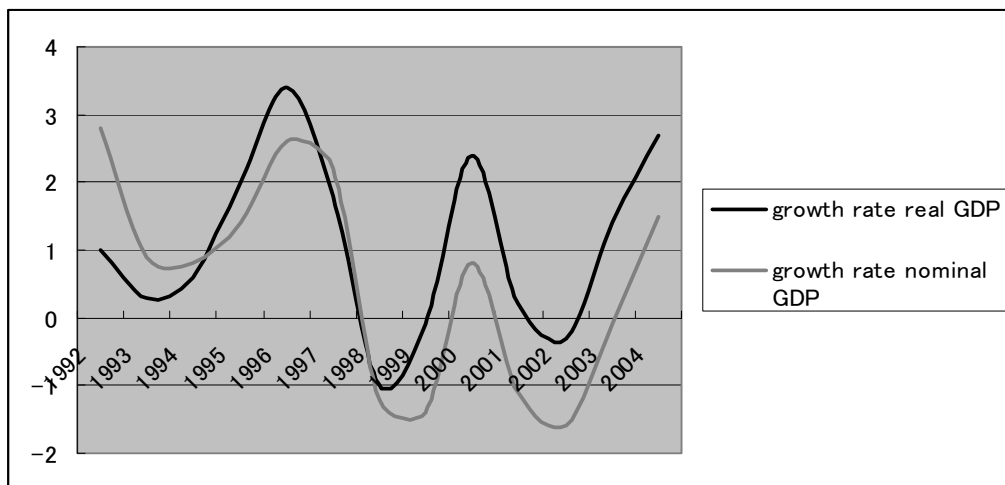
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### Introduction

In these days a long forgotten word – deflation often appears in economic publications. As the development in recent years points out, it is not only a theoretical problem but also a problem of economic policy.

Since 1992 up to these days, Japan has faced an unprecedented recession. For example, the annual growth rate of nominal GDP in Japan was only 0.58 % in average from 1992 to 2004 and the annual growth rate of real GDP in Japan averaged 1.10 % till 2004 (see figure 1). In the last 2 years we could notice the growth 2.7 % in the year 2004 and by estimates even higher growth in the year 2005,<sup>2</sup> but still there is a question if the Japanese economy has reached a long-term growing course. From the 1950s to early 1970s, Japan had about 10 % economic growth rate and continued to grow steadily by about 5 % until the 1990s. But even now all business barometers indicate disconsolate Japanese economic condition.

Figure 1: The growth rate of GDP in Japan



The source: Cabinet Office

We can conceive that the most important factor of the decline of the Japanese economy in the 1990s was the low performance of the total factor productivity (TFP). Hayashi Fumio, one of the most famous professors of econometrics in Japan, declared that fall of the labor input forced down the Japanese economy in the 1990s. It means that Japan will not be able to achieve an economic growth as in last decades because Japan has become a society with an elderly

<sup>1</sup> Authors are heavily indebted to Zdenka Jeřábková from University of Economics Prague who provided detailed comments and recommendations on this article.

<sup>2</sup> At the time of writing of this article, the final data are not known to the authors.

population (Hayashi and Prescott 2002). Generally, older people tend to spend less of their income on the consumption. Moreover, if there are unfavourable expectations of the future development, people will postpone the consumption. It also illustrates the case of the Japanese economy where savings have been growing even in the situation of the zero nominal interests.<sup>3</sup> Both situations “slow down” the consumption and sequentially the output. On the other hand, Dale J. Jorgenson, professor of econometrics at the Harvard University, claimed that Japan will be able to achieve the 2 % growth rate of real GDP because the IT investment and the transition of labor population can be estimated to increase in the next decade (Jorgenson and Kazuyuki 2003). It is not an outstanding performance for Japan indeed yet it is more than a stable growth rate in developed countries. We can also agree that the Japanese economy has such a growth rate potential particularly because of the success of Japanese industries, especially manufacturing industry. Since 1992, the year in which Japan began to suffer from depression, Japanese manufacturing industry has shown a great performance. But there is a phenomenon that spoils such success of companies. The phenomenon is deflation.

Let us try to show in this short article how the deflation influences Japanese economy. Chapter 1 describes the main effects of deflation in Japan. Chapter 2 focuses on problems which are caused by constant deflation. The chapter also pays attention to Japanese debt balance. In the last chapter we will deal with some influences of deflation on economic policy.

### 1. Main pressures of Japan’s deflation

Japanese economy has been experiencing the deflation since 1992. It is not only the cause of the recession in Japan but it also constituted the result of the recession. Anyway, the deflation which we have faced till now is closely related to a business trend in Japan. Firstly, we analyze the capital-loss cause of deflation. Secondly, the article dissects the deflation of price index (GDP deflator). Finally we describe the main causes of deflation.

The deflation of property has continued constantly after the “Bubble economy”.<sup>4</sup> Especially the fall of the land prices is very remarkable: for example, in comparison with the level in 1988 the existing price level of real estates is only 55 %.<sup>5</sup> On the other hand, the stock prices have also had a falling trend since 1989. Recently, there seems to be a calmer trajectory of the stock prices in Japan but still, there is a question if the bottom is over.<sup>6</sup> Hence, the Japan’s capital-loss was 1330 trillion yen from 1989 to 2002 totally, which is about 20 % of GDP in those years. After the “Bubble economy” that occurred from 1986 to 1993, price level of real estates had decreased year by year, especially in 1993, 1994 and 1997 (see figure 2).

According to many economists the core problem in Japan is the “deflation of assets”. Asian crisis (1997) or Russian crisis (1998) did not lead to improvement of this situation. Since 1993 there has been a new agreement on capital adequacy ratio (BASEL I). Whilst Japanese banks

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<sup>3</sup> The low consumption rate and high saving rate are ordinary phenomena of the Japanese economy. There are many reasons for that: high expenditures on housing, education and provision for seniors.

<sup>4</sup> Bubble economy: we refer to the situation on the stock market in 1980s when TOPIX went up by almost 400 % between 1983 and 1989 and the price index of urban commercial land in six large cities rose by almost 500 %.

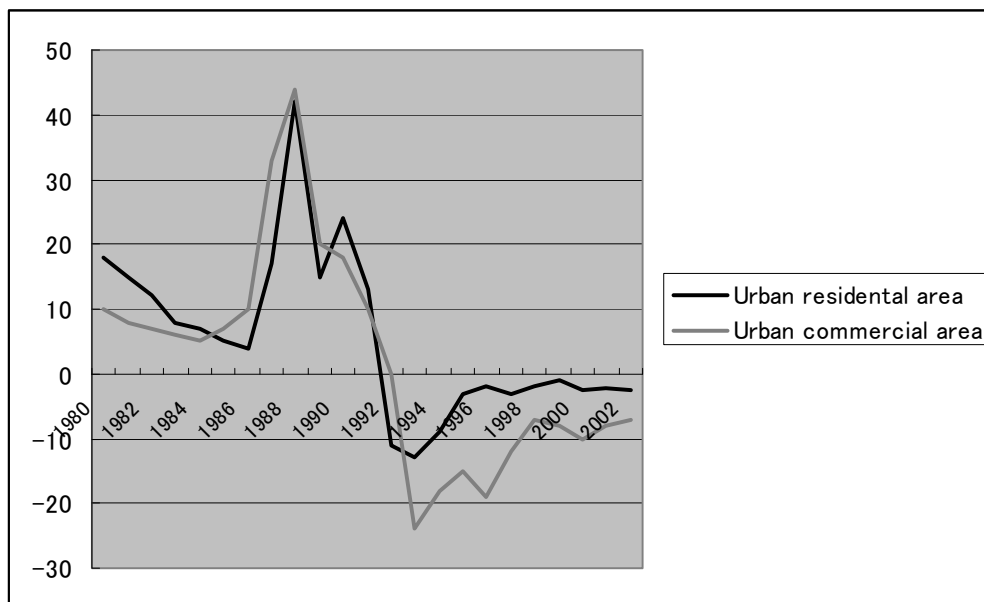
<sup>5</sup> Data are from the Japanese Ministry of Transport and the Bank of Japan.

<sup>6</sup> Asset price volatility had been as high as it was during the Great Depression, but had not been accompanied by volatility in general prices (Ueda 2003, p. 3).

could subsume obscure capital gains of hold stocks into capital coverage (TIER II), the fall of stock prices led to a downturn of the capital adequacy ratio. The banks solved this situation logically by credit constraint. It conducted to attenuation of an economic activity.

Considering the following figure, the price level of commercial areas decreased more seriously than the price in residential areas after the “Bubble economy”. Moreover, the price reduction of commercial areas influences the balance of accounting of companies; therefore it is also the main pressure which decreases profits of companies. Decline in prices of assets (assets have been provided as a guarantee for granted credits) also had a direct unfavourable impact on banks, as these did not receive credits back even after selling the mortgage.

Figure 2: Price index of urban land



The ratio to the year before (%)  
 The source: Ministry of Finance

The reasons of decreasing of the land price can be analyzed with using of “Proceed-restoration model”. The Proceed-restoration model can be described by the expression:

$$P=c/(r+t+z+g)^7$$

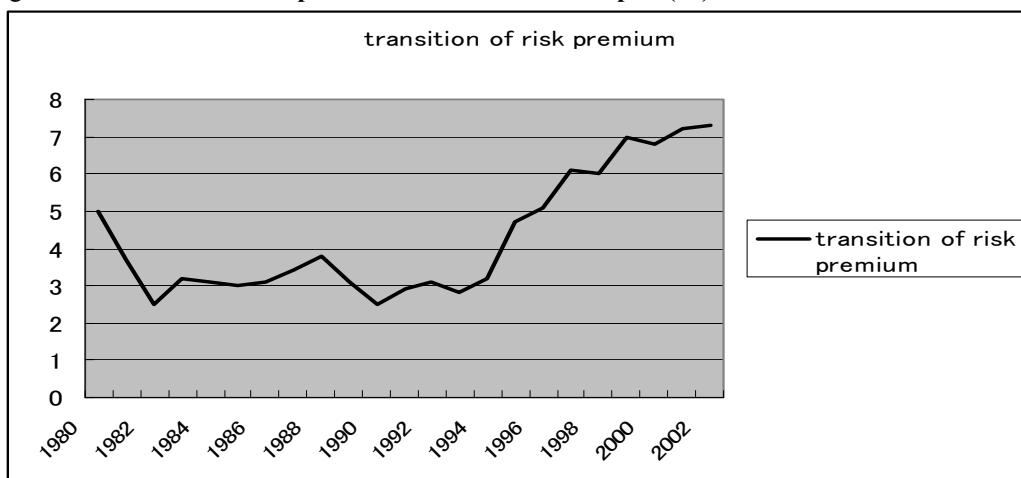
- “P” (price of property)
- “c” (this year’s estimated profit)
- “r” (the interest rate of safe property)
- “t” (the rate of property tax)
- “z” (risk premium)

<sup>7</sup> The proceed restoration model is normally used by stock analysts. But in this case it could be useful when the real estate market in Japan is analyzed because it is natural to consider the estimated profit.

“g” (the estimated growth rate of profit)

The Proceed-restoration model shows what the main pressures of the deflation on the real estate are. The conclusion of this model is increase of “risk premium” and decrease in “the estimated growth rate of profit”. The risk premium of Japan’s real estate has increased since the middle 1990s<sup>8</sup> (see figure 3) because many Japanese companies continued to reconstruct and managements had debts from that period. For that reason, many companies are cautious to have a real estate.

Figure 3: **Transition of risk premium of real estate in Japan (%)**



*The source:* Created on the basis of data of Ministry of Finance and Bank of Japan

The estimated rate of profit has decreased as well. The estimated rate of profit of the non-manufacturing industry for five years was 4 % in 1990 as a peak, but since 1992, it has been under 1 %.<sup>9</sup> In regard of the model, the decreasing of estimated rate of profit and increasing of risk premium add a denominator, so the price level of land decreases. The fall on the stock market also deepened after “Bubble economy” (see figure 5). Japanese companies and especially banks sold amount of stocks because they wanted to dissolve the “Mochiai system,” which is particular stock co-holding style in Japan<sup>10</sup>, and paper losses. In 2001 the fall of stock price stopped thanks to foreign investments.

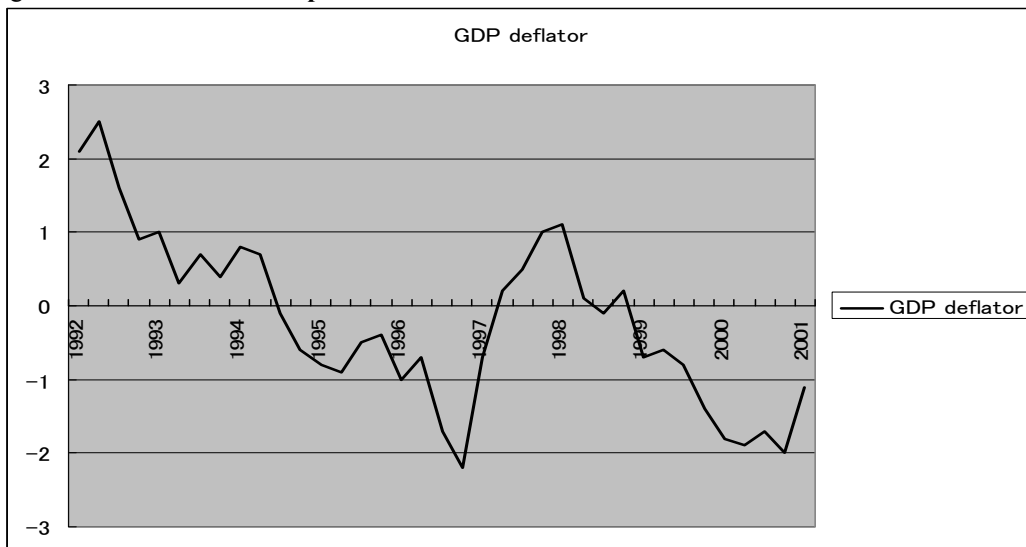
The price of stocks has a great impact on losses of accounts. According to a questionnaire of The Cabinet Office that was given to leading companies of Japan, 70 % of companies answered that the fall of stock price has diminished their accountable profit. They also refer to the balance-sheet of the most important banks in Japan; the capital-loss of stock price was 1.2 trillion yen at average (about 1.8 % of GDP). Last but not least, figure 4 indicates the GDP deflator which points out Japanese deflation.

<sup>8</sup> Data are from The Cabinet Office.

<sup>9</sup> Data are from The Cabinet Office.

<sup>10</sup> Mochiai system is a kind of co-operation in stock holding system in Japan. Some companies hold the stocks of other companies and they reject interference from outside stockholder.

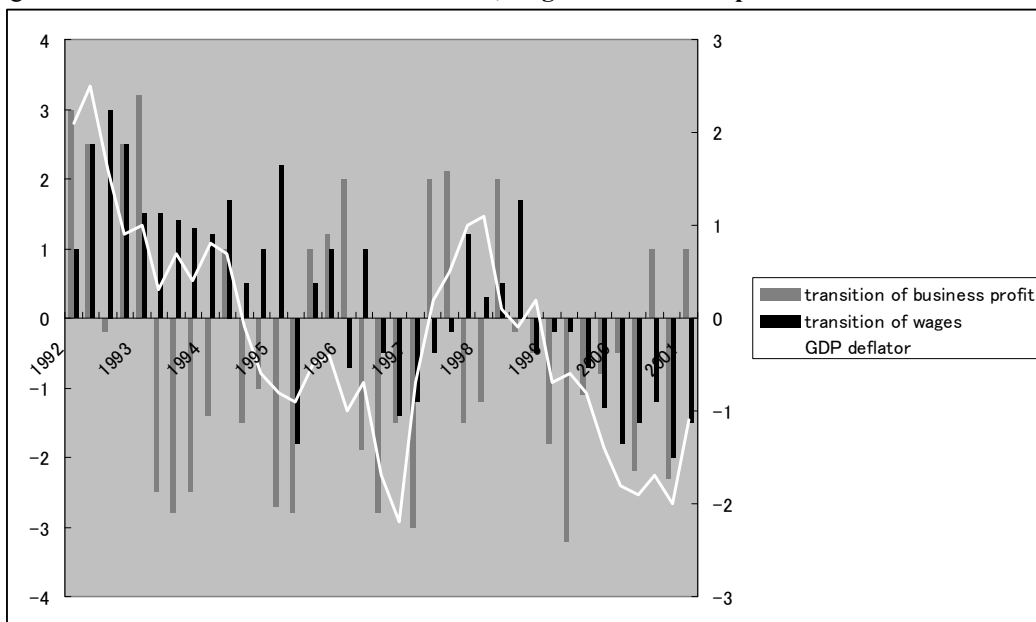
Figure 4: **GDP deflator in Japan**



*The source:* Ministry of Finance

GDP deflator is a result of domestic factor of domestic constructions. But recently, the wages and profit of companies in Japan have a great influence as we can see in figure 5. The overall price level slumped between 1997 and 2004 by about 3 %. If we look at CPI can observe that there was price stability in Japan 2004 and -0.4 % in the last year. The expectations for this budget year predict only a moderate positive value of the CPI.

Figure 5: The transition rate of GDP deflator, wages and business profit



The ratio to the year before (%)

The source: Ministry of Economy, Trade and Industry

Now we will try to generate the GDP deflator from simple Multiple Regression Analysis.

$$\text{GDP deflator} = \beta_0 + \beta_1 x_1 (\text{transition of wages}) + \beta_2 x_2 (\text{transition of business profit}) + \mu$$

The result of that Regression Analysis is  $R=0.80$  and it is significant in 95 % standard ( $n=36$ ).

From this model we can find out that the deflation in Japan comes from the decreasing level of wages and business profit. It is really “simple” for the Japanese to get out of deflation: they just increase the wages and business profit. But as we have already stated, the decreasing prices of property (especially real estates and stocks) drastically diminish company profits. For that reason Japanese companies have recently made a reconstruction and this is the main factor of decreasing wages. That is to say that the Japanese reconstruction means not only company system reconstruction but also a payroll cut.<sup>11</sup> This is why it is very difficult to escape deflation control.

## 2. The most serious problem of deflation in Japan

In this part of the article we would like to outline the main pressures of deflation in Japan. We intend to imply the most significant influences of deflation in Japan.

Of course the main influence is on economy which is affected from both demand and supply

<sup>11</sup> The recent reconstruction means the end of Japanese lifetime employment system. Under this system, the Japanese enjoyed stable life plan. But now they cannot anticipate stability, so consumption has also decreased because of anxiety. This is also one of the essential pressures of deflation.

side and it oppresses the profit of companies, which has already been analyzed in many papers: for example Kikuo (2000), Nakajima (2001), and Hayashi and Prescott (2002). Still, we would like to point out the most serious problems that are occurred by deflation.

The deflation makes the primary balance worse through the reduction of tax income which is caused by the low performance of companies. Not only reduction of income tax but also insolvency of the government create fatal damage to Japanese economy in the future. We chalk out that problem by focusing on Japanese primary balance in this chapter. At first, let us have a look at the general budget account of Japanese government in 2004 (see figure 6).

Figure 6: **General account budget of Japan in 2004**

<i>Income headline</i>	<i>Amount</i>	<i>Dependence</i>
Tax income	41,747,000,000	50,8 %
Profit of government enterprises	16,703,502	0,0 %
Assets income	261,771,140	0,3 %
Other income	3,495,449,975	4,3 %
Public loan	36,590,000,000	44,6 %
total	82,110,924,617	100,0 %

*The source:* Ministry of Finance, (unit: 1000 yen)

As is obvious from the table, almost 50% of the Japanese government incomes come from the public loans. It is, we could say, the fatal level in a developed country, and it is natural that others think so; for example, the grading of Moody's or Fitch Rating indicates this point too (see figure 7).

Figure 7: **The grading of Japanese bonds by Moody's and Fitch Rating**

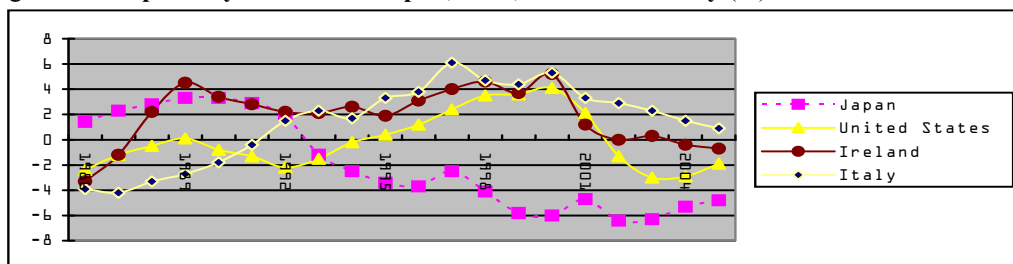
<i>Moody's</i>	<i>Country</i>
Aaa	USA, Britain, France, Germany, Spain, Singapore, Australia
Aa	Hong-Kong, Italy
A	Japan, Chile
Bbb	Russia, Mexico
Bb	Costa-Rica
B	Turkey, Argentina

<i>Fitch</i>	<i>Country</i>
AAA	USA, Britain, France, Germany, Spain, Singapore, Australia
AA	Hong-Kong (-), Japan (-), Italy (-)
A	Chile (+)
BBB	Mexico
BB	Russia (+), Costa-Rica (+)
B	Turkey (+), Argentina (+)

*The source:* Moody's, Fitch Rating

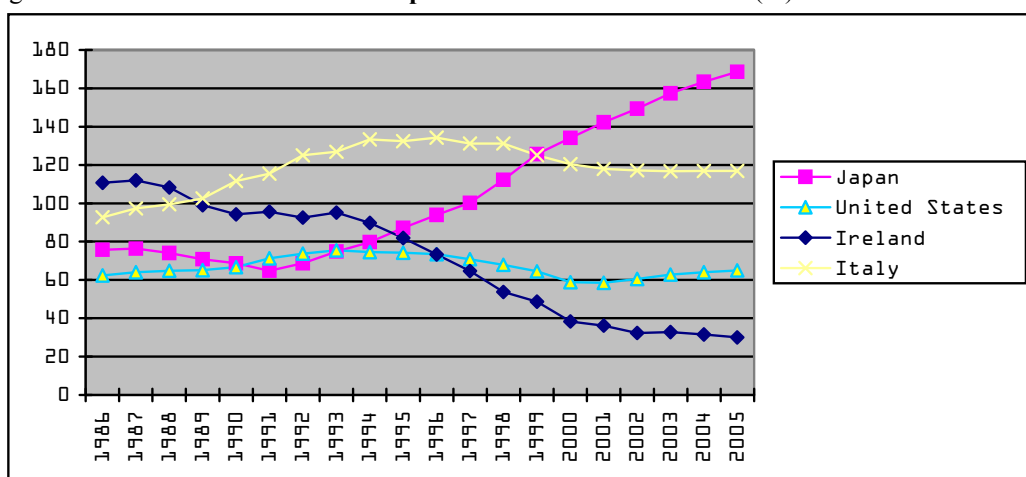
As we can see from the tables above, Japanese bonds are also low-graded for a developed country which was once called, "Japan as No. 1". But other data indicate that this grading is really reasonable (see figures 8 and 9).

Figure 8: The primary balances of Japan, USA, Ireland and Italy (%)



The source: OECD

Figure 9: The balances of debt in comparison with the ratio of GDP (%)



The source: OECD

- From 1995 onwards, housing corporation shares have no longer been classified as financial assets.
- Includes the debt of the Inherited Debt Fund from 1995 onwards.
- Includes the debt of the Japan Railway Settlement Corporation and the National Forest Special Account from 1998 onwards.

Referring to the figures above, Italy which is called “the kingdom of deficit,” had improved primary balance rapidly because they had to meet the Maastricht standards which were described as a condition to enter the EMU. Furthermore, e.g. Ireland had also improved its situation and now the balance of debt as the ratio of GDP is only 38 %. It is necessary to say that other countries are truly rallying. On the other hand, Japanese primary balance is really poor in comparison to the rest of the world; since 1992 the government has degenerated rapidly because it provided expansive financial policy several times (see the chapter 3). But the Japanese economy did not recover as authorities hoped, and financial policy worsened “only” the Japanese primary balance.<sup>12</sup> We can expect that the ratio of government debt/GDP will

<sup>12</sup> For the fiscal year of 2004, the primary deficit was planned in an amount 8% of GDP. Some pessimistically predicted that the total debt could get near the limit of 200 % of GDP in the year 2005.



continue to increase. There are two main reasons for this development: the first is “a principal point of our article” – deflation and the second reason is the slowdown of the growth rate of Japanese economy in the near future. We will analyze that problem through the simple “Dormer-model”.

### The guidance expression of Dormer model<sup>13</sup>

G = Government expenditures

T = Tax income

$\Delta B$  = amount of issues

R = payment of interest

The general accounting of government is

$$T + \Delta B = G + R$$

And the deficit of finance is

$$\Delta B = G + R - T$$

When the primary balance is 0,

$$\Delta B - R = G - T = 0$$

And if the interest rate equals to “r” and the balance of debt equals to “B”,

$$R = rB$$

if we put down  $\Delta B$  instead of R

$$\Delta B = rB$$

$$r = \Delta B/B$$

Interest rate can equal to the ratio of the balance of debt.

And nominal GDP equals to “Y” and the growth rate of nominal GDP equals to “g”,

$$g = \Delta Y/Y$$

If we assume that  $g=r$

$$\Delta Y/Y = \Delta B/B$$

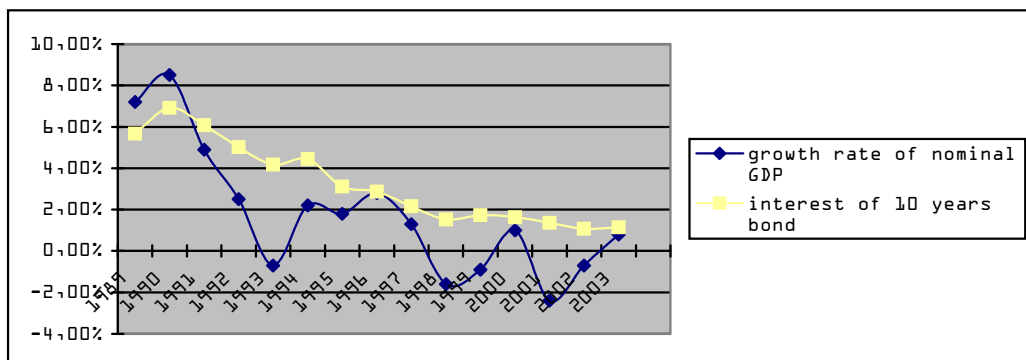
that means

$$g=r$$

If the ratio of the balance of debt and the ratio of GDP moves in the same direction (declining or increasing), the equation will maintain fixed. This means that the most important element is “r” (long term bond interest). If  $g > r$ , the growth rate of nominal GDP is superior to “r”, the ratio of the balance of debt to GDP will decrease. But unfortunately, in Japan now “g” is lower than “r”. The balance of debt will increase more rapidly than growth rate of GDP, so the ratio of the balance of debt to GDP will diverge constantly. See the next Figure (figure 10)

<sup>13</sup> This model is picked from (Ishi 2004).

Figure 10: The growth rate of nominal GDP and the interest of ten-year bond of Japan



The source: Ministry of Finance and Bank of Japan

Referring to this figure, the growth rate of GDP has constantly been under the interest rate. As has been already stated, the growth rate of the real GDP in Japan was not so bad but the nominal GDP is in really serious situation because of the deflation. Therefore, the deflation in Japan will do harm to all “economic events” in the nearest future. In previous chapters we have described some causes and effects of Japanese deflation. In the following chapter we will mention some selected links to the economy policy.

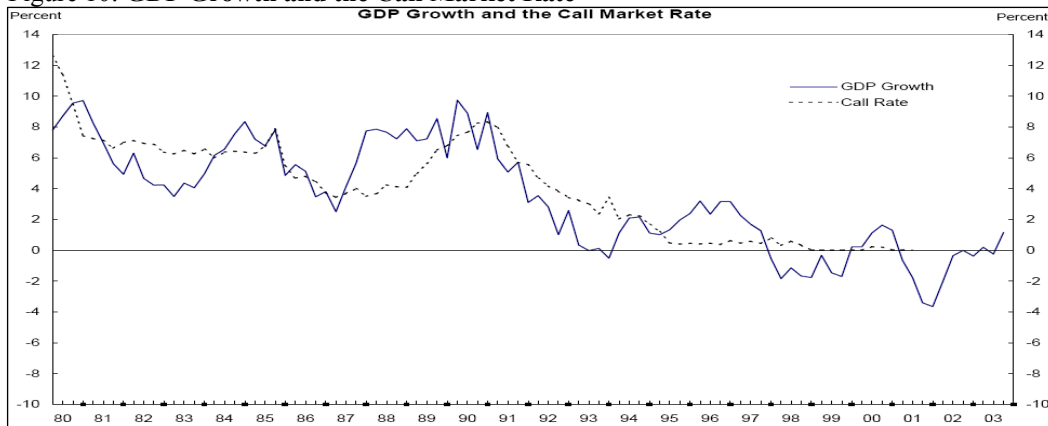
### 3. Some links to the economic policy

*“Japanese-type deflation is an economy's way of “trying” to get the expected inflation it needs”*  
P. Krugman (1999)

In this chapter we will describe how the Japanese government and the central bank (Bank of Japan) have overcome the serious situation from the point of view of an economic policy. Let us have a look at what the reaction of economic authorities to emerging conditions was. A logical reaction to the decline of aggregate demand is from the part of monetary authority an expansive monetary policy.

If we focus on main interest rates we can see the right reaction of Bank of Japan (BoJ) to economic contraction by monetary policy easing and gradually decreasing of long-term interest rate. The call rate today, for example, is in principle zero (see figure 10). The first half of the 1990s witnessed a significant downturn, when rates declined from 7 % to 0.5 %. Almost zero nominal (not real!) rates have been observed since the second half of the 90s. Low real interest rates would not have to imply considerable problem for future development. On the other side, they do not help definitely sharp recovery of investment activity. As we point above, the fact that Japanese commercial banks have made difficult access to credits as a respond to an incapability of numerous firms to pay their liabilities (insolvency) seems to be a greater problem.

Figure 10: GDP Growth and the Call Market Rate

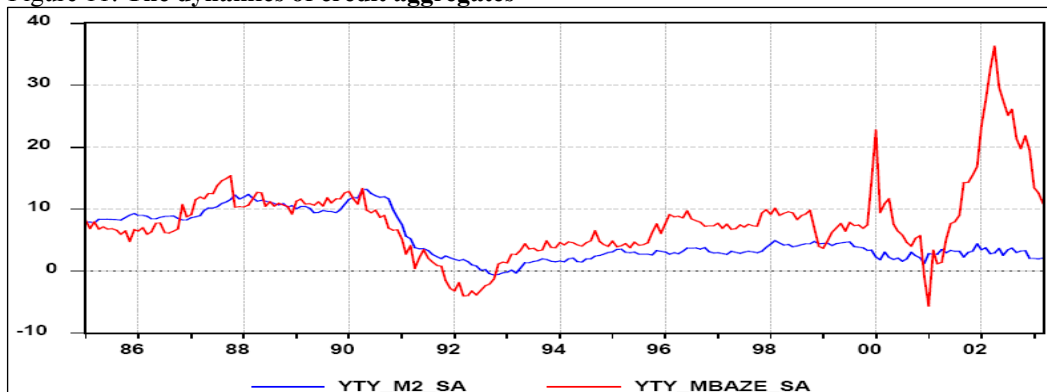


The Source: Hetzel (2004), p. 37

This interest is linked to the fact that the current Japanese “zero interest rate policy” led neither to successful increase in real activity in the Japanese economy, nor to an adjustment of deflationary gap. Since 1999 the movement of the price level had been assuming negative values and the BoJ had to respond to it by further cutting the nominal interest rates to avoid increasing in real interest rate that could further damage the investments. The solution in form of lowering of nominal interest rate cannot be carried out forever (the impossibility of negative nominal interest rate). Since 1999 the BoJ has been making the “zero interest rate policy”. Japan has fallen into a deflationary trap. In the past years, the BoJ has maintained the nominal interest rates on short-term debt effectively close to zero. Under a zero nominal interest rate, the real interest rate equals to the minus rate of inflation.

Expansive monetary policy has had also a form of an increase of monetary base. The BoJ has overrun commercial banks with an excess liquidity. However, the monetary base growth had only a poor effect on increase of broader monetary aggregates (see figure 11). „...the multiplier decreases permanently regardless of the fact if the BoJ buys bonds or shares. Logically, the poor growth rate of money stock is caused by negative credit dynamics .” (Frait, 2003, p. 6).

Figure 11: The dynamics of credit aggregates



The Source: Frait (2003), p. 7

Why the expansive provisions did not have a healing effect? Hasmonetary policy in Japan lost its ability to react?

Let us have a look at Krugman's explanation (Krugman, 1999). The sticky real interest rate can cause the liquidity trap. This rate is a real quantity – it expresses the price of current goods in terms of future goods and it is  $(1+i)(P/P^e)$ .<sup>14</sup> Although there is a zero nominal rate in the Japanese economy, the real interest rate is high. Hence the ratio  $P/P^e$  is also high. „Clearly, the economy “wants” a lower value of  $P/P^e$ , and because  $P^e$  is sticky – because people anticipate about what prices will be in the future – this adjustment is coming via a fall in  $P$ ” (Krugman 1999, p. 3). This is the reason why Japan is in deflation, the economy is clinched by this process and there will be a higher expected future level than the current price level. It is the way how to “ensure” higher expected inflation. The second ratio can also increase providing; the economic subjects will be looking for price increase in the future. This situation could lead to the situation that the economic subjects could end up the consumption time out und they could buy goods and services “already today.” In opinion of many economists (e.g. Speigel 2004), the subjects in Japan in these days could be at the beginning of those considerations. With respect to the rise of 10-years government bonds in last years, the Japanese subjects should expect the future price increase, constriction of monetary policy or combination of both, optionally.

After this contemplation, the solution might seem to depend on shoulders of the fiscal policy. The crowding-out effect is minimized in the case of deflation and the effect of an expansionary provisions (e. g. assessed taxes abatement) could be more powerful. During the 1990s, the Japanese government carried out a series of expansionary arrangements based on deficit financing. In the second half of the 1990s, the government accomplished several fiscal incentive packages<sup>15</sup> and tax abatements. High investments carried off a rescheduling of the Japanese bank system. A collapse of asset prices had a serious incidence on the financial system. The

<sup>14</sup>  $i$  the one-period nominal interest rate,  $P$  the current nominal price level, and  $P^e$  the expected future price level. The formula above can be also written as  $P(1+i)/P^e$ .

<sup>15</sup> The Japanese government performed a fiscal incentive package valued at 16.7 trillion yen early in 1998, and in the same year in November the government announced another fiscal incentive package, valued at 23.9 trillion yen. Other encouragements were e. g. 18 trillion yen in 1999 and 11 trillion yen in 2000, (Data from: Powell 2002).

banks got into difficulties with their liquidity. The deflation (signifying a wealth-switching from debtors) broke out in a business sector. Consequential bad credits further worsened instability of the banking system. The government established a bank recapitalization fund and passed a statute allowing it to nationalize unviable banks (in 1998 the government nationalized The Long Term Credit Bank). A year later, in 1999, large amount of money was poured into redevelopment of the banking system; it was namely 8 trillion yen from the public budgets that were divided among fifteen most significant banks. The public debt increased to an incredible extent and the government budget was permanently in high deficit. Another fiscal impulse would not have led to a bolder effect (it would have only worsened de the condition of public deficits). As an argument for this statement, we would like to claim that e. g. high propensity to save; unjustifiable additional indebtedness or a tax abatement would have been presumably conducted by an antagonistic behavior of economic subjects in terms of Barro-Ricardian equivalence, etc.

In reaction to the facts mentioned above, the BoJ reacted by an application of series of non-traditional methods – so-called “quantitative easing policy.” A component part of this type of the monetary policy was inter alia bank liquidity as an operative instrument (the BoJ flooded commercial banks with excess liquidity) and sequentially, as a matter of fact, the central bank carried out direct crediting of government – it buys just long-term government bonds. “The BoJ announced that it will maintain its “quantitative easing policy” and its zero nominal interest rates until the Japanese economy will not be sufficiently far from “the deflation zone.” The application of all unconventional disjunctions is a matter of controversy. Some difficulties of this policy could be: the commercial banks prefer holding the risk-free assets (government securities) instead of holding the risk assets (shares or firm-crediting for their new start), therefore the intermediary function of banks is threatened, etc. (e. g.: Frait 2003).

According to some proposals, the BoJ should accept the policy of active reserve creation where the creation depends on overshooting of the goal for the money increase or for the price level. The money creation in conjunction with decent stability of the money demand could stimulate Japanese expenditures (consumption). Hetzel suggests: “The BoJ could make clear that it is ready to expand its portfolio of illiquid assets to increase the monetary base by whatever amount is necessary to revive money growth, restore the expectation of price stability, and maintain price stability” (Hetzel 2003, p. 28).

### **Conclusion**

We have described the causes and effects of Japanese deflation und we have also mentioned some recommendations for economic policy. It is natural that this paper is too short to depict the whole problem of deflation in Japan but we believe that we fared well to point out some important and unmarked circumstances.

The merits of Japanese slump point are wider. The deflation is only one of the most conspicuous symptoms of an economic development in recent years. In many aspects, such a situation is new for economic policy authorities. In relation to that, the BoJ exploited and utilized rather untraditional monetary instruments (they have not proved to be very successful) and afterwards it looked for “routes outward,” also with the help of controversial practices. An advancement will show us (as it looks to be from the last data) if the Japanese economy can get out of the worst and which instruments and policies have been more successful than others. Assuredly, the Japanese troubles significantly conducted to the fact that the economic theory

attends intensively to this phenomenon which is a serious problem and not a feature of healthy economy.

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- [23] Fitch Rating: [www.fitchratings.com/](http://www.fitchratings.com/)

[24] OECD: [www.oecd.org/](http://www.oecd.org/)

### **Summary**

Práce se zabývá fenoménem deflace a vybranými problémy japonské ekonomiky, které s deflací souvisejí. V první části se autoři zabývají tím, jaké účinky měla (má) deflace na japonskou ekonomiku. V druhé části je pozornost soustředěna na některé doprovodné efekty související s deflací. Jde zejména o problém nadměrného růstu veřejného dluhu v Japonsku. Poslední část se věnuje tomu, jakou pozornost věnovaly hospodářsko-politické autority tomuto závažnému jevu a zdali dokázaly najít účinné nástroje na její odstranění/minimalizaci.