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The Timing of Public Spending in Japan and the US

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Abstract

This paper considers a monthly pattern in government spending. I have found that public spending increases at the end of the fiscal year for both the Japanese central government and the US federal government and that the effects are stronger in recent years than in the past. I then propose two hypotheses that would explain why public spending increases at the end of the fiscal year.

1. Introduction

Anecdotal evidence tells us that public works increase at the end of the fiscal year in Japan.[1] In fact, one study estimates that almost half of all public works were performed during the last two months, February and March, of fiscal year 2000 in Japan.[2] Motivated by these observations, I ask if this phenomenon can be seen in both the Japanese and the US public sectors.[3]

I look at public construction and private construction data from both countries and perform empirical tests. The estimation results suggest that the phenomenon in which public spending increases at the end of the fiscal year exists in the Japanese central government and the US federal government. The results also indicate that the effect is weak for the past but strong for recent years in both countries.

I would like to thank Professor Linda Cohen, Professor Amihai Glazer, Professor Jun Ishii, Professor Justin Tobias, and the anonymous referees for helpful comments and suggestions. I am also grateful to the Department of Economics and the School of Social Sciences at UC-Irvine for financial support to collect the data. All remaining errors are my own.

1 It is true that many Japanese people complain about public works increasing at the end of the fiscal year.

2 *Asahi Shimbun*, 25 August 2002. Although this research covers from February to December in the *calendar* year of 2001, it will be clear that almost half of public works are done at the end of the fiscal year of 2000. In the research five prefectures (Aichi, Gifu, Mie, Shizuoka, and Nagano) are investigated.

3 This research is devoted to finding facts at this time – I do not address questions of whether it is right or wrong.

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Given the estimation results, I ask why public spending increases at the end of the fiscal year and why this spending pattern is allowed. To answer this question I apply two models: delayed stabilization and option value. The delayed stabilization model argues that conflict causes a delay in implementing policy, as each interest group attempts to increase its share of the benefits. The option value approach considers the value of the option to invest in the future and argues that there is economic value to delay, stemming from the arrival of better spending opportunities in the future.

The structure of this essay is as follows. Section 2 covers the related literature. Sections 3 and 4 explain the data and estimations for Japan and the US respectively. Section 5 proposes scenarios and explains why public spending increases later in the fiscal year. Section 6 will conclude.

2. Literature

The literature on the political business cycle (Nordhaus, 1975; Tufte, 1978; Schuknecht, 2000; Keech and Pak, 1989; Kohno and Nishizawa, 1990) and delayed stabilization (Alesina and Drazen, 1991) discusses the pattern/timing of implementation of economic policy. The literature on option value (Dixit, 1992) considers the timing of investment, and offers an alternative view of the investment decision to the classical view of net present value. As far as I know, there is no research that attempts to combine the ideas from delayed stabilization and option value with the political business cycle.

Political business cycle theory considers economic fluctuations influenced by governments (Nordhaus, Tufte, Schuknecht, Keech and Pak, and Kohno and Nishizawa). One cycle is called the electoral-type in which governments compete for votes and manipulate the economy to win in upcoming elections. The other cycle is a partisan-type cycle in which different preferences for certain economic polices across political parties cause certain economic fluctuations. A left-wing party tends to place less weight on inflation relative to unemployment than a right-wing party and also tends to place more weight on the benefits of public goods relative to the tax burdens necessary to finance them than a right-wing party; voters recognize and act on these differences, and parties generally fulfill their promises.

Nordhaus presents a hypothesis in which incumbents compete for votes by reducing unemployment along the short-run Philips curve at the expense of increased inflation afterward. Tufte argues that incumbents adopt more easily maneuverable policies such as transfer payments, tax cuts, or public works. Keech and Pak find evidence that an electoral business cycle exists in veteran's transfer payments in the US between 1961 and 1978. They also find that the cycle does not contribute to growth in public expenditure in this country. Kohno and Nishizawa argue that the short-term effect of political manipulation on public construction is significant in Japan. Schuknecht finds that governments in 24 developing countries manipulate spending on public works rather than lower taxes to enhance electoral support.

In the literature on the delayed stabilization model, Alesina and Drazen discuss the reasons why public policy is not implemented quickly. They argue that a policy is

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implemented if both interest groups agree to it. For example, the share of the burden of higher taxes and expenditure cuts is disproportionate or different across political parties. The different groups disagree on how the burden should be allocated between them. Even though the policy should be implemented quickly, this conflict causes political stalemate.

The literature on option value argues that investing when the net present value exceeds its cost under the Marshallian criterion may be suboptimal and suggests that the optimal investment decision should take into consideration the opportunity of waiting under uncertainty. Most investment decisions have three characteristics: the investment is irreversible, there is uncertainty on the future return, and the investment decision can be postponed to get more information. Under these conditions, the opportunity to delay the investment decision has a positive value, and the opportunity cost of the investment should include this value. The optimal investment decision considers not only the future discounted return but also the value of the option to invest in the future.

3. Japanese Central Government

Data

I compare the data for public construction and the data for private construction to see if the amount of public works undertaken at the end of the fiscal year is larger than in other months. I chose the monthly time series 'public construction started by state' (hereafter PCS) and 'private civil engineering works started' (hereafter PRS).[4] The private construction series will account for confounding effects, such as seasonal or monthly effects as general construction will be more active in some months during a fiscal year than others. There will also be other miscellaneous factors that affect both private and public construction. This section will see how public construction increases or decreases relative to private construction.

Figure 1 shows the percentages for public construction (PCS) and private construction (PRS) for March out of the annual total for fiscal years from 1970 to 1998. The Japanese fiscal year begins in April and ends in March. As we can see, after about fiscal year 1987, the percentage of the total annual construction started in March increased.

Figure 2 shows for each month the mean of the monthly percentages for PCS and PRS for fiscal years from 1970 to 1998. As we can see, the average of the March spending is the highest.

Estimation

I will conduct statistical tests to see if the amount of public works undertaken at the end of the fiscal year is larger than in other months. Although Figure 1 suggests

[4] PCS is the appraised value of construction, which is the sum of the contract agreement and the estimated value of inputs that the contractor supplies for free. PCS is the sum of values of construction that started each month. PRS is the total cost of the construction, which started each month.

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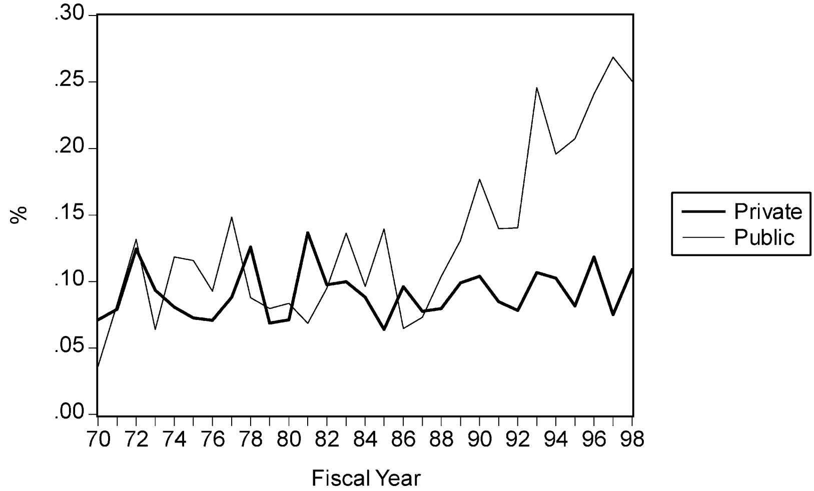

Figure 1 % March spending in Japan from FY1970 to 1998.

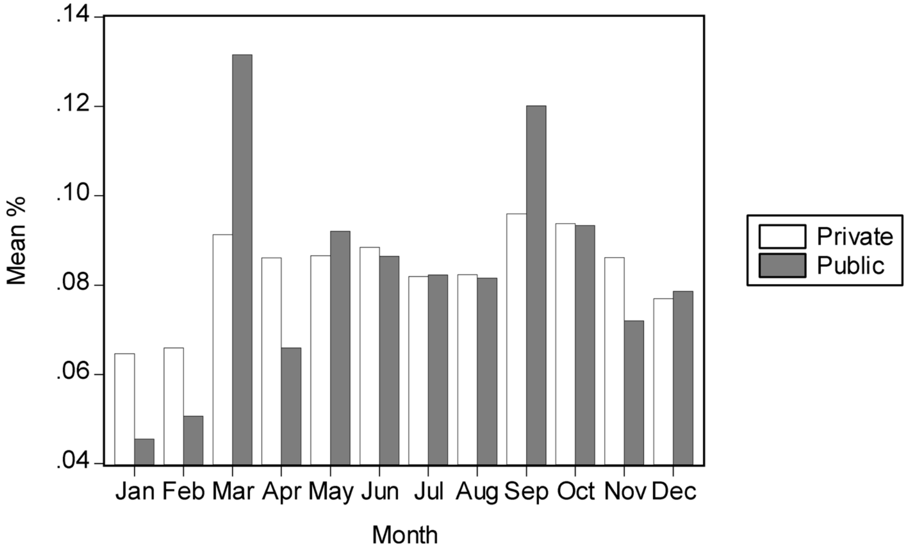

Figure 2 Mean of monthly % in Japan from FY1970 to 1998.

that a structural break might have happened around fiscal year 1987, the break point would be arbitrary. One appropriate technique would be the Hansen test, which might be used if one is uncertain when a structural change might have taken place. I used the percentages for PCS spent in March out of the total annual public construction in each fiscal year as the dependent variable and the percentages for PRS spent in March out of the total private construction in each fiscal year as the independent variable. The

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Table 1. *OLS estimates. Dependent variable = log public construction (PCS)*

Variables	Coeff.	(T-stat.)
Constant	4.24	(4.91)**
log private construction	0.22	(3.28)**
log public construction ($t-1$)	0.34	(7.27)**
March	0.25	(3.19)**
After 1988	−0.25	(−2.08)*
March × *After 1988*	0.62	(6.07)**
Trend	0.004	(5.36)**
R^2	0.8770	
N	359	

Notes: **1% Significant level *5% Significant level.

individual test statistics on the constant and the dependent variable are $H = 1.60$ and 1.70 respectively. Since the 1% critical value is 0.748, I rejected the hypothesis of model stability. The joint test statistic is $H = 1.90$ and the 1% critical value is 1.35, which gives rise to the same result. Therefore, the results support the pattern seen in the previous figure in which the monthly public construction in March began expanding around fiscal year 1987.

I also performed a test in which the test statistic is based on the cumulative sum of the squared scaled recursive residuals, an alternative test for structural break at unknown time.[5] When I examined the plot of the cumulated sum of the squared residuals, the null hypothesis of model stability was rejected at the 5% significance level.

Given these test results, and based on an arbitrary structural break time, I also tried to fit a regression. I divided the two PCS and PRS into two groups: before fiscal year 1987 and after fiscal year 1988. The log of PCS is the dependent variable. As the independent variable I use the log of PRS and lagged dependent variable. *March* is the dummy variable which equals 1 if it is March from fiscal year 1988 to 2002. *After 1988* is the dummy variable equal to 1 if the observation is from fiscal year 1988 to 2002. *March* × *After 1988* is the interaction term if the observation is both March and after fiscal year 1988. I also include the trend variable. I assumed the error terms are white noise. Table 1 below shows the OLS estimation results.

[5] The *t*th recursive residual is the prediction error for y_t, public construction (PCS), when the regression is estimated using the first $t-1$ observations. Namely, it is computed by $e_t = y_t - x_t' b_{t-1}$, where x_t is the vector of regressors associated with observation y_t and b_{t-1} is the least squares coefficients computed using the first $t-1$ observations. The test statistic S_t is $\frac{\sum_{r=K+1}^{r=t} w_r^2}{\sum_{r=K+1}^{r=T} w_r^2}$, where $w_r = \frac{e_r}{\sqrt{1+x_r'(X_{r-1}'X_{r-1})^{-1}x_r}}$ $r = k+1, \ldots, T$ and w_r is assumed to be distributed as $N(0, \sigma^2)$. The expected value of the test statistic is $(t-K)/(T-K)$ under the null hypothesis. The significance of departures from the expected value line is assessed by reference to a pair of lines drawn parallel to the expected value line. If the cumulated sum moves outside the confidence bounds, the hypothesis of parameter stability is thought of as doubtful.

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Among estimated coefficients, the coefficient for *March* is positive and statistically significant. This indicates that public spending increased in *March* before fiscal year 1988 on average, holding everything else constant. The coefficient for *After 1988* is negative, so public spending slightly declined after fiscal year 1988 on average, after controlling for other variables. The estimated coefficient for the interaction term is positive and statistically significant. In addition, it is greater than the estimated coefficient for *March* ($0.62 + 0.25 - 0.25 > 0.25$). It follows that public spending increased more after fiscal year 1988 than before fiscal year 1987. Estimation results for yearly dummies and monthly dummies are suppressed for ease of presentation.[6]

4. US federal government

When I consider the monthly patterns in public spending of the US federal government, I can take advantage of the unique circumstance in which the fiscal year of US federal government shifted from 1 July–30 June to 1 October–30 September in 1976. Unlike the Japanese analysis in the previous section, I can compare monthly spending patterns between different months, based on the same time series data. This will enable the confounding effects to be better controlled for and there will be less confounding effects involved in the analysis.

Data

I obtained the monthly data on public construction performed by the US federal government and private construction from January 1964 to December 2002. I chose the time series 'buildings of federal construction' (hereafter BFC) and the series 'nonresidential buildings of private construction' (hereafter NBPC) from 'Value of Construction Put in Place' (C30) issued by the US Census Bureau. A detailed explanation of this data set is in the appendix.

Figure 3 below shows the percentages for public construction (BFC) and private construction (NBPC) spent in June out of the annual total of each construction for fiscal years 1965–2002. Before the change in fiscal year – that is, when June was the last month of the fiscal year – public spending was slightly higher than private spending in general. However, after the change, except for a few major peaks in fiscal years 1990 and 1993, these two series moved together at about the same level. According to Figures 5 and 6, which show the mean of the monthly percentages for public and private construction out of total annual construction for fiscal years from 1965 to 1976 and for fiscal years from 1977 to 2002, the mean of the monthly percentages for public construction is highest in June before fiscal year 1976, but it is not after fiscal year 1977.

Figure 4 shows the percentages for private and public construction in September out of the annual total of each construction for fiscal years 1965 to 2002. After fiscal year

6 The estimated coefficients are statistically significant in general. But yearly dummies after fiscal year 1988 are mostly not significant. This will probably be due to correlation with the variable *After 1988*.

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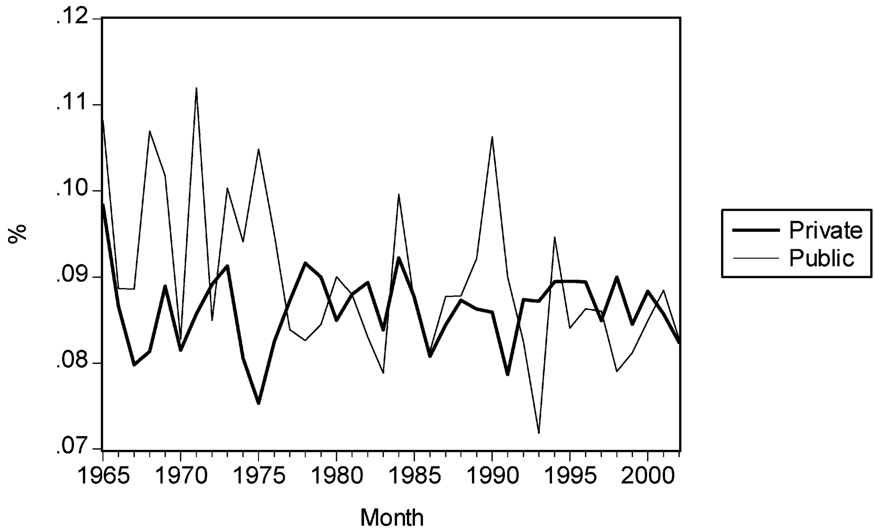

Figure 3 % June spending in the US from FY1965 to 2002.

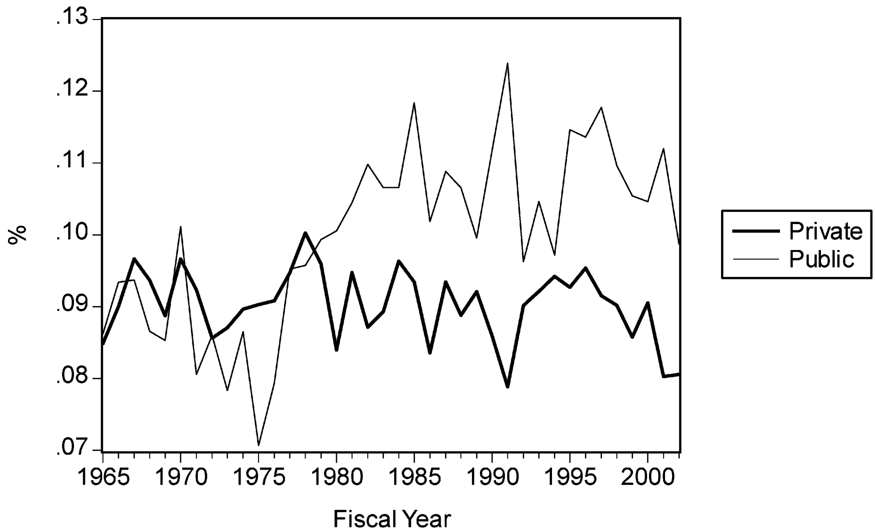

Figure 4 % September spending in the US from FY1965 to 2002

1977, that is, when September became the last month of the fiscal year, public spending in September jumped to the higher level. Before fiscal year 1976, public spending in September was lower than private spending in some years. Figures 5 and 6 confirm this point. The mean of the monthly percentages for public construction in September is the highest after fiscal year 1977, but it is not before fiscal year 1976.

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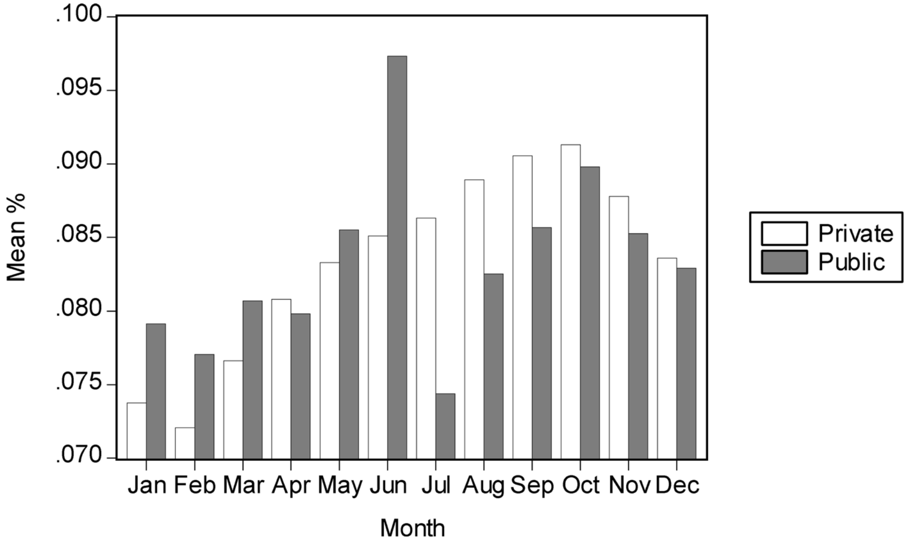

Figure 5 Mean of monthly % in the US before FY1976.

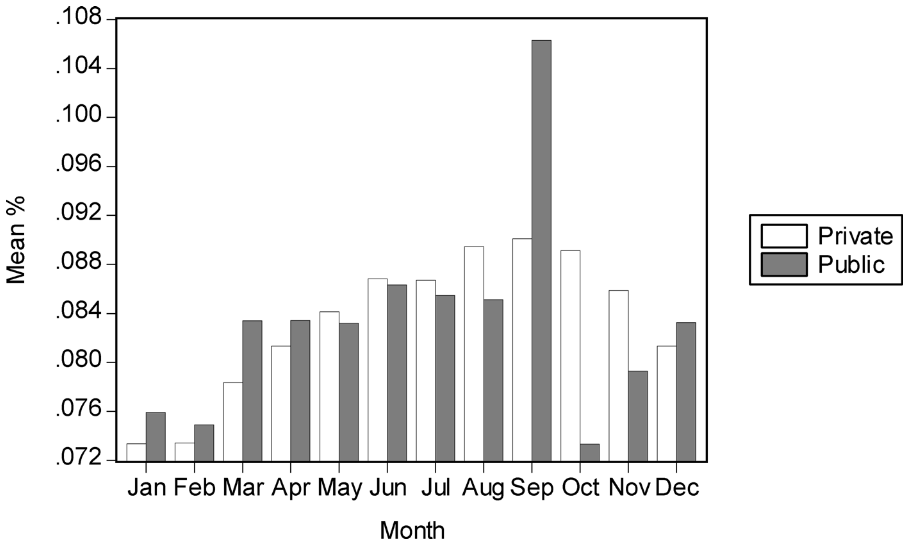

Figure 6 Mean of monthly % in the US after FY1977.

Estimation

To test the hypothesis that public construction was carried out more in June than other months before 1976 but more in September than other months after 1976, I construct four dummy variables, and then I fit the regression equation. The dummy variable *June_Before* equals 1 if it corresponds to June for fiscal years 1964 to 1976 and 0 otherwise. *June_After* takes on the value of 1 if it corresponds to June for fiscal years 1977

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Table 2. *OLS estimates. Dependent variable = log public construction (BFC)*

Variables	Coeff.		(T-stat.)
Constant	5.410		(6.013)**
Private construction	0.051		(0.556)
Public construction ($t-1$)	0.069		(1.418)
June_Before	0.200		(5.964)**
June _After	0.040		(1.581)
September_After	0.245		(9.285)**
September_Before	0.041		(1.213)
R^2		0.8812	
N		467	

Notes: **1% Significant level *5% Significant level.

to 2002 and 0 otherwise. *September_After* is set as 1 if it corresponds to September for fiscal years 1977 to 2002 and 0 otherwise. *Septrember_Before* is equal to 1 if it corresponds to September for fiscal years 1964 to 1976 and 0 otherwise.

The dependent variable is the log of the series 'buildings of federal construction (BFC)'. As independent variables I use the log of the series 'nonresidential buildings of private construction (NBPC)' and the lagged dependent variable. I assume error terms are white noise. Yearly dummies and monthly dummies have been suppressed for ease of presentation.[7]

The estimation results are given in Table 2. Although private construction (NBPC) and the lagged dependent variable are not statistically significant, the dummy variables *June_Before* and *September_After* are significant as expected.

Then I conduct the following linear hypotheses tests. β represents the coefficients on the four dummy variables *June_Before*, *June_After*, *September_After*, and *September_Before* respectively.

$$\begin{cases} H_0 : \beta_4 = \beta_5 \\ H_1 : \beta_4 > \beta_5 \end{cases}$$

The F-test statistic is 14.60 or the t-test statistic is 3.82, and the null hypothesis is rejected at the 1% level of significance. It would follow that public spending is greater in June before fiscal year 1976 than after fiscal year 1977.

$$\begin{cases} H_0 : \beta_6 = \beta_7 \\ H_1 : \beta_6 > \beta_7 \end{cases}$$

The *F*-test statistic is 23.55 or the *t*-test statistic is 4.85, and the null hypothesis is rejected at the 1% level of significance. It would follow that the public spending is greater in September after fiscal year 1977 than before fiscal year 1976.

7 They are statistically significant in general.

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Thus, I would conclude that public construction increased at the end of the fiscal year both before and after 1976. In addition, when the two t-test statistics are compared, the test for the September spending more strongly rejects the null hypothesis than the test for the June spending. It would follow that the increased public spending is more significant in recent years than in past years. This result would be consistent or in the same direction as the Japanese case.

5. Why does public spending increase later in a fiscal year?

Governments are sometimes said to use up the annual budget within the fiscal year and spend most of it at the end of the fiscal year. But the question is raised why governments wait to spend until the end of the fiscal year, and why such delay in implementing public policy is allowed. This paper proposes two hypotheses which could explain why public spending policy is not implemented early in the fiscal year but later in the fiscal year.

The first argument is based on delayed stabilization (Alesina and Drazen, 1991). Suppose there are two groups in the Ministry of Land, Infrastructure and Transport, and imagine these two groups discussing in which city to construct a new airport building. Assume group *T* prefers to construct the airport building in Tokyo, but group *S* prefers to construct it in Osaka. Assume further there are two types of *S*: type S_S and type S_T. The utility that type S_S receives declines if the airport building is constructed in Tokyo, but type S_S gets positive utility from constructing it in Osaka. Type S_T can compromise and get a positive lower level of utility from constructing it in Tokyo but get a positive higher level of utility from constructing it in Osaka. *T* gets a higher level of utility, T_T, from constructing it in Tokyo but a lower level of utility, T_S, from constructing it in Osaka. Both *T* and *S* get zero utility if the project is not implemented. *T* doesn't know which type *S* is but knows that type S_S has probability *f* and type S_T has probability $(1 - f)$. Assume that *S* has perfect information. *S* knows both his own type and the type of *T*. A certain amount of budget is allocated to the ministry before they start discussions.

This is a two-stage game, and there are two periods, 1 and 2. *T* makes a proposal in period 1, and it is implemented in period 1 if *S* agrees in period 1. If *S* disagrees, the game goes on to period 2. If *S* agrees in period 2, then the project is implemented in period 2, but if *S* disagrees in period 2, the project is not implemented forever. Also assume that δ is the future discount factor applied only for the utility *T* gets in period 2 if the project is not implemented in period 1.$0 < \delta < 1$. Assume that *S* does not depreciate his utility in period 2.

Now suppose *S* disagreed in period 1 and the game went on to period 2. *T* offers Tokyo in period 2 if $T_S < (1 - \mathrm{f})T_T$. This is because when *T* offers Tokyo in period 2, *T* gets T_T if *S* is type S_T with probability $(1 - f)$ and gets nothing if *S* is type S_S with probability *f*, and so his expected utility is given by $(1 - f)T_T + f \times 0$ in this case. Thus, if *S* is type S_T, *S* agrees to the offer of Tokyo. The airport building is constructed in Tokyo in period 2. *T* gets T_T, and *S* gets positive utility. But if *S* is type S_S, *S* disagrees to

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this offer, and the project is not implemented forever. If $T_S > (1-f)T_T$, then T offers Osaka and S agrees regardless of which type S is. The airport building is constructed in Osaka in period 2. T gets T_s, and S gets positive utility.

Now go back to period 1. Let's think about the case where T offers Tokyo in period 1 and offers Osaka in period 2 because delayed implementation actually occurs in this case! T offers Osaka in period 2 if the following condition holds

$$T_S > (1-f)T_T. \tag{1}$$

T offers Tokyo in period 1 if the following condition holds

$$T_S < (1-f)T_T + f\delta\, T_S. \tag{2}$$

The right-hand side of condition (2) represents the expected utility T gets from offering Tokyo in period 1 plus the discounted expected future utility he will get from offering Osaka in period 2. If and only if conditions (1) and (2) hold simultaneously, T offers Tokyo in period 1 and offers Osaka in period 2. Solving (1) and (2), we get

$$f\delta\, T_S > 0. \tag{3}$$

Therefore, as long as condition (3) holds, T offers Tokyo in period 1 and offers Osaka in period 2. If S knows that condition (3) holds, then both types of S disagree in period 1 but wait until period 2 and agree in period 2 because S knows that T will offer Osaka in period 2 and S will get positive utility. Thus regardless of which type S is, delayed policy implementation occurs if $f\delta T_S > 0$.

If $T_S > (1-f)T_T + f\delta T_S$, however, T offers Osaka in period 1. Assuming that S accepts an offer immediately when S is indifferent between agreeing in period 1 and agreeing in period 2, both types of S agree in period 1 if T offers Osaka in period 1. The new airport building is constructed in Osaka in period 1. T gets T_S, and S gets positive utility.

The last case is such that T offers Tokyo both in period 1 and in period 2. T offers Tokyo in period 2 if

$$T_S < (1-f)T_T. \tag{4}$$

T offers Tokyo in period 1 if condition (2) holds. Thus, if conditions (2) and (4) hold simultaneously, T offers Tokyo in both periods. Since $f\delta\ T_S$ is strictly positive, if condition (4) holds, T offers Tokyo in both periods. If S is type S_T, he accepts the offer in period 1 because we assume that S accepts an offer immediately when he is indifferent between agreeing in period 1 and agreeing in period 2. The airport building is constructed in Tokyo in period 1. T gets T_T, and S gets positive utility. If S is type S_S, S always disagrees to the offer, and the airport building is not constructed forever.

In short, if $f\delta\ T_S > 0$ (condition 1), then T offers Tokyo in period 1 and offers Osaka in period 2. S disagrees in period 1 but agrees in period 2 regardless of which

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type S is. Thus, T gets T_S and S gets positive utility in period 2. If $T_S > (1-f)T_T + f\delta T_S$ (condition 2), T offers Osaka in period 1 and both types of S agree. The new airport building is constructed in Osaka in period 1. T gets T_S, and S gets positive utility in this case. If $T_S < (1-f)T_T$ (condition 3), then T always offers Tokyo. If S is type S_T, S agrees in period 1 and the airport building is constructed in Tokyo in period 1. T gets T_S and S gets positive utility if S is type S_T. But if S is type S_S, S always disagrees and the new airport building is not constructed forever. Therefore, the delayed implementation will occur only in the first case.

This argument is used in terms of the decision-making process. For example, when the public sector determines its spending policy under the unanimity rule, policy implementation will be delayed, but the policy could be implemented relatively quickly when it is determined by majority rule. In the above scenario, both types of government officials have to agree to implement the policy under the unanimous rule, while it is implemented relatively more quickly under majority rule when either of the two types has a majority.

The second hypothesis is based on option value (Dixit, 1992). Suppose the Ministry of Land, Infrastructure and Transport considers constructing either roads or residential housing. The ministry can choose the timing to invest today or tomorrow. So there are two periods 1 and 2 in this game. Suppose the state of nature in period 2 is either r or h. r stands for the state of nature favorable for investing in roads, and h stands for the state of nature favorable for investing in residential housing. The probability that the state of nature is r in period 2 is π. The probability that the state of nature is h in period 2 is $1-\pi$.

If the state of nature favors roads in period 2, and if the ministry invests in roads, the ministry receives the benefit V_R^r. If the ministry invests in roads when the state of nature favors investing in housing, the ministry receives V_R^h. Similarly, if the state of nature is h, and if the ministry invests in housing, it receives V_H^h. If the ministry invests in housing when the state of nature is r, the benefit is V_H^r. I assume $V_R^r > V_R^h$ and $V_H^h > V_H^r$.

The expected return from investing in roads in period 1 is $\pi V_R^r + (1-\pi)V_R^h$. The expected return from investing in residential housing in period 1 is $\pi V_H^r + (1-\pi)V_H^h$.

On the other hand, the expected return when the ministry waits until period 2 to make a decision of whether to invest in roads or housing evaluated in period 1 is given by $\pi V_R^r + (1-\pi)V_H^h - K$. K stands for an additional cost incurred from making a decision later, such as higher administration costs or higher wages.[8]

There are two cases: (1) Suppose $V_R^r > V_H^h$. The ministry invests in roads in period 1 if $\pi V_R^r + (1-\pi)V_R^h > \pi V_R^r + (1-\pi)V_H^h - K$. Thus, if $\frac{K}{1-\pi} > V_H^h - V_R^h$, the ministry invests in roads in period 1. Otherwise, the ministry waits until period 2. (2) Suppose

8 One newspaper article says that general contractors anticipate orders from private firms in the first half of the fiscal year and orders from public sectors in the second half of the fiscal year in Japan. So, K may be smaller than I expect (Asahi Shimbun, 25 August 2002).

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$V_H^h > V_R^r$. The ministry invests in residential housing in period 1 if $\pi V_H^r + (1-\pi)V_H^h > \pi V_R^r + (1-\pi)V_H^h - K$. Thus, if $\frac{K}{\pi} > V_R^r - V_H^r$, the ministry invests in housing in period 1. Otherwise, the ministry waits until period 2.

If the cost of making an investment decision later is greater than the expected difference in the benefits from investing in housing and the benefits from investing in roads when the state of nature favors housing, the ministry invests in roads in period 1. In other words, the ministry will wait before making an investment decision until period 2 if the cost is smaller than the expected difference in the two benefits. On the other hand, if the cost of making an investment decision later is smaller than the expected difference in the benefits from investing in roads and the benefits from investing in housing when the state of nature favors roads, the ministry waits until period 2. Taking into account the value of waiting for making an investment decision as the option value approach argues, under certain conditions it would be possible that public spending increases at the end of the fiscal year.

One might argue that government officials use up their budget because the following fiscal year's budget is determined by how much budget they use in the current fiscal year. If the next year's budget is reduced when a portion of budget is left, however, the officials should spend it earlier under this threat. On the other hand, if there is a sort of punishment if the budget is overspent, the officials will certainly spend later in the fiscal year. But I would argue that the effects of these two threats offset each other.

6. Conclusion

In this paper I found that public construction is performed more at the end of the fiscal year than in other months both in Japan and the US. In addition, the effect would be more significant in recent years than in the past.

Delayed stabilization and option value suggest that government spending could increase at the end of the fiscal year. Disagreement between groups under the unanimity rule can cause a delay in public spending, and the value of the option to wait for making an investment decision can induce public sectors to spend their budget later in the fiscal year.

Increased public spending at the end of the fiscal year may hold in other countries or local governments, and so the next step for this research will be to look at those data. At the same time I will consider what happened in Japan around fiscal year 1988 which might change the public spending pattern.

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Appendix

'Value of Construction Put in Place' measures the value of construction installed or built at the site during a given period. This includes (1) cost of materials installed or built, (2) cost of labor and a proportionate share of the cost of construction equipment rental, (3) constructor's profit, (4) cost of architectural and engineering work, (5) miscellaneous overheads and office costs chargeable to the project on the owner's book, and (6) interest and taxes paid during construction.

'Construction' includes, for example, new buildings, additions, reconstructions, or replacements, such as the complete replacement of a roof, mechanical and electrical installations, such as elevators or central air-conditioning, and site preparation and outside construction of fixed structures or facilities, such as sidewalks, highways, and streets, parking lots, power distribution lines, or gas pipelines. 'Construction' does not include maintenance and repairs to existing structures, land acquisition, or special purpose equipments, such as lockers in schools or beds or X-ray machines in hospitals. Regardless of when work on each individual project started or when payments were made to the contractors, the total value for a given period is the sum of the value of work done on all ongoing projects during this period.

A series results from direct measurement when it is based on reports of the actual value of construction progress or construction expenditures obtained from a complete census or sample survey. When such information is not available, a series results from indirect estimation, using related construction statistics. Since some of the directly measured monthly construction value-in-place estimates are based on samples, estimates are subject to both sampling and nonsampling errors, such as mistakes in recording or coding the data obtained. The series 'buildings of federal construction' (BFC) that I choose from the data set is developed by direct measurement. This includes new family housing units and the redevelopment of existing units constructed

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for the armed services, construction done at the Department of Energy research and development facilities, federally owned schools, laboratories, libraries, museums, health care and institutional facilities, such as veterans' hospitals or court houses. The public construction (BFC) is based on monthly data supplied to the Census Bureau by each Federal agency involved in construction activities with few exceptions. Information is obtained from Federal budget documents for a small number of agencies where the information is not available. These budget totals are prorated over the fiscal year to derive monthly estimates. Data are updated when additional information is available. I do not use seasonally adjusted data.

Source: Value of Construction Put in Place (May 1999) issued by United States Bureau of the Census

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