Do Households Smooth Expenditure over Anticipated Income Changes? Evidence from Bonus Payments to Public Employees in Japan[†]

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Abstract:

This paper provides new evidence of consumers' reaction to an anticipated sizable change in income. Until FY2002, Japanese public employees received predictable large bonus payments three times a fiscal year (in June, December, and March), but the March bonus was abolished in FY2003. We compare the seasonal patterns of public employees' expenditure before and after the reform of the bonus payment schedule. Contrary to the prediction of the life cycle/permanent income hypothesis (LC/PIH), we find evidence that monthly patterns of household expenditure were significantly affected by the anticipated large change in income pattern. However, at closer inspection, this excess sensitivity of expenditure is observed only for expenditure subcategories of some durability, i.e., durables and semi-durables. Thus, while the LC/PIH does not appear to hold for expenditure (which we observe here), it may still hold for consumption.

Key words: Life cycle/permanent income hypothesis; excess sensitivity; bonus payments; Family Income and Expenditure Survey; Japan.
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1. Introduction

One of the central tenets of the standard life-cycle/permanent income hypothesis (LC/PIH) is that individuals engage in consumption smoothing[1] and that income changes that are anticipated should not affect the pattern of consumption. According to the hypothesis, individuals optimizing their consumption path dynamically over their lifetime respond to a (predicted) change in income at the time they become aware of the change, not when it actually materializes. Therefore, in theory, there should be no association between individuals' pattern of consumption and an anticipated change in the pattern of income unless some underlying assumptions of the LC/PIH, such as the absence of liquidity constraints, are violated.

However, notwithstanding the straightforward theoretical prediction, empirical studies on the LC/PIH have produced mixed results. A number of empirical studies using aggregate data, such as Campbell and Mankiw (1989), have reported that consumers in fact do respond to predicted income changes at the time they occur (rather than when they first becomes aware of them). Recent empirical studies using micro data to examine the impact of policy-induced income changes have obtained similar findings (Souleles, 1999, 2002; Parker, 1999; Shapiro and Slemrod, 1995, 2003; and Shimizutani, 2006). On the other hand, there are also a number of micro data-based studies focusing on the effect of large and regular (easily predictable) income movements that report that the LC/PIH describes consumption behavior well (Paxson, 1993; Browning and Collado, 2001; and Hsieh, 2003).

These conflicting findings may be explained by the fact that earlier studies focused on income shock episodes of different sizes and types to identify the effect of

[1] The standard LC/PIH predicts that households will smooth their marginal utility but not necessarily consumption itself.

predicted income changes on consumption. While studies that examined relatively small anticipated income movements caused by policy changes often found excess sensitivity in consumption, other studies that examined the effect of large and regular income movements appear to find consumption smoothing.[2] Some scholars employ the bounded rationality argument that consumers behave in the manner predicted by the LC/PIH when the cost of calculating the anticipated income change is low and the utility gain from smoothing consumption is large.

While the bounded rationality argument appeals to economists as it allows for rational economic agents, whether it really holds is open to discussion. Another possible explanation for the mixed results is that some of the cases examined in previous studies were not appropriate episodes for testing the consumption response to anticipated income changes. More concretely, most of the income change data examined in previous studies were constructed using observed household characteristics that are not necessarily randomly distributed (see Johnson, Parker and Souleles, 2006; Coulibaly and Li, 2006; and Stephens, 2008 for a discussion of this point). In other words, a certain share of previous studies on this topic probably fail to validate the assumption that household characteristics used to construct household income changes are uncorrelated with all other unobserved determinants of consumption growth, rendering their empirical findings less reliable.

Against this background, the purpose of this paper is to exploit an ideal episode of exogenous income change and reliable micro data from Japan's *Family Income and Expenditure Survey* (FIES) to re-examine the issue of consumption smoothing in

[2] A few more recent studies (Stephens and Unayama, 2011; Hori and Shimizutani, 2009) on Japanese households, for which very detailed and reliable diary-based monthly FIES data are available, report that the monthly patterns of expenditure appear to be significantly affected by anticipated large changes in the pattern of individuals' income.

response to a predictable income change. Specifically, the episode we focus on is the following. Until FY2002, public employees in Japan conventionally received large and predictable bonus payments three times a year, in June, December, and March; however, the March bonus was abolished from FY2003 (i.e., from March 2004), with sufficient advance notice given in FY2002. As this represents a large and predictable income change, we utilize this episode to test the LC/PIH by comparing the seasonal pattern of public employees' expenditure before and after the change in the pattern of bonus payments. Although the FIES only provides data on household expenditure (rather than consumption), we attempt to examine household consumption patterns by focusing on a number of expenditure subcategories of different durability, that is, non-durables, services, semi-durables, and durables.

The combination of an ideal episode and the rich information provided by the micro-level data from the FIES presents us with a perfect setting for the examination of households' reaction to an anticipated income change. The reasons are as follows. First, salary and bonus payments to public employees in Japan are exogenously predetermined. While bonus payments in the private sector are also large, predictable, and highly institutionalized, it is likely that at least part of these bonuses are performance-based, leaving room for discriminating payments, and whether a worker receives a bonus or not may not be random. On the other hand, as described in the following section, bonus payments to public employees are regulated by law, leaving no room for performance-based adjustments, and are therefore anticipated without uncertainty. By comparing the seasonal pattern of public employees' expenditure before and after the bonus payment reform, we can avoid potential endogeneity from non-random observations.

Second, the episode of the bonus payment reform in the Japanese public sector allows us to examine consumers' response to a sizable change in the *timing* of income payments, since the amount of lifetime earnings remained largely unchanged. That is, although the March bonus, which was equivalent to roughly half a month's salary, was abolished from FY2003, the total amount of annual bonus payments remained broadly unchanged, since the bonus amount was simply added to the other two bonus payments, thus resulting in larger bonuses in June and December. As in the episode examined by Shapiro and Slemrod (1995), this episode allows us to distill the effect of an anticipated income change without considering other factors that could affect a household's permanent income.

Third, the monthly income and expenditure data from the FIES are considered to be highly reliable. Data reliability is of crucial importance for the Euler equation analysis, which uses a first difference-based specification. While earlier studies that examined large and regular income changes used retrospective quarterly data, the FIES data used in this paper are monthly data based on family account books (diaries) that sample households are requested to fill in and that are collected twice a month. Therefore, there are likely to be far fewer measurement errors in the FIES expenditure data than in the datasets used in earlier studies, such as the U.S. Consumer Expenditure Survey, which asks households to recall their spending over the previous three months.

Although studies on large and regular income changes using quarterly data so far have not yet rejected the LC/PIH, they may have overlooked a deviation from it owing to the less reliable quality of the retrospective data used. Therefore, our question is whether the expenditure patterns of public employees, which were recorded in the reliable monthly FIES data, were significantly affected by the exogenous change in the

pattern of income due to the abolition of the March bonus in FY2003. To do so, we basically compare the expenditure pattern of public employees in the post-reform period (July 2003–June 2008) with that in the pre-reform period (July 1997–June 2002). In the first instance, we do so without any control group in our regression analysis. Later, we then use private sector employees as a control group to confirm that our results do not reflect factors common to public and private sector employees.

In contrast with earlier studies on the effect of large and regular income movements (such as Browning and Collado, 2001, and Hsieh, 2003), we find that Japanese public employee households did not entirely smooth their expenditure in the face of an anticipated large change in the pattern of income. The monthly pattern of public employees' expenditure significantly changed after the abolition of the March bonus, seemingly rejecting the LC/PIH. However, taking a closer look, it emerges that excess sensitivity of expenditure is clearly observed only for expenditure subcategories of some durability, i.e., durables and semi-durables. Therefore, our result does not rule out the possibility that Japanese households are still smoothing the flow of services from the consumption of durables, as the LC/PIH essentially predicts.

The remainder of this paper is organized as follows. Section 2 describes the bonus system for Japanese public employees and the abolition of the March bonus in FY2003. Section 3 explains the FIES dataset used in this study. Section 4 runs several regressions to compare the monthly expenditure patterns of public employees before and after the March bonus abolition. Section 5 then extends the regressions to include private sector employees as a control group to examine the robustness of our findings. Finally, Section 6 summarizes our findings and concludes.

2. Bonus payments to public employees and the abolition of the March bonus

In Japan, the salaries and allowances of workers in the central government are uniformly regulated by law, with the National Personnel Authority (*Jinji in*, henceforth NPA) in charge of administration.[3] The salary schedules and allowances, including bonus payments for national government employees, are revised annually in August based on NPA recommendations (in the "Remuneration Report and Recommendation") for the next fiscal year,[4] mainly taking account of the salary gap between the private and the public sector. The proposal is then debated in parliament and, in most cases, approved without modification in the fall of the year before it takes effect. The process is open to public scrutiny and widely reported in the media, making payment schedules in the next year fairly predictable.

It is important to stress here that monthly salary payments and bonuses for public employees are completely predetermined and, unlike in private firms, unaffected by personal performance. Moreover, unlike bonus payments in the private sector that fluctuate depending on current business conditions, the bonus amount and payment date are scheduled entirely in advance and anticipated without uncertainty. Salaries and allowances for local government employees follow the pay schedule for central government employees, although there are minor variations across prefectures and municipalities.

Table 1 shows the value of public employees' bonus payments (relative to monthly regular salaries) and their distribution within the fiscal year for the period 1997 to 2008. The annual total of bonus payments is quite sizable (roughly 5 months' salary)

[3] Salaries consist of a monthly salary, salary adjustment pay, and (for teachers) teacher's duty pay. Allowances include living allowances, area allowances, and overtime allowances as well as bonus payments. Bonus payments consist of a term-end allowance (*kimatsu teate*) and a diligence allowance (*kinben teate*), which, despite of what the name suggests, is paid irrespective of performance.

[4] The fiscal year in Japan begins in April and ends in March.

and payments are made at regular intervals over the fiscal year (i.e., in June, December, and – until FY2002 – March). As will be seen later, annual total bonuses relative to monthly regular salaries are roughly similar for public sector employees and private sector employees working for a large firm with a bonus system, although in the case of private sector employees, bonuses are paid only in June (or July) and December, but not in March. The dates of the bonus payments for public employees are June 30 (summer), December 10 (winter), and (until FY2002) March 15 (spring), although the dates are moved forward to a weekday if the corresponding date falls on a weekend or a holiday.

While the ratio of bonus payments to monthly regular salaries has been gradually falling in the public sector (Table 1) – probably in response to smaller bonus payments in the private sector since the late 1990s (shown later) – the change that is more important for our analysis here is the abolition of the March bonus in FY2003 (April 2003–March 2004). As shown in the table, the March bonus for public employees amounted to about half a month's regular salary until FY2001. FY2002 was a transition year in terms of bonus payments and the size of the March bonus (paid in March 2003) relative to monthly regular salaries was reduced to 20 percent. Finally, in August 2002, more than a year in advance, government employees were notified of the abolition of the March bonus from FY2003.

3. Data description

The data used in this study are micro-level data from the *Family Income and Expenditure Survey* (FIES) covering the period from July 1997 to June 2008. The FIES is the Japanese government's main source of information on aggregate consumption expenditure (by households) and is administrated by the Statistics Bureau, Ministry of

Internal Affairs and Communications. The survey covers approximately 8,000 households from all over Japan. Single-member households and households employed in agriculture or fisheries are not surveyed.[5] We use observations for the five-year period from July 1997 to June 2002 before the abolition of the March bonus ("pre-reform period") and observations for the five-year period from July 2003 to June 2008 after the abolition ("post-reform period"). We excluded observations for the period between July 2002 and June 2003, when the March bonus was gradually being phased out, as we are interested in whether consumers respond to a predicted change in income when it actually materializes. Since the LC/PIH predicts that consumers respond to the change in income at the time they become aware of it, including the phase-out period, when the abolition of the March bonus was announced, would obscure the point of our analysis.[6]

The sampling design consists of three steps. First, approximately 170 municipalities (cities/towns/villages) are chosen using stratified sampling based on location, population, and other factors. Second, survey units (one unit consists of 100 households) are randomly chosen from all selected municipalities. Third, six non-single-member households are randomly chosen in each survey unit. Each household is surveyed for six months and one-sixth of the households are replaced by new households every month, making it possible to construct six-month panels of 1,200−1,300 households on average. The survey provides detailed information on

[5] The FIES began covering households engaged in agriculture or fisheries in July 1999 and single-member households in January 2002, adding a further 1,000 households to the sample for a current sample size of 9,000 households. We did not use those households in the sample to maintain consistency of the sampling design throughout the estimation period.

[6] For readers interested in what happened in the gradual phase-out period, Appendix 1 reports the monthly income and expenditure patterns between July 2002 and June 2003 to provide a comparison with the pre- and post-reform patterns. Broadly speaking, expenditure patterns in the phase-out period appear to fall between those in the pre-reform and those in the post-reform period.

income and expenditures for individual households as well as on the characteristics of these households and the jobs of household heads. The monthly expenditure data are compiled from a diary collected twice a month, meaning that our dataset likely is more reliable than most other datasets, which are typically based on retrospective questionnaires.[7]

To ensure that our findings in this paper do not depend on sample selection, we employed two different samples in the empirical analysis below, that is, a "broadly-defined sample" and a "narrowly-defined sample". To construct the former, we dropped observations for households with a self-employed (or a jobless) household head since we do not have monthly income information for these households. After dropping households for which monthly income information is not available, our analysis is restricted to wage earner households, which account for roughly half of all observations in the FIES. We further confine our sample to households where the head of household is an office, or white-collar, worker. Using this broadly-defined sample, we will examine whether the seasonal expenditure pattern of public employee households changed after the abolition of the March bonus. To confirm the validity of the findings, we will also examine whether the observed changes in the seasonal pattern differ between public sector employee households (the "public sector group") and private sector employee households (the "private sector group"), using households whose head works for a large private company with more than 1,000 employees as our control group.

Although we focus on white-collar households so as to examine households of

[7] The FIES simply asks respondents to enter their expenditures by category in a diary. The form to be filled in by respondents and instructions for diary keeping can be found in Ministry of Internal Affairs and Communications (various years). When publishing the FIES, the Ministry groups the goods and services listed in the diary into four categories (based on their durability). Details of the classification of specific goods into the four categories are shown in Appendix 2.

roughly comparable attributes, occupational choice is not entirely random, and there remains some heterogeneity between the two groups (other than the timing of bonus receipts). Moreover, the two groups in the broadly-defined sample contain households that receive bonuses in months other than the regular bonus months, i.e., June (or July) and December in the case of private sector employees, and June, December, and – until FY2002 – March in the case of public sector employees, or that receive no bonuses at all. Therefore, to make the two groups homogeneous except for the timing of bonus receipts, we additionally construct the narrowly-defined sample. We do so by further confining our sample to male sole earner households and excluding households that reported no bonus receipts in the regular bonus months, i.e., June (or July[8]), December, and March for public employee households until FY2002, and June (or July) and December for public and private sector employee households from FY2003 (either because they received no bonuses or failed to enter them in the diary). Moreover, we exclude households that report bonus receipts in months other than the regular bonus months. The number of observations in the narrowly-defined sample is about 40 percent of that in the broadly-defined sample.

Table 2 shows the ratio of bonus receipts to regular monthly salaries (both for all households, i.e., including those not receiving a bonus, and for those receiving a bonus) as well as the share of bonus recipients both for the broadly-defined sample (Panel (a)) and the narrowly-defined sample (Panel (b)). Looking at the figures for the broadly-defined sample, the March bonus/salary ratio for the public sector group in the pre-reform period (from July 1997 to June 2002) was 0.28 (for all households) and the

[8] We include public employee households that report receiving a bonus in July in our sample, since the standard date for the payment of the summer bonus, June 30, makes it almost meaningless to distinguish between June bonuses and July bonuses.

share of bonus recipients was 63 percent (the average bonus/monthly salary ratio for households receiving a bonus was 0.45). On the other hand, the ratio for the private sector group was 0.03 and the share 5 percent. Reflecting the bonus reform, the bonus/salary ratio for the public sector group in the post-reform period (from July 2003 to June 2008) falls to 0.01 months and the share of bonus recipients to 3 percent. Looking at the narrowly-defined sample (Panel (b)), we find that the abolition of the March bonus for public sector employees means that the bonus/salary ratio fell from 0.45 to zero.

Turning to the bonuses in other regular bonus months, roughly 75–85 percent of public sector employee households report that they receive a bonus in summer and in winter, while the share among private sector employee households is less than 70 percent. However, looking at the bonus/salary ratio for private sector employee households that do receive a bonus, this is more or less comparable to that for public sector employee households. When we compare the pre- and post-reform periods, the bonus/salary ratios and the bonus recipient shares appear to have decreased in all regular bonus months, probably reflecting the slowdown of Japanese economy. However, it goes without saying that the fall in bonus receipts (from the pre-reform to the post-reform period) is most remarkable for the March bonus for the public sector group. Finally, Panel (b) for the narrowly-defined sample confirms that the bonus/salary ratio and the bonus recipient share are broadly similar for the two groups except for the March bonus payments to the public sector group until FY2002.

The sample statistics of our dataset are reported in Table 3. The total number of observations from July 1997 to June 2008 is 258,328 (for 48,407 households) for the broadly-defined sample and 97,155 (for 19,285 households) for the narrowly-defined

sample. Roughly two-fifths of the total observations are for public employee households, while the remaining three-fifths are for private sector employee households. Since we exclude observations for the gradual phase-out period between July 2002 and June 2003, the total sample is split into a pre-reform sample of 123,685 observations (23,982 households) and a post-reform sample of 109,426 observations (21,389 households).

Shown in the table are the sample statistics for the observation period as a whole as well as the two sub-periods (pre-reform and post-reform), for public and private sector households together and separately, and for the broadly- and the narrowly-defined sample. The results for the sample period as a whole and for the sub-periods all paint a similar picture. That is, average household income and expenditures are somewhat larger for the public sector than for the private sector group in the broadly-defined sample, but look very similar for the two groups in the narrowly-defined sample. In addition, in each sample, the two groups also look similar in terms of their demographic characteristics such as age of the household head, number of family members, and number of workers in the household. Therefore, the sample statistics suggest that households in the public and private sector groups are broadly similar (except for the bonus payment in March before its abolition), especially when the two groups are compared using the narrowly-defined sample.

4. Changes in patterns of monthly expenditure after the bonus reform

In this section, using monthly observations from the FIES, we examine whether there are any changes in the pattern of public employees' monthly income and expenditure from the pre-reform period with the March bonus to the post-reform period without it. In order to statistically capture changes after the abolition of the March bonus, we run

regressions with the following specification:

$$\ln(X_{i,t} / X_{i,t-1}) = \sum_{m=1}^{12} a_m \times MDummy(m) + \sum_{m=1}^{12} b_m \times MDummy(m) \times AFTERDUMMY + \beta Z_t + \varepsilon_{i,t} \quad (1)$$

where $X_{it} = Y_{it}$ *or* C_{it} . The dependent variable is monthly changes in the logarithm of household income (Y_{it}) or household expenditure (C_{it}). We use total consumption expenditure as well as its subcategories for C_{it}. Both variables are converted to a daily basis using the number of days in each month and deflated by the consumer price index for each category. Independent variables consist of twelve month dummies,[9] $MDummy(m)$, to capture the monthly income and expenditure patterns in the pre-reform period (July 1997 to June 2002) and interaction terms between the month dummies and a dummy variable for the post-reform period, $AFTERDUMMY$, which takes 1 for months from July 2003 to June 2008 and zero otherwise. If there was a change in monthly income/expenditure patterns after the abolition of the March bonus, the coefficients on the interaction terms should be significant. In addition, we include the nominal interest rate and relative price changes as control variables (Z_t), while $\varepsilon_{i,t}$ is assumed to be a well-behaved error term. We employ OLS to obtain the coefficient estimates.[10]

The results of the estimation are shown in Table 4.The coefficients on the monthly dummies (a_m; $m = 1, 2, ..., 12$) correspond to the pattern of monthly

[9] Strictly speaking, the model was estimated with a constant and eleven monthly dummies, while we use twelve monthly dummies here to simplify our explanation.

[10] In order to derive the seasonal income and expenditure patterns, we also calculated simple sample averages without imposing linear restrictions. The calculated patterns look quite similar to those obtained from the regression analysis below (see Appendix 3 for a comparison).

income/expenditure in the pre-reform period. The pattern of monthly income/expenditure in the post-reform period is derived as the sum of the month dummy coefficients and the interaction term coefficients ($a_m + b_m$; $m = 1, 2, ..., 12$). The panels in Figure 1, which are drawn from the coefficients reported in Table 4, illustrate the household income patterns for public sector employee households. Both Figure 1.1-(a) based on the broadly-defined sample and Figure 1.1-(b) based on the narrowly-defined sample clearly illustrate that the change in the pattern of the monthly wage of the household head results mainly from the abolition of the March bonus. While we also notice a subtle smoothing of monthly wage payments from the pre- to the post-reform period, probably due to cuts in bonus amounts not only in March but also in other regular bonus months, the changes in other months look very small when compared with the striking difference in the month-on-month changes in March and April.

Staying with public sector employees, Figures 1.2-(a) and 1.2-(b) show the pattern of households' disposable income over the year. The figures indicate that households' monthly disposable income is largely determined by the wage of the household head. The results in Table 4-(a), which are calculated using the broadly-defined sample, suggest that the monthly disposable income of public sector employee households used to increase by 10 percent in March and decrease by 18 percent in April in the pre-reform period. In contrast, in the post-reform period, the pattern of monthly disposable income appears to have reversed, as the coefficients on the interaction terms more than offset the pre-reform coefficients. The smoothing in disposable income in spring comes out more clearly in the narrowly-defined sample (see Figure 1.2-(b) and Table 4-(b)). While disposable income used to increase on the

previous month by 28 percent in March and decrease by 38 percent in April in the pre-reform period, this swing more or less disappeared in the post-reform period, with disposable income actually decreasing by 13 percent in March and increasing by 3 percent in April. In other word, the abolition of the March bonus appears to have eliminated the spring income swing for public employees.

Having confirmed that there was a clear change in the pattern of monthly disposable income for public employees, we now turn to their expenditure patterns. What matters for us is whether there were any changes in the pattern of monthly expenditure from the pre-reform period to the post-reform period, and, if any, whether the changes in the monthly expenditure pattern are associated with those in income. Therefore, what we focus on is the coefficients on the interaction terms in the expenditure regressions. If the pattern of monthly household expenditure is excessively sensitive (relative to the prediction of the LC/PIH) and is affected by the pattern of monthly income, we would expect March and April expenditures to be higher in the pre-reform period than in the post-reform period (with April expenditures likely affected by the fact that the spring bonus was paid in the middle of the month, on March 15). That is, in that case, the coefficient (b_3) on the interaction term of the March dummy and the post-reform dummy should be significantly negative, and that (b_5) on the May dummy and the post-reform dummy should be significantly positive.[11]

The results, reported in column (3) of Table 4 and illustrated in Figure 2, look generally consistent with this excess sensitivity argument. The monthly pattern of consumption expenditure in the post-reform period looks different from that in the pre-reform period, and the difference is statistically significant at the 1 percent level (as

[11] The reason why we focus on the May rather than the April interaction term is that the sign on the latter is difficult to predict, since the income change in March probably affects expenditure with a lag.

indicated by the F-statistics for the null hypothesis that the coefficients on the interaction terms (b_ms) are all zero). In addition, the coefficient on the March interaction term is negative and statistically significant, suggesting an association between income and consumption expenditure. The positive coefficient on the May interaction term, on the other hand, is not statistically significant in the regression based on the narrowly-defined sample. However, it turns significant in the regression based on the narrowly-defined sample. Panel (b) of Figure 2 shows that in the regression based on the narrowly-defined sample, monthly household expenditure, which in the pre-reform period used to increase by 11 percent in March and decrease by 7 percent in May, in the post-reform period increases by only 3 percent in March and decreases by the same amount in May.

Although the observed response of household expenditure to the anticipated income change may at first glance appear to be inconsistent with the LC/PIH, what the hypothesis really predicts is not a smoothing of expenditure but a smoothing of consumption. Unfortunately, we cannot observe household consumption directly, since what is actually recorded in the FIES diaries is households' expenditure. Since consumption expenditure includes items of different durability, the observed association between income and expenditure may have resulted from expenditure on durable goods, for which it is reasonable to assume that the lag between expenditure and actual consumption is larger than for nondurable goods.

To examine whether this is the case, we examine expenditure patterns by subcategory. The panels in Figure 3, which are drawn based on the coefficients reported in columns (4)–(7) of Table 4, illustrate the change in the pattern of monthly expenditure on four expenditure subcategories, i.e., services, nondurables,

semi-durables, and durables, following the abolition of the March bonus. The F-tests show that the null hypothesis that the coefficients on the month dummies are the same before and after the March bonus abolition (or that the coefficients on the interaction terms are zero for all months) is rejected at the 1 percent significance level for almost all of the subcategory regressions (except the regression for durables in the narrowly-defined sample), again suggesting some deviation from the LC/PIH. However, there seem to be clear differences in the extent to which different expenditure subcategories are affected: while expenditure on services, semi-durables, and durables decreased significantly in March after the bonus reform (Figures 3.1, 3.3, and 3.4), the decrease in March in expenditure nondurables (Figure 3.2) is hardly discernable, suggesting that the pattern of nondurables expenditure was not greatly affected by the abolition of the March bonus.

To sum up, the abolition of the March bonus for public employees appears to have noticeably changed not only the pattern of monthly income but also that of monthly expenditure, especially around March. At first glance, this observed association between an anticipated change in the pattern of income and actual expenditure looks inconsistent with the LC/PIH. However, since the size of the bonus reform-driven expenditure changes is very different for expenditure subcategories of different durability, suggesting that the observed expenditure responses to the anticipated change in the timing of income flows result from a lag between expenditure and actual consumption, this leaves open the possibility that although the LC/PIH does not appear to hold for expenditure it may still hold for consumption.

5. Including private sector employee households as a control group

The results in the previous section show that the monthly expenditure pattern of public employee households changed in and after FY2003. Although the abolition of the March bonus is the most obvious candidate to account for the change in expenditure patterns, we have not yet excluded other possible factors that might have affected expenditure patterns. Returning to Figure 2, it can be seen that the post-reform expenditure pattern looks smoother not only in March but also in other months, most notably in July-August. This overall smoothing could suggest that factors other than the abolition of the March bonus may have been at play. To examine this issue, we use the sample of private sector employees as a control group. As already discussed in Section 3, the attributes of white-collar workers in the public sector and in large private sector firms are not very different, or even look homogeneous in the narrowly-defined sample, except for the timing of bonus receipts. Therefore, if something correlated with the abolition of the March bonus is responsible for the changes in expenditure patterns, inclusion of the control group in our regressions should alter the coefficients on the interaction terms in which we are interested.

Concretely, we extend our dataset to include the private sector group and run regressions of the following specification:

$$\begin{aligned}\ln(X_{i,t} / X_{i,t-1}) = & \sum_{m=1}^{12} a_m \times MDummy(m) \\ & + \sum_{m=1}^{12} b_m \times MDummy(m) \times PUBLIC \\ & + \sum_{m=1}^{12} c_m \times MDummy(m) \times AFTER\,DUMMY \\ & + \sum_{m=1}^{12} d_m \times MDummy(m) \times PUBLIC \times AFTERDUMMY \\ & + \beta Z_t + \varepsilon_{i,t}\end{aligned} \tag{2}$$

where $X_{i,t} = Y_{i,t} or C_{i,t}$.[12] Other than $PUBLIC$, the variables are the same as in equation (1). $PUBLIC$ is a dummy variable for the public sector group to distinguish it from the private sector group. $a_m + b_m$ captures the pattern of public employees' monthly income/expenditure in the pre-reform period (July 1997–June 2002), while $a_m + b_m + c_m + d_m$ captures that in the post-reform period (July 2003–June 2008). In this new specification, we can decompose the fall (rise) in March (May) expenditure in the post-reform period into the effect of the abolition of the March bonus, i.e., d_3 (d_5), and other factors which are common to the public and private sector groups, i.e., c_3 (c_5).

The panels in Figure 4, which are based on the estimates reported in Table 5, illustrate the monthly income patterns of the private and the public sector group. The panels show that noticeable changes in the monthly income pattern took place (in spring) only for the public group. The monthly income patterns for the private sector group in the pre-reform and the post-reform period are largely indistinguishable, although the bonus amounts in summer and winter were slightly smaller in the post-reform period, while the spring income patterns (from February to May) for the public group have become very similar to those of the private group after the bonus reform.[13]

Our main interest is, of course, to see whether a similar transformation in the patterns is observed for the expenditure variables. If the monthly expenditure pattern of the public sector group stands out from the remaining patterns only in the pre-reform period, and if the remaining patterns – those of the public sector group in the post-reform period and of the private sector group in both periods – resemble each other,

[12] As for the a_m part, we again run the regression with a constant and eleven month dummies.

[13] Our discussion here focuses on the magnitude in the difference in income patterns (or their "economic significance") that can be gleaned from the figures. In terms of statistical significance, all four income patterns are in fact significantly different, probably due to the large sample size of our dataset.

this would indicate that the change in the monthly expenditure pattern resulted from the abolition of the March bonus. This conclusion would be further supported if we find a negative/positive coefficient (d_3/d_5) on the interaction terms among the March/May dummy, the post-reform dummy, and the public sector employee dummy in the expenditure regressions.

The results of the expenditure regressions (with the control group) are shown in Figure 5 and generally support the interpretation that the change in the monthly expenditure pattern resulted from the abolition of the March bonus. The monthly expenditure patterns do not look very different from each other with the notable exception of the pre-reform pattern for the public sector group. Tests of the joint hypothesis whether the expenditure patterns in spring (or from February to May) are identical between the private and the public sector group suggest that the patterns become statistically indistinguishable in the post-reform period, while they were significantly different in the pre-reform period (see the F-tests in column (3) in Table 5-(b) for the narrowly-defined sample).

While minor changes from the pre-reform to the post-reform period can also be noticed for the private sector group, especially for June and December, similar changes in the two regular bonus months (or overall smoothing) can be observed for the public group, suggesting that these changes probably result from a general decrease in bonus payments in the post-reform period (as already reported in Section 2), i.e., a factor common to the public and the private sector group. Indeed, after the inclusion of the private group in our sample, the statistical significance of the coefficients on the interaction terms of interest (the *d*s) declined considerably, while the sign on the March (May) interaction term continues to be negative (positive), which is consistent with the

excessively sensitive consumption argument.

Further examination of the expenditure response for each of the four expenditure subcategories (Figure 6 and columns (4)–(7) of Table 5) sheds more light on the results obtained so far. The effects of the abolition of the March bonus on expenditure on services and nondurables look very small (columns (4) and (5)): The absolute value of the coefficients is small and most are statistically insignificant. The only exception is the significantly positive coefficient on the May interaction term (d_5) in the service regression using the narrowly-defined sample (column (4) in Table 5-(b)), suggesting that the abolition of the March bonus may have had some effect on the expenditure on services. On the other hand, the absolute values of the coefficients for the other two expenditure components, semi-durables and durables, are considerably larger (especially in the case of durables), although the negative coefficient on the March interaction term (d_3) for durables is not significant, probably due to the large errors and smaller sample size for this subcategory.

To sum up, we find that the monthly expenditure pattern of the public sector group from February to May, that is, the months in which expenditure is most likely to be affected by the abolition of the March bonus, has become very similar to that of the private group after the abolition of the March bonus, suggesting some association of expenditure and the anticipated sizable change in the timing of income. However, as seen in the examination of the public sector employee-only sample in the previous section, the sensitivity of expenditure is not uniform across expenditure subcategories: an clear reaction of expenditure to the income change is observed only for semi-durables and durables. The effect on services expenditure is ambiguous, while there is no effect on nondurables expenditure.

6. Summary and conclusion

Despite the large body of literature on consumers' response to an anticipated change in income, the empirical evidence remains inconclusive. Exploiting an ideal natural experiment in Japan – the preannounced abolition of the March bonus for government officials from March 2004 (FY2003) – this study sought to obtain evidence on the absence or presence of consumption smoothing in response to a large and predictable change in income. Specifically, using household level panel data from the *Family Income and Expenditure Survey*, we compared the pattern of public employees' monthly expenditure before and after the reform of bonus payments to test the life cycle/permanent income hypothesis (LC/PIH).

In contrasting with a few earlier studies on the effect of large and predictable (regular) income movements, such as Browning and Collado (2001) and Hsieh (2003), we find evidence that the monthly pattern of household expenditure was significantly affected by the anticipated large change in the timing of income flows. In other words, Japanese public employee households did not smooth their expenditure in the face of an anticipated large change in the pattern of income, suggesting some deviation from the LC/PIH prediction.

However, a closer look reveals that an excess sensitivity of expenditure is clearly observed only for expenditure subcategories of some durability, i.e., durables and semi-durables. Therefore, while the findings of this paper, i.e., the association between an anticipated change in the pattern of income and expenditure patterns, have important implications for policy-related issues, such as the magnitude of the fiscal multiplier, they do not rule out the possibility that Japanese households are smoothing

the flow of services from durable expenditures, or that the LC/PIH holds good for individual consumers in Japan.

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Table 1. Bonus payments to public employees in Japan

	Summer	Winter	Spring	Total
Standard date of payment	30-Jun	10-Dec	15-Mar	-
FY1997	2.20	2.60	0.55	5.35
FY1998	2.20	2.50	0.55	5.25
FY1999	2.20	2.25	0.50	4.95
FY2000	2.05	2.15	0.55	4.75
FY2001	2.05	2.10	0.55	4.70
FY2002	2.05	2.40	0.20	4.65
FY2003	2.25	2.15	0.00	4.40
FY2004	2.10	2.30	0.00	4.40
FY2005	2.10	2.35	0.00	4.45
FY2006	2.125	2.325	0.00	4.45
FY2007	2.125	2.375	0.00	4.50
FY2008	2.15	2.35	0.00	4.50

Source: National Personnel Authority.

Notes: The Japanese fiscal year runs from April to March.
The figures in the table are the sum of the end-of-term allowance (*kimatsu teate*) and the diligence allowance (*kinben teate*) relative to monthly regular income.

Table 2. Ratio of bonus income (relative to monthly household head regular income) and share of bonus recipients: Public vs. private sector workers

(a) All wage earning white-collar worker households (Broadly-defined sample)

Time period	Type of household head	March observations				June observations				July observations				December observations				Annual total
		Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % Share	Bonus recipients Mean (S.D.)	
			(*i*)				(*ii*)				(*iii*)				(*iv*)			(*i*)+(*ii*)+(*iii*)+(*iv*)
Pre-reform (Jul 1997 to Jun 2002)	Public employees	3,846	0.28	63%	0.45	3,727	1.36	69%	1.98	3,892	0.31	15%	2.06	3,864	1.94	86%	2.25	3.89
			(0.24)		(0.13)		(0.98)		(0.42)		(1.27)		(2.68)		(1.28)		(1.09)	
	Private sector employees	6,158	0.03	5%	0.59	6,188	0.82	36%	2.28	6,415	0.59	31%	1.90	6,253	1.62	74%	2.18	3.05
			(0.17)		(0.45)		(4.35)		(7.04)		(1.02)		(0.93)		(1.37)		(1.14)	
Post-reform (Jul 2003 to Jun 2008)	Public employees	3,498	0.01	3%	0.25	3,432	1.22	62%	1.96	3,534	0.29	15%	1.91	3,562	1.77	84%	2.12	3.29
			(0.05)		(0.15)		(1.02)		(0.48)		(0.71)		(0.52)		(1.25)		(1.07)	
	Private sector employees	5,401	0.02	2%	0.88	5,262	0.67	33%	2.04	5,364	0.52	29%	1.77	5,396	1.28	67%	1.90	2.48
			(0.20)		(1.03)		(1.09)		(0.91)		(0.95)		(0.95)		(1.13)		(0.85)	

(b) Male sole white-collar wage earner head households with bonus receipts in the regular bonus months (Narrowly-defined sample)

Time period	Type of household head	March observations				June observations				July observations				December observations				Annual total
		Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % share	Bonus recipients Mean (S.D.)	Number of observations	Mean (S.D.)	Bonus recipients % Share	Bonus recipients Mean (S.D.)	
			(*i*)				(*ii*)				(*iii*)				(*iv*)			(*i*)+(*ii*)+(*iii*)+(*iv*)
Pre-reform (Jul 1997 to Jun 2002)	Public employees	1,131	0.45	100%	0.45	1,329	1.60	82%	1.95	1,473	0.32	17%	1.92	1,331	2.20	100%	2.20	4.57
			(0.13)		(0.13)		(0.82)		(0.36)		(0.74)		(0.46)		(1.16)		(1.16)	
	Private sector employees	2,415	0.00	0%		2,338	1.05	49%	2.15	2,371	0.81	41%	1.95	2,344	2.21	100%	2.21	4.07
			(0.00)				(1.21)		(0.79)		(1.17)		(1.04)		(1.15)		(1.15)	
Post-reform (Jul 2003 to Jun 2008)	Public employees	1,367	0.00	0%		1,329	1.33	69%	1.92	1,257	0.40	21%	1.93	1,381	2.07	100%	2.07	3.80
			(0.00)				(0.95)		(0.41)		(0.80)		(0.43)		(0.75)		(0.75)	
	Private sector employees	2,068	0.00	0%		2,004	0.99	47%	2.09	1,804	0.71	39%	1.82	1,874	1.97	100%	1.97	3.67
			(0.00)				(1.21)		(0.88)		(1.03)		(0.85)		(0.88)		(0.88)	

Table 3. Sample statistics

	(a) All wage earning white-collar worker households (Broadly-defined sample)						(b) Male sole white-collar wage earner head households with bonus receipts in the regular bonus months (Narrowly-defined sample)					
	Public & Private		Public		Private		Public & Private		Public		Private	
Full sample: Jul 1997 to Jun 2008	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Monthly disposable income	556	518	608	594	524	462	530	470	545	479	521	464
Household head regular monthly income	445	184	455	162	438	196	466	171	474	154	461	180
Household head bonus income	123	358	143	357	111	357	156	403	164	375	151	419
Monthly consumption expenditure	314	253	323	261	307	247	307	236	310	237	306	235
Monthly services expenditure	140	153	141	158	139	150	138	135	136	141	139	132
Monthly non-durables expenditure	115	46	119	47	112	45	112	43	115	44	110	42
Monthly semi-durables expenditure	35	49	37	52	34	47	34	43	35	43	34	44
Monthly durables expenditure	24	150	26	154	22	147	23	149	24	147	23	150
Annual income in the previous year (before tax)	8,634	3,518	9,180	3,514	8,291	3,476	7,743	2,786	7,804	2,481	7,706	2,958
Age of the household head	45.0	9.7	45.5	9.4	44.7	9.8	42.4	9.2	43.1	9.0	42.0	9.3
Number of family members	3.5	1.1	3.6	1.1	3.5	1.1	3.5	1.1	3.6	1.1	3.5	1.0
Number of workers in the household	1.6	0.7	1.6	0.7	1.5	0.7	1.0	0.0	1.0	0.0	1.0	0.0
Number of observations (Number of households)	258,328	(48,308)	99,651	(18,597)	158,677	(29,770)	97,131	(19,248)	37,040	(7,315)	60,091	(11,947)
Pre-reform: Jul 1997 to Jun 2002	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Monthly disposable income	573	549	629	620	539	497	545	504	572	528	531	490
Household head regular monthly income	450	182	462	162	443	192	469	171	484	152	461	181
Household head bonus income	131	369	152	367	118	369	162	413	178	386	154	427
of which in March	61	115	136	124	14	79	69	110	216	78	0	0
of which in June	472	580	646	496	367	601	604	603	760	441	515	662
of which in July	213	439	140	357	258	477	285	503	159	381	362	551
of which in December	800	601	909	484	734	653	1,036	516	1,046	322	1,030	598
Monthly consumption expenditure	317	258	328	270	310	251	310	237	316	239	306	236
Monthly services expenditure	137	157	139	162	136	154	134	137	134	138	135	137
Monthly non-durables expenditure	117	47	121	47	115	46	114	44	119	44	112	44
Monthly semi-durables expenditure	37	50	40	54	36	48	36	43	38	43	35	43
Monthly durables expenditure	25	154	28	164	23	148	24	150	26	152	23	148
Annual income in the previous year (before tax)	8,866	3,599	9,403	3,591	8,538	3,565	7,879	2,819	7,991	2,464	7,816	2,996
Age of the household head	44.6	9.8	45.0	9.5	44.4	9.9	41.9	9.2	42.4	8.8	41.7	9.4
Number of family members	3.6	1.1	3.6	1.2	3.5	1.1	3.6	1.1	3.6	1.1	3.5	1.0
Number of workers in the household	1.6	0.7	1.6	0.7	1.5	0.7	1.0	0.0	1.0	0.0	1.0	0.0
Number of observations (Number of households)	123,685	(23,982)	46,895	(9,108)	76,790	(14,892)	46,198	(9,429)	16,496	(3,386)	29,702	(6,044)
Post-Reform: from Jul 2003 to Jun 2008	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Monthly disposable income	533	481	577	555	504	423	508	426	514	412	504	436
Household head regular monthly income	438	185	446	161	433	199	463	169	464	154	462	179
Household head bonus income	110	337	127	339	99	336	142	384	145	358	140	402
of which in March	7	82	3	23	9	103	0	0	0	0	0	0
of which in June	416	565	558	490	324	590	538	610	608	466	491	684
of which in July	190	420	135	341	225	461	272	493	190	399	329	542
of which in December	674	559	805	465	588	597	938	455	955	322	925	532
Monthly consumption expenditure	311	249	319	253	306	246	305	234	304	233	306	235
Monthly services expenditure	143	150	144	154	143	148	142	134	138	140	144	128
Monthly non-durables expenditure	113	45	117	46	110	43	109	42	112	44	107	40
Monthly semi-durables expenditure	33	48	34	49	32	47	32	42	31	42	33	44
Monthly durables expenditure	22	147	24	145	22	148	22	143	22	140	22	153
Annual income in the previous year (before tax)	8,390	3,417	8,926	3,422	8,043	3,369	7,588	2,667	7,594	2,479	7,585	2,883
Age of the household head	45.5	9.6	46.1	9.4	45.1	9.7	43.0	9.0	43.7	9.2	42.6	9.2
Number of family members	3.5	1.1	3.5	1.1	3.5	1.1	3.5	1.0	3.5	1.1	3.5	1.0
Number of workers in the household	1.6	0.7	1.6	0.7	1.5	0.7	1.0	0.0	1.0	0.0	1.0	0.0
Number of observations (Number of households)	109,426	(21,290)	43,038	(8,349)	66,388	(12,975)	41,172	(8,375)	16,656	(3,344)	24,516	(5,042)

Table 4. OLS coefficient estimates for regression model (1) and derived monthly patterns

(a) All wage earning public sector worker households (Broadly-defined sample)

		(1) Wage of household head (WHH) Coeff.	s.e.		(2) Disposable income (DI) Coeff.	s.e.		(3) Consumption expenditure (C) Coeff.	s.e.		(4) Services expenditure (SC) Coeff.	s.e.		(5) Non-durables expenditure (NDC) Coeff.	s.e.		(6) Semi-durables expenditure (SDC) Coeff.	s.e.		(7) Durables expenditure (DC) Coeff.	s.e.	
Jan dummy	$a_{0\text{-}1}$	-1.01	(0.008)	***	-1.17	(0.011)	***	-0.29	(0.013)	***	-0.19	(0.019)	***	-0.25	(0.007)	***	-0.62	(0.111)	***	-0.58	(0.133)	***
Feb dummy	$a_{0\text{-}2}$	0.09	(0.004)	***	0.07	(0.010)	***	0.01	(0.013)		0.00	(0.018)		0.12	(0.007)	***	-0.44	(0.057)	***	-0.25	(0.138)	*
Mar dummy	$a_{0\text{-}3}$	0.13	(0.005)	***	0.02	(0.011)	*	0.09	(0.013)	***	0.07	(0.019)	***	0.02	(0.007)	**	0.14	(0.044)	***	-0.03	(0.140)	
Apr dummy	$a_{0\text{-}4}$	-0.21	(0.005)	***	-0.26	(0.012)	***	-0.05	(0.013)	***	-0.02	(0.020)		0.01	(0.007)		-0.34	(0.051)	***	-0.54	(0.139)	***
May dummy	$a_{0\text{-}5}$	-0.05	(0.004)	***	-0.26	(0.012)	***	-0.09	(0.012)	***	-0.10	(0.019)	***	0.01	(0.006)		-0.29	(0.033)	***	-0.46	(0.138)	***
Jun dummy	$a_{0\text{-}6}$	0.78	(0.010)	***	0.88	(0.013)	***	-0.03	(0.013)	**	-0.05	(0.018)	***	0.01	(0.007)		-0.23	(0.036)	***	-0.07	(0.138)	
Jul dummy	$a_{0\text{-}7}$	-0.60	(0.015)	***	-0.72	(0.018)	***	0.09	(0.014)	***	0.09	(0.019)	***	0.07	(0.007)	***	0.00	(0.074)		0.00	(0.140)	
Aug dummy	$a_{0\text{-}8}$	-0.16	(0.008)	***	-0.15	(0.013)	***	-0.07	(0.012)	***	-0.02	(0.020)		0.04	(0.007)	***	-0.57	(0.059)	***	-0.80	(0.138)	***
Sep dummy	$a_{0\text{-}9}$	0.01	(0.004)	***	-0.12	(0.010)	***	-0.09	(0.012)	***	-0.14	(0.020)	***	-0.01	(0.007)	*	-0.32	(0.076)	***	-0.30	(0.141)	**
Nov dummy	$a_{0\text{-}11}$	0.00	(0.004)		-0.12	(0.010)	***	-0.02	(0.014)		-0.02	(0.019)		0.04	(0.007)	***	-0.17	(0.035)	***	-0.17	(0.134)	
Dec dummy	$a_{0\text{-}12}$	0.97	(0.008)	***	1.02	(0.011)	***	0.25	(0.013)	***	0.11	(0.019)	***	0.30	(0.007)	***	0.28	(0.040)	***	0.17	(0.126)	
Jan dummy x Post-reform dummy	b_1	0.06	(0.012)	***	0.14	(0.013)	***	0.09	(0.012)	***	0.04	(0.018)	**	0.08	(0.008)	***	0.16	(0.033)	***	0.04	(0.117)	
Feb dummy x Post-reform dummy	b_2	-0.01	(0.004)	**	-0.01	(0.011)		-0.02	(0.012)		0.00	(0.017)		-0.02	(0.006)	***	-0.09	(0.036)	**	-0.02	(0.134)	
Mar dummy x Post-reform dummy	b_3	-0.23	(0.005)	***	-0.24	(0.012)	***	-0.05	(0.013)	***	-0.05	(0.019)	**	-0.01	(0.007)	*	-0.13	(0.039)	***	-0.22	(0.136)	
Apr dummy x Post-reform dummy	b_4	0.23	(0.006)	***	0.24	(0.013)	***	0.02	(0.014)		0.01	(0.021)		0.00	(0.007)		0.07	(0.036)	**	0.35	(0.136)	**
May dummy x Post-reform dummy	b_5	-0.01	(0.004)		0.00	(0.013)		0.01	(0.013)		0.00	(0.020)		-0.01	(0.006)		0.06	(0.034)	*	-0.07	(0.135)	
Jun dummy x Post-reform dummy	b_6	-0.08	(0.014)	***	-0.12	(0.016)	***	-0.02	(0.012)	*	-0.02	(0.018)		-0.01	(0.007)		0.01	(0.032)		-0.12	(0.137)	
Jul dummy x Post-reform dummy	b_7	0.07	(0.022)	***	0.12	(0.024)	***	-0.04	(0.012)	***	-0.06	(0.019)	***	-0.01	(0.007)		-0.11	(0.032)	***	-0.14	(0.135)	
Aug dummy x Post-reform dummy	b_8	0.00	(0.011)		-0.01	(0.014)		0.02	(0.013)		0.03	(0.020)	*	0.01	(0.007)		0.07	(0.033)	**	-0.10	(0.129)	
Sep dummy x Post-reform dummy	b_9	-0.01	(0.004)	***	0.01	(0.010)		0.03	(0.012)	**	0.03	(0.020)		0.01	(0.007)	*	-0.03	(0.034)		0.24	(0.136)	*
Oct dummy x Post-reform dummy	b_{10}	-0.01	(0.005)	**	-0.01	(0.010)		-0.01	(0.013)		-0.03	(0.019)	*	0.01	(0.007)	*	-0.05	(0.034)		-0.18	(0.140)	
Nov dummy x Post-reform dummy	b_{11}	0.01	(0.005)		0.01	(0.010)		0.00	(0.012)		-0.01	(0.019)		0.00	(0.007)		0.08	(0.034)	**	-0.12	(0.129)	
Dec dummy x Post-reform dummy	b_{12}	-0.07	(0.011)	***	-0.15	(0.013)	***	-0.07	(0.012)	***	-0.05	(0.019)	**	-0.04	(0.007)	***	-0.13	(0.032)	***	0.01	(0.114)	
Constant	a_0	0.01	(0.00)	***	0.07	(0.007)	***	0.01	(0.009)		0.01	(0.01)		-0.04	(0.005)	***	0.21	(0.027)	***	0.29	(0.105)	***
F test: b m=0 for all months.		F(12, 71932) = 306.74		***	F(12, 72099) = 89.91		***	F(12, 73546) = 10.33		***	F(12, 73483) = 3.14		***	F(12, 73546) = 13.27		***	F(12, 71361) = 7.33		***	F(12, 17501) = 1.50		
R-squared		0.602			0.495			0.046			0.0098			0.1405			0.0340			0.013		
Root MSE		0.390			0.534			0.487			0.7368			0.2655			1.2988			2.4987		
Number of observations		71,956			72,123			73,572			73,509			73,572			71,387			17,527		

Derived monthly patterns for Figures 1, 2, and 3

		Figure no.	WHH 1.1-(a)	DI 1.2-(a)	C 2.1-(a)	SC 3.1-(a)	NDC 3.2-(a)	SDC 3.3-(a)	DC 3.4-(a)
Pre-reform									
Jan	a_1	$(=a_0+a_{0\text{-}1})$	-1.00	-1.09	-0.28	-0.18	-0.29	-0.41	-0.29
Feb	a_2	$(=a_0+a_{0\text{-}2})$	0.10	0.15	0.02	0.01	0.08	-0.23	0.04
Mar	a_3	$(=a_0+a_{0\text{-}3})$	0.14	0.10	0.10	0.08	-0.02	0.35	0.27
Apr	a_4	$(=a_0+a_{0\text{-}4})$	-0.20	-0.18	-0.04	-0.01	-0.03	-0.13	-0.25
May	a_5	$(=a_0+a_{0\text{-}5})$	-0.04	-0.18	-0.08	-0.09	-0.03	-0.08	-0.16
Jun	a_6	$(=a_0+a_{0\text{-}6})$	0.79	0.95	-0.02	-0.04	-0.03	-0.02	0.23
Jul	a_7	$(=a_0+a_{0\text{-}7})$	-0.59	-0.65	0.10	0.11	0.03	0.21	0.30
Aug	a_8	$(=a_0+a_{0\text{-}8})$	-0.15	-0.08	-0.06	-0.01	0.00	-0.36	-0.51
Sep	a_9	$(=a_0+a_{0\text{-}9})$	0.02	-0.05	-0.08	-0.13	-0.05	-0.11	-0.01
Oct	a_{10}	$(=a_0)$	0.01	0.07	0.01	0.01	-0.04	0.21	0.29
Nov	a_{11}	$(=a_0+a_{0\text{-}11})$	0.01	-0.04	-0.01	-0.01	0.01	0.04	0.12
Dec	a_{12}	$(=a_0+a_{0\text{-}12})$	0.98	1.09	0.25	0.12	0.26	0.49	0.46
Post-reform									
Jan		a_1+b_1	-0.94	-0.95	-0.19	-0.14	-0.21	-0.25	-0.24
Feb		a_2+b_2	0.09	0.14	0.00	0.00	0.07	-0.32	0.02
Mar		a_3+b_3	-0.09	-0.15	0.04	0.03	-0.03	0.21	0.05
Apr		a_4+b_4	0.03	0.06	-0.02	0.00	-0.03	-0.05	0.10
May		a_5+b_5	-0.05	-0.19	-0.07	-0.09	-0.03	-0.02	-0.24
Jun		a_6+b_6	0.71	0.83	-0.04	-0.06	-0.04	-0.01	0.11
Jul		a_7+b_7	-0.52	-0.53	0.06	0.04	0.02	0.10	0.15
Aug		a_8+b_8	-0.15	-0.09	-0.04	0.02	0.01	-0.29	-0.61
Sep		a_9+b_9	0.01	-0.04	-0.05	-0.10	-0.04	-0.14	0.23
Oct		$a_{10}+b_{10}$	0.00	0.07	0.00	-0.02	-0.02	0.16	0.12
Nov		$a_{11}+b_{11}$	0.02	-0.03	-0.01	-0.02	0.01	0.12	0.00
Dec		$a_{12}+b_{12}$	0.90	0.94	0.19	0.07	0.23	0.37	0.47

(b) Sole wage earner public employees who reported bonus receipts in the regular bonus months (Narrowly-defined sample)

		(1) Wage of household head (WHH) Coeff.	s.e.		(2) Disposable income (DI) Coeff.	s.e.		(3) Consumption expenditure (C) Coeff.	s.e.		(4) Services expenditure (SC) Coeff.	s.e.		(5) Non-durables expenditure (NDC) Coeff.	s.e.		(6) Semi-durables expenditure (SDC) Coeff.	s.e.		(7) Durables expenditure (DC) Coeff.	s.e.	
Jan dummy	$a_{0\text{-}1}$	-1.16	(0.006)	***	-1.28	(0.012)	***	-0.28	(0.019)	***	-0.21	(0.029)	***	-0.23	(0.011)	***	-0.63	(0.175)	***	-0.59	(0.219)	***
Feb dummy	$a_{0\text{-}2}$	0.07	(0.005)	***	0.04	(0.013)	***	-0.01	(0.020)		0.00	(0.028)		0.10	(0.011)	***	-0.52	(0.089)	***	-0.36	(0.231)	
Mar dummy	$a_{0\text{-}3}$	0.24	(0.006)	***	0.22	(0.014)	***	0.09	(0.020)	***	0.06	(0.029)	**	0.01	(0.011)		0.16	(0.069)	**	-0.07	(0.231)	
Apr dummy	$a_{0\text{-}4}$	-0.35	(0.006)	***	-0.44	(0.016)	***	-0.07	(0.021)	***	-0.06	(0.030)	**	0.01	(0.011)		-0.28	(0.080)	***	-0.54	(0.228)	**
May dummy	$a_{0\text{-}5}$	-0.07	(0.006)	***	-0.21	(0.018)	***	-0.10	(0.019)	***	-0.12	(0.028)	***	0.00	(0.010)		-0.36	(0.051)	***	-0.54	(0.220)	**
Jun dummy	$a_{0\text{-}6}$	0.90	(0.014)	***	1.01	(0.019)	***	-0.05	(0.019)	**	-0.06	(0.027)	**	0.00	(0.011)		-0.28	(0.056)	***	-0.09	(0.231)	
Jul dummy	$a_{0\text{-}7}$	-0.72	(0.026)	***	-0.82	(0.030)	***	0.09	(0.021)	***	0.08	(0.028)	***	0.06	(0.011)	***	0.01	(0.115)		0.15	(0.226)	
Aug dummy	$a_{0\text{-}8}$	-0.20	(0.013)	***	-0.20	(0.019)	***	-0.11	(0.019)	***	-0.06	(0.030)	**	0.00	(0.010)		-0.74	(0.091)	***	-1.03	(0.215)	***
Sep dummy	$a_{0\text{-}9}$	0.00	(0.005)		-0.08	(0.013)	***	-0.09	(0.018)	***	-0.15	(0.029)	***	-0.01	(0.010)		-0.28	(0.118)	**	-0.28	(0.223)	
Nov dummy	$a_{0\text{-}11}$	-0.02	(0.006)	***	-0.08	(0.014)	***	-0.03	(0.02)		-0.03	(0.028)		0.04	(0.011)	***	-0.22	(0.054)	***	-0.05	(0.208)	
Dec dummy	$a_{0\text{-}12}$	1.09	(0.006)	***	1.17	(0.012)	***	0.21	(0.02)	***	0.08	(0.028)	***	0.26	(0.011)	***	0.24	(0.062)	***	0.02	(0.203)	
Jan dummy x Post-reform dummy	b_1	0.03	(0.007)	***	0.11	(0.010)	***	0.07	(0.019)	***	0.02	(0.028)		0.06	(0.012)	***	0.12	(0.052)	**	0.02	(0.192)	
Feb dummy x Post-reform dummy	b_2	0.00	(0.005)		0.03	(0.015)	*	-0.01	(0.018)		0.00	(0.027)		-0.01	(0.011)		-0.04	(0.055)		0.04	(0.225)	
Mar dummy x Post-reform dummy	b_3	-0.37	(0.006)	***	-0.41	(0.015)	***	-0.08	(0.021)	***	-0.08	(0.030)	***	-0.01	(0.011)		-0.19	(0.062)	***	-0.37	(0.229)	
Apr dummy x Post-reform dummy	b_4	0.37	(0.007)	***	0.41	(0.018)	***	0.04	(0.023)	*	0.04	(0.032)		-0.02	(0.011)		0.09	(0.058)		0.25	(0.231)	
May dummy x Post-reform dummy	b_5	-0.01	(0.006)		-0.02	(0.020)		0.04	(0.020)	**	0.04	(0.029)		0.00	(0.010)		0.11	(0.053)	**	0.23	(0.224)	
Jun dummy x Post-reform dummy	b_6	-0.14	(0.020)	***	-0.17	(0.024)	***	0.00	(0.020)		-0.03	(0.027)		0.00	(0.011)		0.05	(0.050)		0.15	(0.229)	
Jul dummy x Post-reform dummy	b_7	0.14	(0.039)	***	0.18	(0.042)	***	-0.08	(0.020)	***	-0.08	(0.029)	***	-0.02	(0.011)	**	-0.16	(0.049)	***	-0.39	(0.214)	*
Aug dummy x Post-reform dummy	b_8	-0.04	(0.018)	**	-0.04	(0.023)	*	0.06	(0.020)	***	0.07	(0.031)	**	0.02	(0.011)	*	0.13	(0.052)	**	0.17	(0.200)	
Sep dummy x Post-reform dummy	b_9	-0.01	(0.005)	*	0.02	(0.013)		0.00	(0.019)		0.01	(0.030)		0.00	(0.010)		-0.04	(0.052)		0.09	(0.216)	
Oct dummy x Post-reform dummy	b_{10}	-0.01	(0.006)	**	-0.01	(0.013)		-0.01	(0.018)		-0.04	(0.028)		0.00	(0.010)		-0.04	(0.052)		-0.36	(0.223)	
Nov dummy x Post-reform dummy	b_{11}	0.02	(0.007)	**	0.01	(0.013)		0.00	(0.018)		-0.03	(0.028)		0.00	(0.010)		0.08	(0.052)		-0.20	(0.191)	
Dec dummy x Post-reform dummy	b_{12}	-0.04	(0.007)	***	-0.13	(0.010)	***	-0.03	(0.018)	*	-0.04	(0.028)		-0.02	(0.012)	*	-0.08	(0.051)		0.09	(0.184)	
Constant	a_0	0.02	(0.00)	***	0.06	(0.010)	***	0.02	(0.013)	*	0.03	(0.020)	*	-0.03	(0.007)	***	0.24	(0.042)	***	0.35	(0.167)	**
F test: b m=0 for all months.		F(12, 26368) = 570.68		***	F(12, 26359) = 140.16		***	F(12, 26887) = 5.09		***	F(12, 26880) = 2.65		***	F(12, 26887) = 3.23		***	F(12, 26328) = 3.84		***	F(12, 6513) = 1.12		
R-squared		0.7245			0.6260			0.0473			0.0120			0.1287			0.0423			0.0151		
Root MSE		0.3428			0.4632			0.4595			0.6774			0.2561			1.2329			2.4625		
Number of observations		26,392			26,383			26,913			26,906			26,913			26,354			6,539		

Derived monthly patterns for Figures 1, 2, and 3

		Figure no.	WHH 1.1-(b)	DI 1.2-(b)	C 2.1-(b)	SC 3.1-(b)	NDC 3.2-(b)	SDC 3.3-(b)	DC 3.4-(b)
Pre-reform									
Jan	a_1	$(=a_0+a_{0\text{-}1})$	-1.13	-1.22	-0.26	-0.17	-0.25	-0.39	-0.23
Feb	a_2	$(=a_0+a_{0\text{-}2})$	0.10	0.11	0.02	0.04	0.08	-0.28	0.00
Mar	a_3	$(=a_0+a_{0\text{-}3})$	0.27	0.28	0.11	0.10	-0.02	0.40	0.29
Apr	a_4	$(=a_0+a_{0\text{-}4})$	-0.33	-0.38	-0.05	-0.03	-0.02	-0.03	-0.19
May	a_5	$(=a_0+a_{0\text{-}5})$	-0.04	-0.15	-0.07	-0.08	-0.03	-0.12	-0.18
Jun	a_6	$(=a_0+a_{0\text{-}6})$	0.93	1.08	-0.02	-0.02	-0.03	-0.03	0.26
Jul	a_7	$(=a_0+a_{0\text{-}7})$	-0.70	-0.76	0.11	0.12	0.03	0.25	0.50
Aug	a_8	$(=a_0+a_{0\text{-}8})$	-0.18	-0.13	-0.09	-0.03	-0.03	-0.50	-0.68
Sep	a_9	$(=a_0+a_{0\text{-}9})$	0.02	-0.02	-0.06	-0.11	-0.03	-0.04	0.07
Oct	a_{10}	$(=a_0)$	0.02	0.06	0.02	0.03	-0.03	0.24	0.35
Nov	a_{11}	$(=a_0+a_{0\text{-}11})$	0.00	-0.02	0.00	0.00	0.01	0.03	0.30
Dec	a_{12}	$(=a_0+a_{0\text{-}12})$	1.12	1.23	0.23	0.12	0.24	0.48	0.38
Post-reform									
Jan		a_1+b_1	-1.10	-1.11	-0.19	-0.15	-0.19	-0.26	-0.21
Feb		a_2+b_2	0.10	0.14	0.01	0.03	0.07	-0.33	0.04
Mar		a_3+b_3	-0.10	-0.13	0.03	0.01	-0.02	0.21	-0.08
Apr		a_4+b_4	0.04	0.04	-0.01	0.02	-0.03	0.06	0.06
May		a_5+b_5	-0.05	-0.17	-0.03	-0.04	-0.03	-0.01	0.04
Jun		a_6+b_6	0.78	0.90	-0.03	-0.06	-0.02	0.01	0.41
Jul		a_7+b_7	-0.56	-0.58	0.04	0.04	0.01	0.09	0.11
Aug		a_8+b_8	-0.21	-0.18	-0.03	0.05	-0.01	-0.37	-0.51
Sep		a_9+b_9	0.02	0.00	-0.06	-0.10	-0.03	-0.09	0.17
Oct		$a_{10}+b_{10}$	0.01	0.05	0.01	-0.01	-0.02	0.20	0.00
Nov		$a_{11}+b_{11}$	0.02	-0.01	-0.01	-0.02	0.01	0.10	0.11
Dec		$a_{12}+b_{12}$	1.08	1.10	0.20	0.08	0.22	0.40	0.47

Note: All regressions are estimated by OLS and include the nominal interest rate and relative price changes as control variables. Numbers in the parentheses are robust standard errors. ***, **, and * denote significance at the 1%, 5%, and 10% level respectively.

Table 5. OLS coefficient estimates for regression model (2) and derived monthly patterns

(a) All wage earning white-collar worker households (Broadly-defined sample)

	(1) Wage of household head (WHH)		(2) Disposable income (DI)		(3) Consumption expenditure (C)		(4) Services expenditure (SC)		(5) Non-durables expenditure (NDC)		(6) Semi-durables expenditure (SDC)		(7) Durables expenditure (DC)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Jan dummy	$a_{0\text{-}1}$	-0.80 (0.008) ***	-0.93 (0.011) ***	-0.22 (0.010) ***	-0.11 (0.015) ***	-0.23 (0.006) ***	-0.43 (0.071) ***	-0.46 (0.102) ***
Feb dummy	$a_{0\text{-}2}$	0.12 (0.003) ***	0.09 (0.007) ***	0.03 (0.010) ***	0.02 (0.014)	0.13 (0.005) ***	-0.38 (0.039) ***	-0.07 (0.108)
Mar dummy	$a_{0\text{-}3}$	-0.04 (0.003) ***	-0.11 (0.008) ***	0.07 (0.010) ***	0.08 (0.015) ***	0.02 (0.005) ***	0.08 (0.033) **	-0.06 (0.114)
Apr dummy	$a_{0\text{-}4}$	0.05 (0.004) ***	-0.02 (0.008) **	0.01 (0.010)	0.05 (0.016) ***	0.01 (0.005) ***	-0.28 (0.036) ***	-0.04 (0.108)
May dummy	$a_{0\text{-}5}$	-0.01 (0.003) ***	-0.17 (0.009) ***	-0.05 (0.009) ***	-0.04 (0.015) **	0.01 (0.005) **	-0.23 (0.026) ***	-0.27 (0.105) ***
Jun dummy	$a_{0\text{-}6}$	0.45 (0.008) ***	0.52 (0.011) ***	-0.01 (0.009)	-0.04 (0.014) ***	0.02 (0.005) ***	-0.17 (0.027) ***	0.15 (0.110)
Jul dummy	$a_{0\text{-}7}$	-0.09 (0.013) ***	-0.20 (0.015) ***	0.08 (0.010) ***	0.09 (0.014) ***	0.06 (0.005) ***	0.05 (0.049)	0.03 (0.106)
Aug dummy	$a_{0\text{-}8}$	-0.27 (0.008) ***	-0.27 (0.010) ***	-0.04 (0.009) ***	0.01 (0.015)	0.04 (0.005) ***	-0.52 (0.040) ***	-0.50 (0.105) ***
Sep dummy	$a_{0\text{-}9}$	0.04 (0.004) ***	-0.07 (0.008) ***	-0.02 (0.009) ***	-0.05 (0.015) ***	0.01 (0.005) **	-0.32 (0.050) ***	-0.08 (0.109)
Nov dummy	$a_{0\text{-}11}$	0.06 (0.003) ***	-0.04 (0.007) ***	0.03 (0.010) ***	0.02 (0.015) *	0.06 (0.005) ***	-0.11 (0.027) ***	0.06 (0.106)
Dec dummy	$a_{0\text{-}12}$	0.83 (0.008) ***	0.86 (0.010) ***	0.20 (0.010) ***	0.08 (0.015) ***	0.28 (0.005) ***	0.26 (0.029) ***	0.20 (0.101) **
Jan dummy x Public dummy	b_1	-0.17 (0.011) ***	-0.20 (0.013) ***	-0.04 (0.011) ***	-0.05 (0.017) ***	-0.02 (0.007) **	-0.04 (0.029)	0.08 (0.106)
Feb dummy x Public dummy	b_2	0.01 (0.004) **	0.03 (0.009) ***	0.00 (0.010)	0.01 (0.016)	0.00 (0.006)	0.03 (0.032)	0.03 (0.121)
Mar dummy x Public dummy	b_3	0.20 (0.005) ***	0.18 (0.010) ***	0.05 (0.011) ***	0.02 (0.017)	0.00 (0.006)	0.07 (0.033) **	0.24 (0.128) *
Apr dummy x Public dummy	b_4	-0.22 (0.006) ***	-0.20 (0.011) ***	-0.03 (0.012) **	-0.03 (0.019) *	0.00 (0.006)	-0.06 (0.030) *	-0.30 (0.120) **
May dummy x Public dummy	b_5	0.00 (0.004)	-0.04 (0.011) ***	-0.01 (0.011)	-0.03 (0.017) *	0.00 (0.006)	-0.01 (0.029)	0.03 (0.118)
Jun dummy x Public dummy	b_6	0.36 (0.013) ***	0.40 (0.015) ***	0.01 (0.010)	0.02 (0.016)	0.00 (0.006)	0.00 (0.028)	-0.01 (0.122)
Jul dummy x Public dummy	b_7	-0.47 (0.020) ***	-0.49 (0.022) ***	0.04 (0.011) ***	0.04 (0.017) **	0.01 (0.006) *	0.05 (0.028) *	0.18 (0.122)
Aug dummy x Public dummy	b_8	0.14 (0.011) ***	0.15 (0.014) ***	0.00 (0.011)	0.00 (0.018)	0.01 (0.006)	0.03 (0.029)	-0.10 (0.119)
Sep dummy x Public dummy	b_9	0.01 (0.004) **	-0.01 (0.009)	-0.04 (0.011) ***	-0.05 (0.017) ***	-0.02 (0.006) ***	-0.03 (0.030)	-0.01 (0.125)
Oct dummy x Public dummy	b_{10}	0.04 (0.004) ***	0.04 (0.009) ***	0.03 (0.011) **	0.03 (0.017) *	0.01 (0.006)	0.04 (0.030)	0.21 (0.126) *
Nov dummy x Public dummy	b_{11}	-0.02 (0.004) ***	-0.03 (0.009) ***	-0.02 (0.011) *	-0.01 (0.016)	-0.01 (0.006)	-0.01 (0.029)	-0.03 (0.114)
Dec dummy x Public dummy	b_{12}	0.18 (0.011) ***	0.20 (0.012) ***	0.07 (0.011) ***	0.06 (0.017) ***	0.03 (0.007) ***	0.08 (0.028) ***	0.17 (0.101) *
Jan dummy x Post-reform dummy	c_1	0.13 (0.012) ***	0.18 (0.013) ***	0.10 (0.009) ***	0.06 (0.014) ***	0.09 (0.006) ***	0.17 (0.027) ***	0.19 (0.094) **
Feb dummy x Post-reform dummy	c_2	-0.01 (0.004) ***	-0.01 (0.008)	-0.01 (0.009)	0.01 (0.014)	-0.02 (0.005) ***	-0.05 (0.029) *	0.06 (0.108)
Mar dummy x Post-reform dummy	c_3	-0.01 (0.004) **	-0.02 (0.008) **	-0.04 (0.010) ***	-0.07 (0.015) ***	-0.01 (0.005) ***	-0.06 (0.030) *	0.06 (0.119)
Apr dummy x Post-reform dummy	c_4	0.01 (0.005) *	0.03 (0.009) ***	0.03 (0.011) **	0.02 (0.016)	0.01 (0.005) **	0.07 (0.028) **	-0.04 (0.109)
May dummy x Post-reform dummy	c_5	-0.01 (0.004)	-0.01 (0.010)	-0.02 (0.010)	-0.03 (0.015) **	0.00 (0.005)	0.02 (0.026)	0.07 (0.108)
Jun dummy x Post-reform dummy	c_6	-0.05 (0.012) ***	-0.07 (0.013) ***	0.01 (0.009)	0.01 (0.013)	0.00 (0.005)	0.01 (0.026)	-0.16 (0.112)
Jul dummy x Post-reform dummy	c_7	0.02 (0.018)	0.04 (0.020) **	-0.04 (0.009) ***	-0.04 (0.014) ***	-0.02 (0.005) ***	-0.06 (0.025) **	-0.07 (0.107)
Aug dummy x Post-reform dummy	c_8	0.03 (0.011) ***	0.04 (0.013) ***	0.04 (0.010) ***	0.05 (0.014) ***	0.02 (0.006) ***	0.12 (0.026) ***	0.16 (0.107)
Sep dummy x Post-reform dummy	c_9	0.00 (0.004)	0.02 (0.008) ***	0.01 (0.010)	0.02 (0.015)	0.01 (0.005) *	-0.03 (0.027)	0.16 (0.111)
Oct dummy x Post-reform dummy	c_{10}	0.00 (0.004)	-0.01 (0.008) *	0.01 (0.010)	-0.01 (0.015)	0.01 (0.005) **	0.04 (0.027)	0.08 (0.111)
Nov dummy x Post-reform dummy	c_{11}	0.00 (0.004)	0.00 (0.008)	-0.01 (0.009)	-0.02 (0.014)	0.00 (0.005)	-0.02 (0.026)	-0.06 (0.104)
Dec dummy x Post-reform dummy	c_{12}	-0.13 (0.012) ***	-0.19 (0.012) ***	-0.05 (0.009) ***	-0.03 (0.014) **	-0.05 (0.006) ***	-0.10 (0.026) ***	-0.06 (0.096)
Jan dum. x Public dum. x Post-reform dum.	d_1	-0.07 (0.017) ***	-0.04 (0.019) **	-0.01 (0.015)	-0.02 (0.023)	-0.01 (0.010)	-0.01 (0.043)	-0.15 (0.150)
Feb dum. x Public dum. x Post-reform dum.	d_2	0.00 (0.006)	0.00 (0.014)	0.00 (0.015)	-0.01 (0.022)	0.00 (0.008)	-0.04 (0.046)	-0.08 (0.172)
Mar dum. x Public dum. x Post-reform dum.	d_3	-0.22 (0.006) ***	-0.22 (0.015) ***	-0.02 (0.016)	0.02 (0.024)	0.00 (0.008)	-0.09 (0.048) *	-0.29 (0.180)
Apr dum. x Public dum. x Post-reform dum.	d_4	0.22 (0.008) ***	0.21 (0.016) ***	-0.01 (0.018)	-0.01 (0.026)	-0.01 (0.008) *	0.01 (0.045)	0.38 (0.174) **
May dum. x Public dum. x Post-reform dum.	d_5	0.00 (0.006)	0.01 (0.017)	0.02 (0.016)	0.03 (0.025)	0.00 (0.008)	0.03 (0.042)	-0.14 (0.173)
Jun dum. x Public dum. x Post-reform dum.	d_6	-0.04 (0.018) *	-0.05 (0.021) **	-0.03 (0.015) **	-0.04 (0.022)	-0.01 (0.008)	0.00 (0.041)	0.04 (0.176)
Jul dum. x Public dum. x Post-reform dum.	d_7	0.05 (0.029) *	0.07 (0.031) **	0.00 (0.015)	-0.02 (0.023)	0.01 (0.009)	-0.05 (0.040)	-0.07 (0.172)
Aug dum. x Public dum. x Post-reform dum.	d_8	-0.03 (0.015) *	-0.05 (0.019) ***	-0.03 (0.016) *	-0.02 (0.024)	-0.01 (0.009)	-0.06 (0.041)	-0.26 (0.167)
Sep dum. x Public dum. x Post-reform dum.	d_9	-0.01 (0.006) **	-0.01 (0.013)	0.02 (0.016)	0.02 (0.024)	0.00 (0.009)	0.00 (0.043)	0.08 (0.175)
Oct dum. x Public dum. x Post-reform dum.	d_{10}	-0.01 (0.006)	0.01 (0.013)	-0.01 (0.016)	-0.02 (0.024)	0.00 (0.008)	-0.09 (0.043) **	-0.26 (0.179)
Nov dum. x Public dum. x Post-reform dum.	d_{11}	0.01 (0.006)	0.00 (0.013)	0.01 (0.015)	0.00 (0.023)	0.00 (0.008)	0.10 (0.043) **	-0.05 (0.165)
Dec dum. x Public dum. x Post-reform dum.	d_{12}	0.06 (0.016) ***	0.04 (0.018) **	-0.02 (0.015)	-0.02 (0.023)	0.01 (0.009)	-0.03 (0.041)	0.08 (0.148)
Constant	a_0	-0.03 (0.002) ***	0.03 (0.005) ***	-0.02 (0.007) ***	-0.02 (0.029) **	-0.04 (0.004) ***	0.16 (0.021) ***	0.08 (0.079)
F test: b m=0 for Feb, Mar, Apr & May	F(4,186042) = 824.76 ***		F(4,186684) = 164.21 ***		F(4,190619) = 5.68 ***		F(4,190461) = 2.27 *		F(4,190619) = 0.22		F(4,184796) = 2.19 *		F(4, 43102) = 2.46 **	
F test: b m+d m=0 for Feb, Mar, Apr & May	F(4,186042) = 7.89 ***		F(4,186684) = 8.28 ***		F(4,190619) = 4.05 ***		F(4,190461) = 3.05 **		F(4,190619) = 1.34		F(4,184796) = 0.79		F(4, 43102) = 0.40	
R-squared	0.4746		0.393		0.0359		0.0068		0.1283		0.0303		0.0088	
Root MSE	0.4216		0.549		0.4777		0.7242		0.2643		1.3022		2.4808	
Number of observations	186,090		186,732		190,669		190,511		190,669		184,846		43,152	

Derived monthly patterns for Figures 4, 5, and 6

	Figure no.	WHH 4.1-(a)	DI 4.2-(a)	C 5.1-(a)	SC 6.1-(a)	NDC 6.2-(a)	SDC 6.3-(a)	DC 6.4-(a)
Pre-reform								
Jan	a_1 (=a_0+$a_{0\text{-}1}$)	-0.83	-0.89	-0.24	-0.13	-0.27	-0.27	-0.38
Feb	a_2 (=a_0+$a_{0\text{-}2}$)	0.09	0.12	0.02	-0.01	0.09	-0.23	0.01
Mar	a_3 (=a_0+$a_{0\text{-}3}$)	-0.07	-0.08	0.05	0.05	-0.02	0.24	0.03
Apr	a_4 (=a_0+$a_{0\text{-}4}$)	0.02	0.02	-0.01	0.02	-0.03	-0.12	0.05
May	a_5 (=a_0+$a_{0\text{-}5}$)	-0.04	-0.14	-0.07	-0.06	-0.03	-0.08	-0.19
Jun	a_6 (=a_0+$a_{0\text{-}6}$)	0.43	0.55	-0.03	-0.06	-0.03	-0.01	0.24
Jul	a_7 (=a_0+$a_{0\text{-}7}$)	-0.12	-0.16	0.06	0.06	0.02	0.21	0.11
Aug	a_8 (=a_0+$a_{0\text{-}8}$)	-0.29	-0.23	-0.06	-0.01	0.00	-0.36	-0.42
Sep	a_9 (=a_0+$a_{0\text{-}9}$)	0.02	-0.04	-0.04	-0.07	-0.03	-0.17	0.00
Oct	a_{10} (=a_0)	-0.03	0.03	-0.02	-0.02	-0.04	0.16	0.08
Nov	a_{11} (=a_0+$a_{0\text{-}11}$)	0.03	-0.01	0.01	0.00	0.02	0.05	0.14
Dec	a_{12} (=a_0+$a_{0\text{-}12}$)	0.80	0.89	0.19	0.06	0.24	0.42	0.28
Pre-reform & Public								
Jan	a_1+b_1	-1.00	-1.09	-0.28	-0.18	-0.29	-0.31	-0.30
Feb	a_2+b_2	0.10	0.15	0.02	0.01	0.08	-0.20	0.04
Mar	a_3+b_3	0.14	0.10	0.09	0.08	-0.02	0.31	0.27
Apr	a_4+b_4	-0.20	-0.18	-0.04	-0.01	-0.03	-0.18	-0.25
May	a_5+b_5	-0.04	-0.18	-0.08	-0.09	-0.03	-0.09	-0.16
Jun	a_6+b_6	0.79	0.95	-0.02	-0.04	-0.03	-0.02	0.23
Jul	a_7+b_7	-0.59	-0.65	0.10	0.10	0.03	0.26	0.29
Aug	a_8+b_8	-0.15	-0.08	-0.06	-0.01	0.00	-0.33	-0.51
Sep	a_9+b_9	0.02	-0.05	-0.08	-0.13	-0.05	-0.20	-0.01
Oct	a_{10}+b_{10}	0.01	0.07	0.01	0.01	-0.04	0.20	0.29
Nov	a_{11}+b_{11}	0.01	-0.04	-0.01	-0.01	0.01	0.04	0.12
Dec	a_{12}+b_{12}	0.98	1.09	0.25	0.12	0.26	0.50	0.46
Post-reform								
Jan	a_1+c1	-0.69	-0.71	-0.14	-0.07	-0.18	-0.10	-0.18
Feb	a_2+c2	0.08	0.12	0.00	0.00	0.07	-0.28	0.07
Mar	a_3+c_3	-0.07	-0.10	0.01	-0.01	-0.04	0.18	0.09
Apr	a_4+c4	0.03	0.05	0.01	0.05	-0.02	-0.05	0.01
May	a_5+c_5	-0.04	-0.15	-0.08	-0.09	-0.03	-0.05	-0.12
Jun	a_6+c_6	0.38	0.49	-0.02	-0.05	-0.03	-0.01	0.08
Jul	a_7+c_7	-0.10	-0.12	0.02	0.02	0.00	0.15	0.05
Aug	a_8+c_8	-0.26	-0.20	-0.01	0.03	0.01	-0.24	-0.25
Sep	a_9+c_9	0.02	-0.01	-0.03	-0.06	-0.02	-0.20	0.16
Oct	a_{10}+c_{10}	-0.03	0.02	-0.01	-0.03	-0.03	0.20	0.16
Nov	a_{11}+c_{11}	0.03	-0.01	0.00	-0.01	0.01	0.02	0.08
Dec	a_{12}+c_{12}	0.66	0.70	0.14	0.03	0.19	0.32	0.22
Post-reform & Public								
Jan	a_1+b_1+c_1+d_1	-0.94	-0.95	-0.19	-0.14	-0.21	-0.16	-0.25
Feb	a_2+b_2+c_2+d_2	0.09	0.14	0.00	0.00	0.07	-0.29	0.02
Mar	a_3+b_3+c_3+d_3	-0.09	-0.15	0.04	0.03	-0.03	0.16	0.04
Apr	a_4+b_4+c_4+d_4	0.03	0.06	-0.02	0.00	-0.03	-0.10	0.09
May	a_5+b_5+c_5+d_5	-0.05	-0.19	-0.07	-0.09	-0.03	-0.03	-0.24
Jun	a_6+b_6+c_6+d_6	0.71	0.83	-0.04	-0.06	-0.04	-0.01	0.11
Jul	a_7+b_7+c_7+d_7	-0.52	-0.53	0.06	0.04	0.02	0.15	0.15
Aug	a_8+b_8+c_8+d_8	-0.15	-0.09	-0.04	0.02	0.01	-0.26	-0.61
Sep	a_9+b_9+c_9+d_9	0.01	-0.04	-0.05	-0.09	-0.04	-0.22	0.23
Oct	a_{10}+b_{10}+c_{10}+d_{10}	0.00	0.07	0.00	-0.02	-0.03	0.15	0.12
Nov	a_{11}+b_{11}+c_{11}+d_{11}	0.02	-0.03	-0.01	-0.02	0.01	0.11	0.00
Dec	a_{12}+b_{12}+c_{12}+d_{12}	0.90	0.94	0.19	0.07	0.23	0.37	0.47

Note: All regressions are estimated by OLS and include the nominal interest rate and relative price changes as control variables. Numbers in the parentheses are robust standard errors. ***, **, and * denote significance at the 1%, 5%, and 10% level respectively.

(b) Male sole white-collar wage earner head households with bonus receipts in the regular bonus months (Narrowly-defined sample)

		(1) Wage of household head (WHH)		(2) Disposable income (DI)		(3) Consumption expenditure (C)		(4) Services expenditure (SC)		(5) Non-durables expenditure (NDC)		(6) Semi-durables expenditure (SDC)		(7) Durables expenditure (DC)	
		Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Jan dummy	$a_{0\text{-}1}$	-1.11	(0.008) ***	-1.24	(0.011) ***	-0.20	(0.015) ***	-0.11	(0.022) ***	-0.20	(0.009) ***	-0.42	(0.112) ***	-0.33	(0.169) *
Feb dummy	$a_{0\text{-}2}$	0.11	(0.005) ***	0.09	(0.011) ***	0.04	(0.015) ***	0.05	(0.021) **	0.12	(0.008) ***	-0.39	(0.061) ***	-0.07	(0.176)
Mar dummy	$a_{0\text{-}3}$	-0.07	(0.005) ***	-0.13	(0.012) ***	0.08	(0.015) ***	0.08	(0.022) ***	0.02	(0.008) ***	0.02	(0.050)	0.09	(0.187)
Apr dummy	$a_{0\text{-}4}$	0.06	(0.005) ***	0.00	(0.012)	0.01	(0.015)	0.07	(0.023) ***	0.02	(0.008) **	-0.34	(0.056) ***	0.13	(0.170)
May dummy	$a_{0\text{-}5}$	-0.02	(0.005) ***	-0.16	(0.013) ***	-0.03	(0.015) **	-0.01	(0.023)	0.02	(0.008) **	-0.26	(0.040) ***	-0.28	(0.170) *
Jun dummy	$a_{0\text{-}6}$	0.60	(0.014) ***	0.69	(0.018) ***	-0.01	(0.015)	-0.02	(0.021)	0.02	(0.008) **	-0.20	(0.043) ***	0.32	(0.180) *
Jul dummy	$a_{0\text{-}7}$	-0.16	(0.026) ***	-0.24	(0.029) ***	0.10	(0.016) ***	0.14	(0.022) ***	0.07	(0.008) ***	0.04	(0.077)	-0.01	(0.177)
Aug dummy	$a_{0\text{-}8}$	-0.40	(0.013) ***	-0.42	(0.017) ***	-0.05	(0.015) ***	0.00	(0.023)	0.03	(0.008) ***	-0.57	(0.063) ***	-0.42	(0.174) **
Sep dummy	$a_{0\text{-}9}$	0.06	(0.005) ***	-0.04	(0.010) ***	-0.01	(0.015)	-0.02	(0.022)	0.02	(0.008) **	-0.41	(0.079) ***	0.08	(0.181)
Nov dummy	$a_{0\text{-}11}$	0.04	(0.005) ***	-0.04	(0.011) ***	0.04	(0.015) ***	0.07	(0.022) ***	0.06	(0.008) ***	-0.17	(0.042) ***	0.24	(0.178)
Dec dummy	$a_{0\text{-}12}$	1.11	(0.007) ***	1.18	(0.011) ***	0.20	(0.015) ***	0.09	(0.022) ***	0.27	(0.009) ***	0.23	(0.046) ***	0.26	(0.168)
Jan dummy x Public dummy	b_1	-0.01	(0.008)	-0.01	(0.011)	-0.03	(0.017) *	-0.03	(0.026)	-0.01	(0.011)	-0.02	(0.047)	0.09	(0.178)
Feb dummy x Public dummy	b_2	0.00	(0.005)	-0.01	(0.012)	0.00	(0.016)	0.03	(0.024)	0.00	(0.010)	-0.04	(0.049)	0.06	(0.205)
Mar dummy x Public dummy	b_3	0.35	(0.005) ***	0.38	(0.013) ***	0.06	(0.019) ***	0.06	(0.027) **	0.00	(0.010)	0.12	(0.053) **	0.18	(0.214)
Apr dummy x Public dummy	b_4	-0.37	(0.006) ***	-0.41	(0.016) ***	-0.03	(0.020)	-0.06	(0.029) **	0.01	(0.010)	0.04	(0.049)	-0.33	(0.193) *
May dummy x Public dummy	b_5	-0.01	(0.005)	-0.02	(0.018)	-0.01	(0.018)	-0.03	(0.026)	0.00	(0.009)	-0.07	(0.046)	0.09	(0.186)
Jun dummy x Public dummy	b_6	0.34	(0.019) ***	0.36	(0.023) ***	0.01	(0.016)	0.03	(0.024)	0.00	(0.009)	-0.02	(0.043)	-0.07	(0.207)
Jul dummy x Public dummy	b_7	-0.52	(0.036) ***	-0.55	(0.040) ***	0.05	(0.018) ***	0.01	(0.026)	0.01	(0.010)	0.10	(0.043) **	0.50	(0.199) **
Aug dummy x Public dummy	b_8	0.24	(0.017) ***	0.26	(0.022) ***	-0.01	(0.018)	0.01	(0.027)	-0.01	(0.010)	-0.07	(0.044)	-0.27	(0.185)
Sep dummy x Public dummy	b_9	-0.01	(0.004) ***	-0.01	(0.010)	-0.03	(0.017) *	-0.05	(0.026) **	-0.01	(0.009)	0.04	(0.047)	-0.02	(0.200)
Oct dummy x Public dummy	b_{10}	0.04	(0.005) ***	0.04	(0.013) ***	0.05	(0.016) ***	0.07	(0.025) ***	0.02	(0.009) **	0.03	(0.046)	0.34	(0.206) *
Nov dummy x Public dummy	b_{11}	-0.02	(0.006) ***	-0.01	(0.013)	-0.02	(0.016)	-0.03	(0.025)	0.00	(0.009)	0.00	(0.045)	0.05	(0.179)
Dec dummy x Public dummy	b_{12}	0.03	(0.008) ***	0.02	(0.011) **	0.06	(0.017) ***	0.07	(0.025) ***	0.02	(0.011) *	0.07	(0.045)	0.10	(0.165)
Jan dummy x Post-reform dummy	c_1	0.07	(0.010) ***	0.16	(0.012) ***	0.08	(0.015) ***	0.06	(0.022) ***	0.08	(0.010) ***	0.14	(0.044) ***	0.07	(0.158)
Feb dummy x Post-reform dummy	c_2	0.00	(0.006)	-0.01	(0.012)	-0.02	(0.014)	0.00	(0.021)	-0.01	(0.008)	-0.07	(0.044)	0.13	(0.171)
Mar dummy x Post-reform dummy	c_3	0.00	(0.005)	-0.02	(0.012)	-0.04	(0.016) **	-0.06	(0.022) ***	-0.01	(0.008) *	-0.03	(0.046)	-0.15	(0.196)
Apr dummy x Post-reform dummy	c_4	0.00	(0.006)	0.02	(0.016)	0.01	(0.016)	0.01	(0.023)	0.01	(0.008)	0.06	(0.042)	-0.26	(0.171)
May dummy x Post-reform dummy	c_5	0.00	(0.005)	0.01	(0.015)	0.00	(0.016)	-0.02	(0.023)	0.00	(0.008)	0.05	(0.040)	0.17	(0.171)
Jun dummy x Post-reform dummy	c_6	-0.04	(0.020) **	-0.06	(0.022) ***	0.03	(0.015) **	0.05	(0.020) **	0.00	(0.008)	0.04	(0.039)	-0.23	(0.178)
Jul dummy x Post-reform dummy	c_7	-0.06	(0.038)	-0.03	(0.040)	-0.05	(0.016) ***	-0.06	(0.023) ***	-0.01	(0.009)	-0.13	(0.041) ***	0.10	(0.190)
Aug dummy x Post-reform dummy	c_8	0.03	(0.019)	0.02	(0.022)	0.05	(0.016) ***	0.05	(0.023) **	0.00	(0.009)	0.14	(0.042) ***	0.33	(0.175) *
Sep dummy x Post-reform dummy	c_9	0.00	(0.005)	0.03	(0.010) ***	-0.01	(0.015)	-0.01	(0.023)	0.02	(0.009) **	-0.02	(0.042)	-0.03	(0.177)
Oct dummy x Post-reform dummy	c_{10}	-0.01	(0.005)	-0.02	(0.012) *	0.02	(0.015)	0.02	(0.022)	0.01	(0.009)	0.02	(0.042)	0.33	(0.179) *
Nov dummy x Post-reform dummy	c_{11}	-0.01	(0.005)	0.01	(0.011)	0.01	(0.014)	0.00	(0.022)	0.00	(0.008)	0.00	(0.041)	-0.09	(0.167)
Dec dummy x Post-reform dummy	c_{12}	-0.07	(0.010) ***	-0.16	(0.011) ***	-0.04	(0.015) ***	-0.04	(0.021) *	-0.04	(0.009) ***	-0.07	(0.041) *	-0.11	(0.157)
Jan dum. x Public dum. x Post-reform dum.	d_1	-0.04	(0.012) ***	-0.05	(0.016) ***	-0.02	(0.024)	-0.04	(0.036)	-0.01	(0.016)	-0.02	(0.068)	-0.04	(0.248)
Feb dum. x Public dum. x Post-reform dum.	d_2	0.00	(0.008)	0.04	(0.019) **	0.01	(0.023)	0.00	(0.034)	0.00	(0.013)	0.02	(0.070)	-0.09	(0.282)
Mar dum. x Public dum. x Post-reform dum.	d_3	-0.37	(0.007) ***	-0.40	(0.019) ***	-0.04	(0.026)	-0.03	(0.037)	0.00	(0.014)	-0.17	(0.075) **	-0.23	(0.301)
Apr dum. x Public dum. x Post-reform dum.	d_4	0.37	(0.009) ***	0.39	(0.024) ***	0.03	(0.028)	0.03	(0.039)	-0.03	(0.014) *	0.04	(0.071)	0.51	(0.287) *
May dum. x Public dum. x Post-reform dum.	d_5	-0.01	(0.008)	-0.03	(0.025)	0.04	(0.025)	0.07	(0.037) *	0.00	(0.013)	0.07	(0.067)	0.05	(0.282)
Jun dum. x Public dum. x Post-reform dum.	d_6	-0.10	(0.028) ***	-0.11	(0.033) ***	-0.04	(0.024)	-0.08	(0.034) **	0.00	(0.013)	0.00	(0.063)	0.38	(0.287)
Jul dum. x Public dum. x Post-reform dum.	d_7	0.19	(0.055) ***	0.21	(0.058) ***	-0.03	(0.026)	-0.02	(0.036)	-0.01	(0.014)	-0.03	(0.064)	-0.49	(0.286) *
Aug dum. x Public dum. x Post-reform dum.	d_8	-0.06	(0.026) **	-0.07	(0.032) **	0.01	(0.026)	0.03	(0.038)	0.02	(0.014)	-0.02	(0.065)	-0.16	(0.265)
Sep dum. x Public dum. x Post-reform dum.	d_9	-0.01	(0.007)	-0.01	(0.016)	0.02	(0.024)	0.02	(0.036)	-0.02	(0.014)	-0.03	(0.067)	0.13	(0.278)
Oct dum. x Public dum. x Post-reform dum.	d_{10}	-0.01	(0.008)	0.01	(0.018)	-0.03	(0.023)	-0.06	(0.035)	0.00	(0.013)	-0.06	(0.066)	-0.68	(0.285) **
Nov dum. x Public dum. x Post-reform dum.	d_{11}	0.02	(0.009) ***	0.00	(0.018)	-0.01	(0.023)	-0.03	(0.034)	0.00	(0.013)	0.08	(0.066)	-0.11	(0.252)
Dec dum. x Public dum. x Post-reform dum.	d_{12}	0.03	(0.012) ***	0.04	(0.015) **	0.01	(0.024)	0.00	(0.035)	0.02	(0.015)	-0.01	(0.065)	0.20	(0.241)
Constant	a_0	-0.02	(0.003) ***	0.03	(0.01) ***	-0.03	(0.011) **	-0.04	(0.016) **	-0.05	(0.006) ***	0.19	(0.032) ***	0.01	(0.133)
F test: bm=0 for Feb, Mar, Apr & May		F(4, 69087) = 2313.76 ***		F(4, 69117) = 375.26 ***		F(4, 70783) = 2.92 **		F(4, 70758) = 3.06 **		F(4, 70783) = 0.51		F(4, 69197) = 2.13 *		F(4, 16440) = 0.98	
F test: bm+dm=0 for Feb, Mar, Apr & May		F(4, 69087) = 3.94 ***		F(4, 69117) = 3.06 **		F(4, 70783) = 0.76		F(4, 70758) = 1.56		F(4, 70783) = 0.63		F(4, 69197) = 0.76		F(4, 16440) = 0.31	
R-squared		0.6330		0.5434		0.0361		0.0089		0.1170		0.0354		0.0100	
Root MSE		0.3902		0.5047		0.4575		0.6684		0.2569		1.2435		2.4782	
Number of observations		69,135		69,165		70,833		70,808		70,833		69,247		16,490	

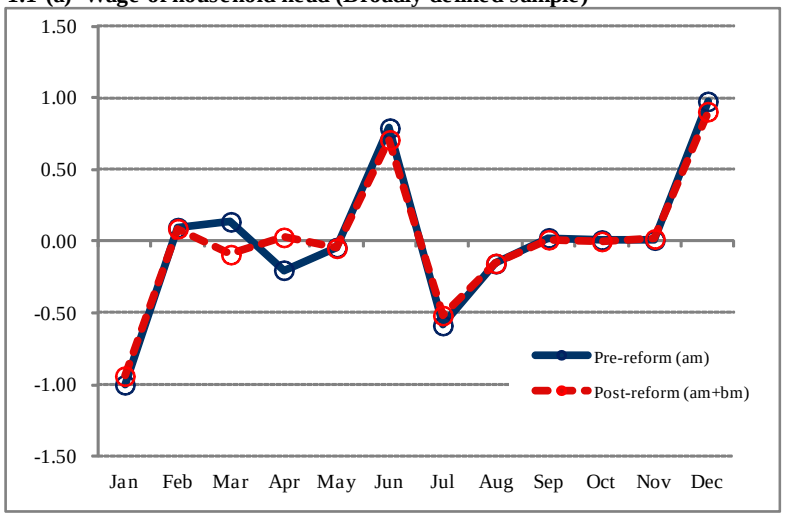
Derived monthly patterns for Figures 4, 5, and 6

		Figure no.	WHH 4.1-(b)	DI 4.2-(b)	C 5.1-(b)	SC 6.1-(b)	NDC 6.2-(b)	SDC 6.3-(b)	DC 6.4-(b)
Pre-reform									
Jan	a_1	$(=a_0+a_{0\text{-}1})$	-1.13	-1.21	-0.23	-0.15	-0.25	-0.23	-0.33
Feb	a_2	$(=a_0+a_{0\text{-}2})$	0.09	0.12	0.01	0.01	0.08	-0.20	-0.07
Mar	a_3	$(=a_0+a_{0\text{-}3})$	-0.09	-0.10	0.05	0.04	-0.02	0.21	0.10
Apr	a_4	$(=a_0+a_{0\text{-}4})$	0.04	0.03	-0.02	0.04	-0.03	-0.15	0.14
May	a_5	$(=a_0+a_{0\text{-}5})$	-0.04	-0.13	-0.06	-0.05	-0.03	-0.07	-0.28
Jun	a_6	$(=a_0+a_{0\text{-}6})$	0.58	0.71	-0.03	-0.06	-0.03	-0.01	0.33
Jul	a_7	$(=a_0+a_{0\text{-}7})$	-0.18	-0.21	0.07	0.11	0.02	0.23	0.00
Aug	a_8	$(=a_0+a_{0\text{-}8})$	-0.42	-0.39	-0.08	-0.04	-0.01	-0.38	-0.41
Sep	a_9	$(=a_0+a_{0\text{-}9})$	0.04	-0.01	-0.03	-0.06	-0.03	-0.22	0.08
Oct	a_{10}	$(=a_0)$	-0.02	0.03	-0.03	-0.04	-0.05	0.19	0.01
Nov	a_{11}	$(=a_0+a_{0\text{-}11})$	0.02	-0.01	0.02	0.03	0.02	0.02	0.25
Dec	a_{12}	$(=a_0+a_{0\text{-}12})$	1.09	1.20	0.17	0.05	0.22	0.42	0.27
Pre-reform & Public									
Jan	a_1+b_1		-1.13	-1.22	-0.26	-0.17	-0.25	-0.25	-0.23
Feb	a_2+b_2		0.10	0.11	0.02	0.04	0.08	-0.23	-0.01
Mar	a_3+b_3		0.27	0.28	0.11	0.10	-0.02	0.33	0.28
Apr	a_4+b_4		-0.33	-0.38	-0.05	-0.03	-0.02	-0.12	-0.19
May	a_5+b_5		-0.04	-0.15	-0.07	-0.08	-0.03	-0.15	-0.19
Jun	a_6+b_6		0.93	1.08	-0.02	-0.02	-0.02	-0.03	0.26
Jul	a_7+b_7		-0.70	-0.76	0.12	0.12	0.03	0.33	0.49
Aug	a_8+b_8		-0.18	-0.13	-0.09	-0.02	-0.03	-0.44	-0.68
Sep	a_9+b_9		0.02	-0.02	-0.06	-0.11	-0.03	-0.17	0.07
Oct	$a_{10}+b_{10}$		0.02	0.06	0.02	0.03	-0.03	0.22	0.35
Nov	$a_{11}+b_{11}$		0.00	-0.02	0.00	0.00	0.01	0.02	0.30
Dec	$a_{12}+b_{12}$		1.12	1.23	0.23	0.12	0.24	0.49	0.37
Post-reform									
Jan	a_1+c_1		-1.06	-1.05	-0.14	-0.09	-0.17	-0.09	-0.26
Feb	a_2+c_2		0.09	0.11	0.00	0.01	0.07	-0.27	0.07
Mar	a_3+c_3		-0.09	-0.12	0.01	-0.02	-0.03	0.18	-0.05
Apr	a_4+c_4		0.04	0.05	0.00	0.05	-0.02	-0.09	-0.13
May	a_5+c_5		-0.04	-0.12	-0.06	-0.07	-0.03	-0.03	-0.10
Jun	a_6+c_6		0.54	0.65	0.00	-0.01	-0.02	0.03	0.10
Jul	a_7+c_7		-0.24	-0.24	0.02	0.05	0.01	0.10	0.10
Aug	a_8+c_8		-0.39	-0.36	-0.03	0.01	-0.01	-0.24	-0.08
Sep	a_9+c_9		0.04	0.02	-0.05	-0.08	-0.01	-0.24	0.05
Oct	$a_{10}+c_{10}$		-0.03	0.01	0.00	-0.02	-0.04	0.21	0.33
Nov	$a_{11}+c_{11}$		0.01	-0.01	0.03	0.03	0.02	0.02	0.16
Dec	$a_{12}+c_{12}$		1.02	1.04	0.13	0.01	0.18	0.35	0.16
Post-reform & Public									
Jan	$a_1+b_1+c_1+d_1$		-1.10	-1.11	-0.19	-0.16	-0.19	-0.12	-0.21
Feb	$a_2+b_2+c_2+d_2$		0.10	0.14	0.01	0.03	0.07	-0.28	0.04
Mar	$a_3+b_3+c_3+d_3$		-0.10	-0.13	0.03	0.01	-0.03	0.13	-0.09
Apr	$a_4+b_4+c_4+d_4$		0.04	0.04	-0.01	0.02	-0.03	-0.02	0.06
May	$a_5+b_5+c_5+d_5$		-0.05	-0.17	-0.03	-0.04	-0.03	-0.03	0.04
Jun	$a_6+b_6+c_6+d_6$		0.78	0.90	-0.03	-0.05	-0.02	0.02	0.41
Jul	$a_7+b_7+c_7+d_7$		-0.56	-0.58	0.04	0.04	0.01	0.17	0.10
Aug	$a_8+b_8+c_8+d_8$		-0.21	-0.18	-0.03	0.05	-0.01	-0.33	-0.52
Sep	$a_9+b_9+c_9+d_9$		0.02	0.00	-0.06	-0.10	-0.03	-0.22	0.16
Oct	$a_{10}+b_{10}+c_{10}+d_{10}$		0.01	0.05	0.01	-0.01	-0.02	0.18	-0.01
Nov	$a_{11}+b_{11}+c_{11}+d_{11}$		0.02	-0.01	0.00	-0.02	0.01	0.10	0.10
Dec	$a_{12}+b_{12}+c_{12}+d_{12}$		1.08	1.10	0.20	0.08	0.22	0.41	0.47

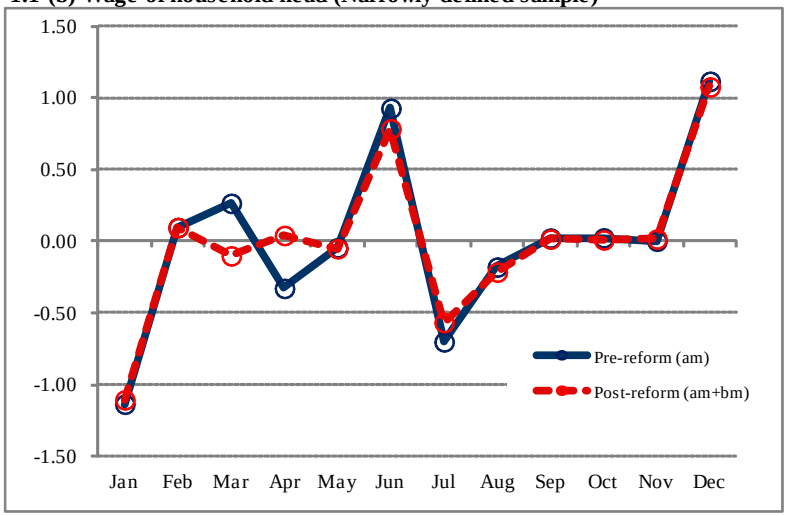
Note: All regressions are estimated by OLS and include the nominal interest rate and relative price changes as control variables. Numbers in the parentheses are robust standard errors. ***, **, and * denote significance at the 1%, 5%, and 10% level respectively.

Figure 1. Month-on-month change in income for public employee households: Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

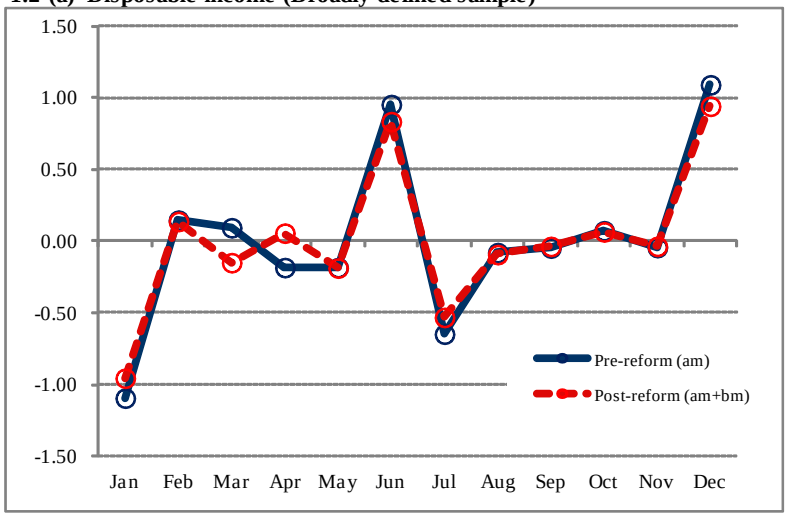
1.1-(a) Wage of household head (Broadly-defined sample)



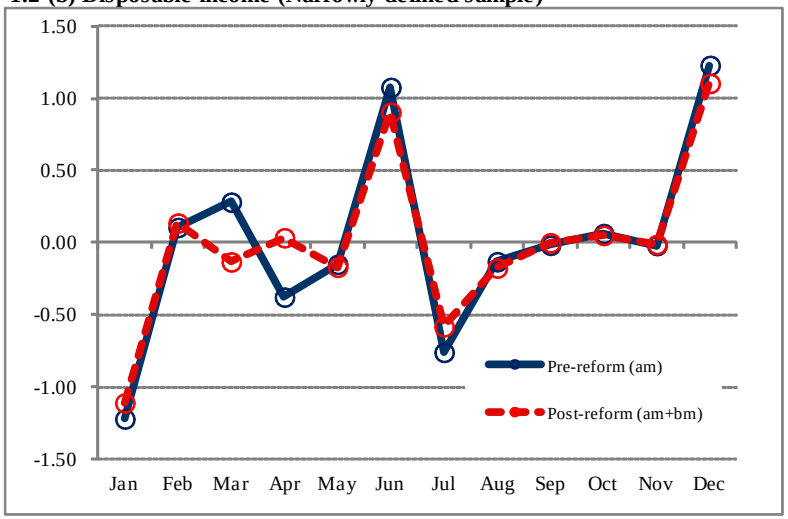
1.1-(b) Wage of household head (Narrowly-defined sample)



1.2-(a) Disposable income (Broadly-defined sample)



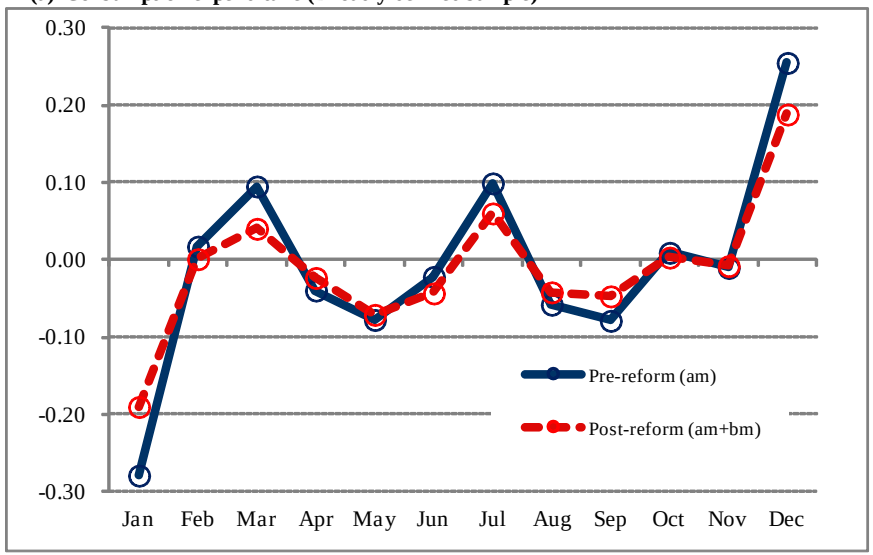
1.2-(b) Disposable income (Narrowly-defined sample)



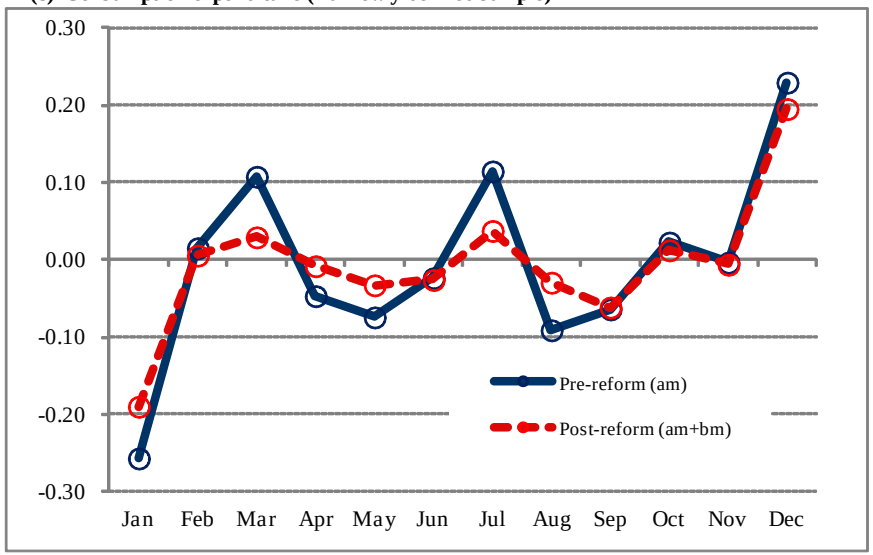
Note: See Table 4 for the estimated regression coefficients.

Figure 2. Month-on-month change in consumption expenditure of public employee households: Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

2-(a) Consumption expenditure (Broadly-defined sample)



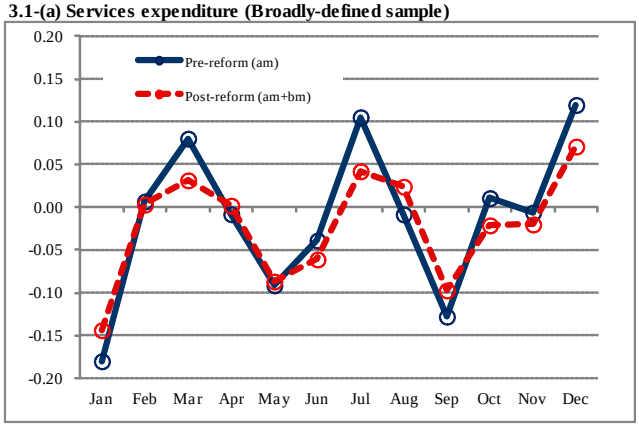
2-(b) Consumption expenditure (Narrowly-defined sample)



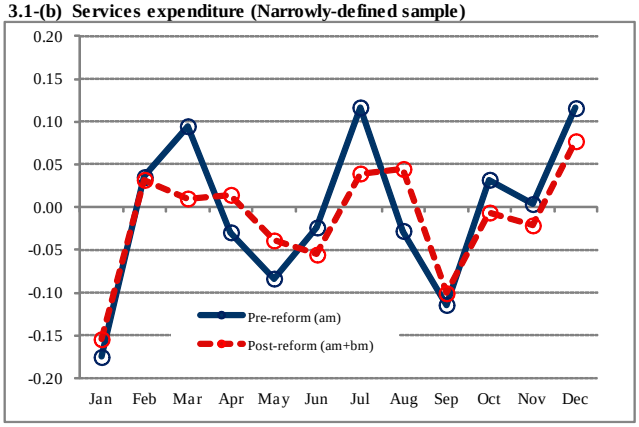
Note: See Table 4 for the estimated regression coefficients.

Figure 3. Month-on-month change in expenditure of public employee households by expenditure component: Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

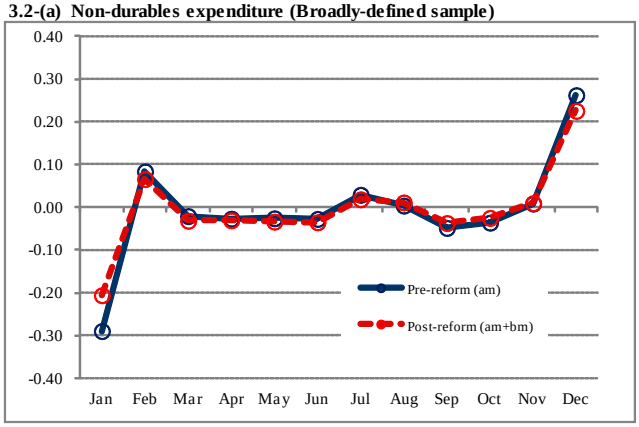
3.1-(a) Services expenditure (Broadly-defined sample)



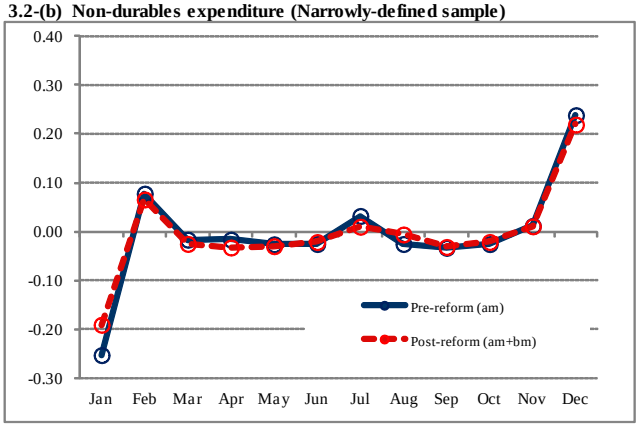
3.1-(b) Services expenditure (Narrowly-defined sample)



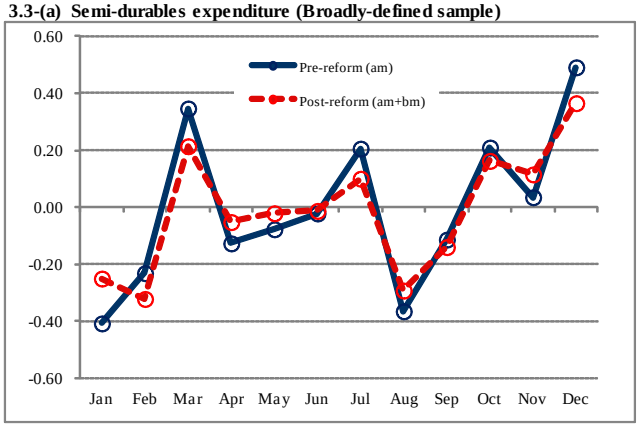
3.2-(a) Non-durables expenditure (Broadly-defined sample)



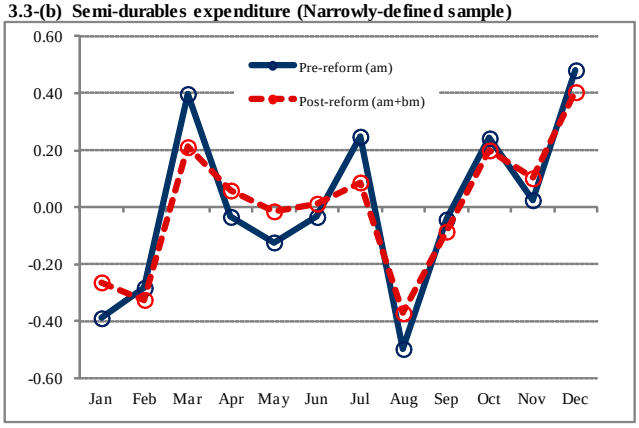
3.2-(b) Non-durables expenditure (Narrowly-defined sample)



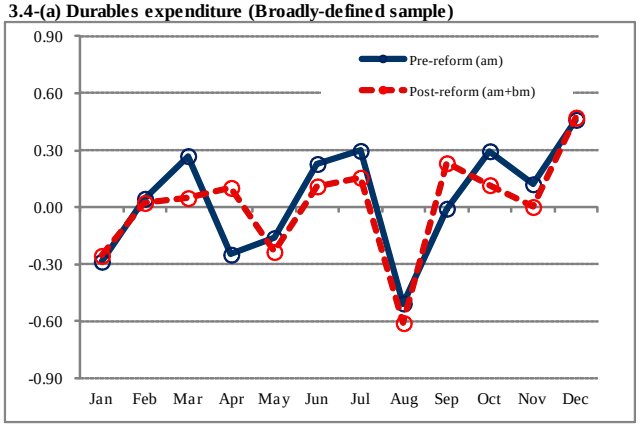
3.3-(a) Semi-durables expenditure (Broadly-defined sample)



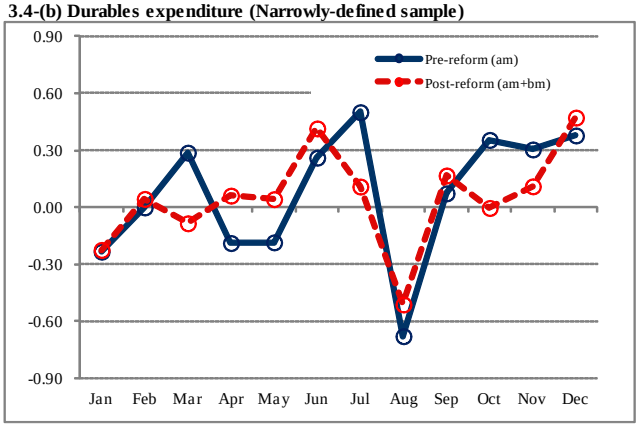
3.3-(b) Semi-durables expenditure (Narrowly-defined sample)



3.4-(a) Durables expenditure (Broadly-defined sample)



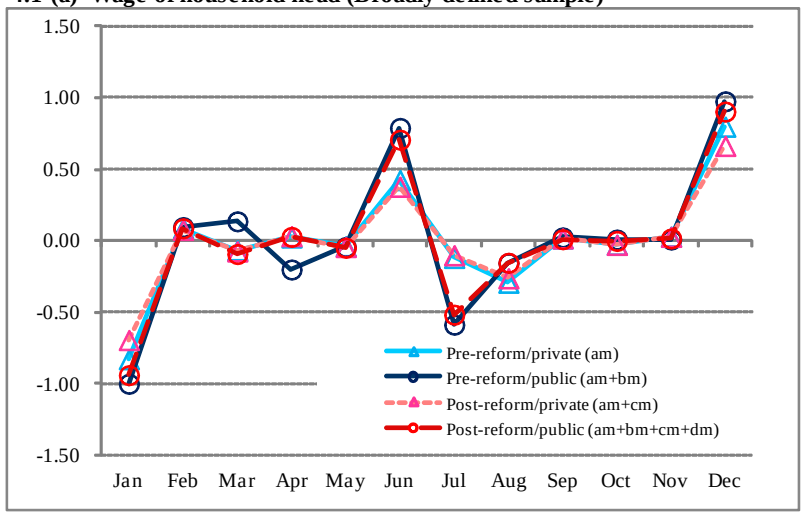
3.4-(b) Durables expenditure (Narrowly-defined sample)



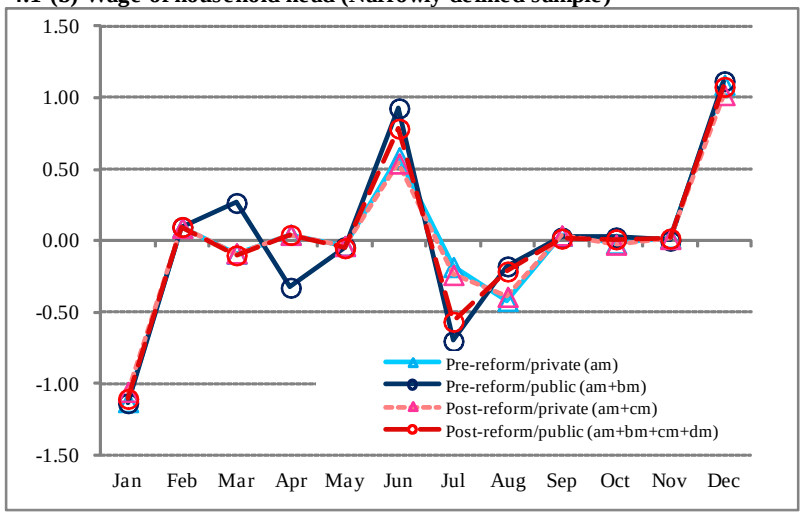
Note: See Table 4 for the estimated regression coefficients.

Figure 4. Month-on-month change in income: Households of office workers at large private sector firms vs. Public employee households
Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

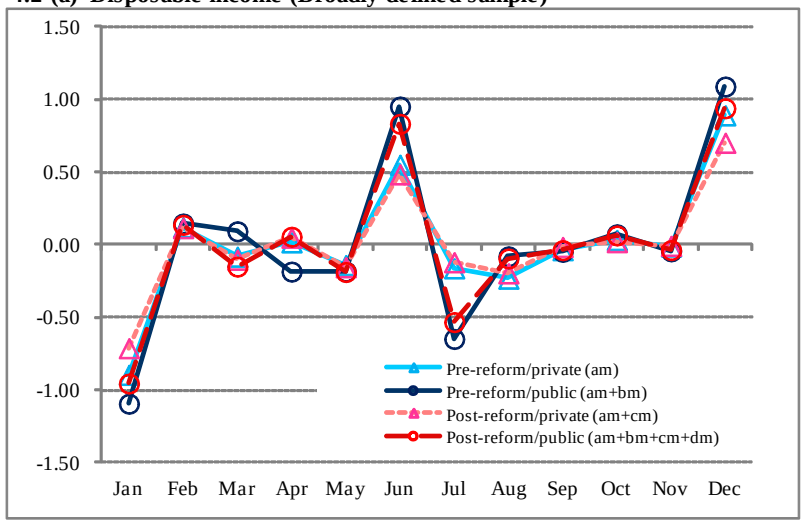
4.1-(a) Wage of household head (Broadly-defined sample)



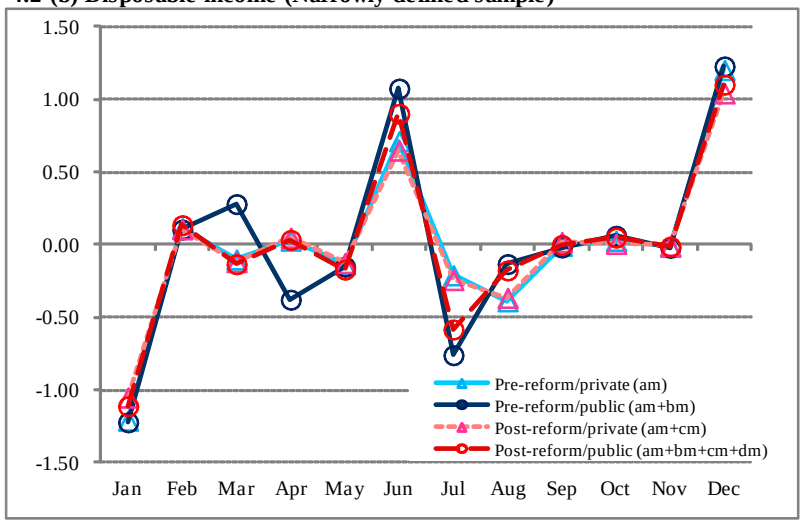
4.1-(b) Wage of household head (Narrowly-defined sample)



4.2-(a) Disposable income (Broadly-defined sample)



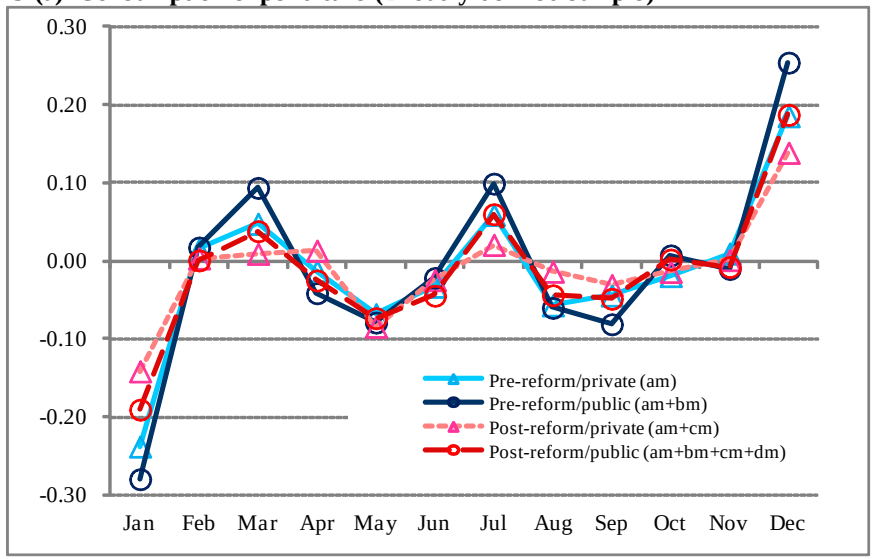
4.2-(b) Disposable income (Narrowly-defined sample)



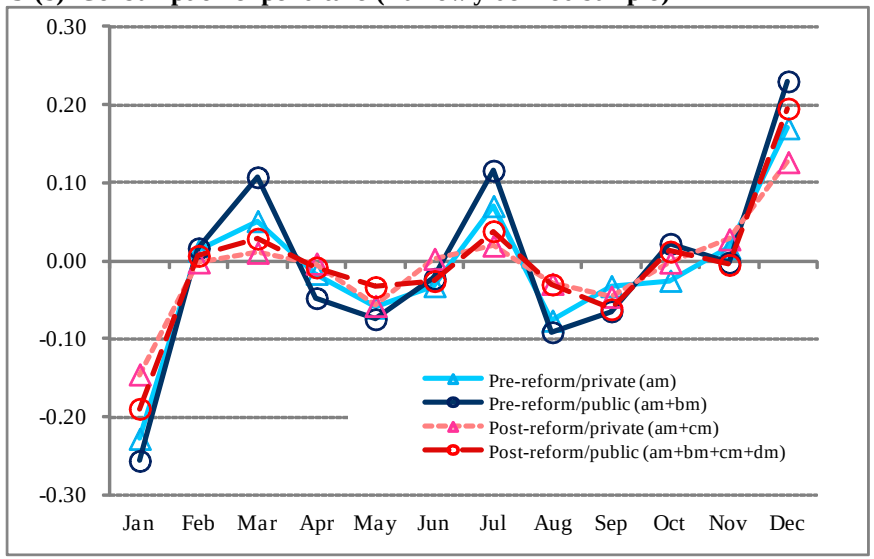
Note: See Table 5 for the estimated regression coefficients.

Figure 5. Month-on-month change in household expenditure: Households of office workers at large private sector firms vs. Public employee households
Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

5-(a) Consumption expenditure (Broadly-defined sample)



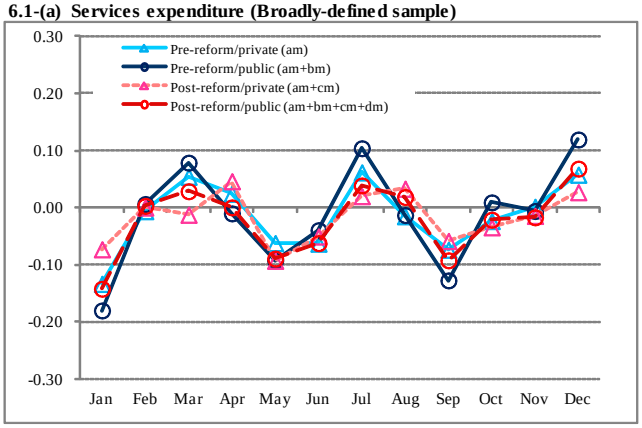
5-(b) Consumption expenditure (Narrowly-defined sample)



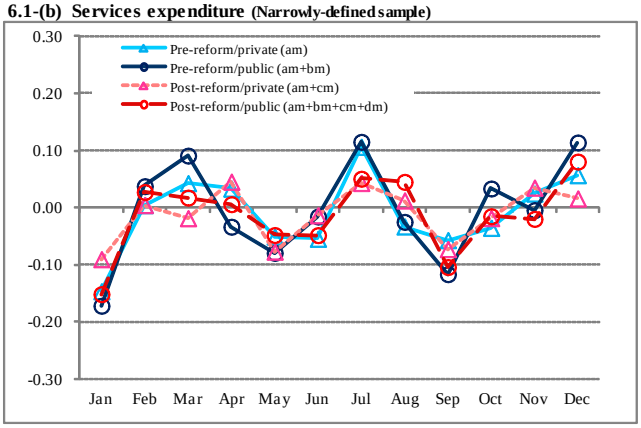
Note: See Table 5 for the estimated regression coefficients.

Figure 6. Monthly-on-month change in expenditure by component: Households of office workers at large private sector firms vs. Public employee households
Pre-reform (1997/07-2002/06) vs. Post-reform (2003/07-2008/06)

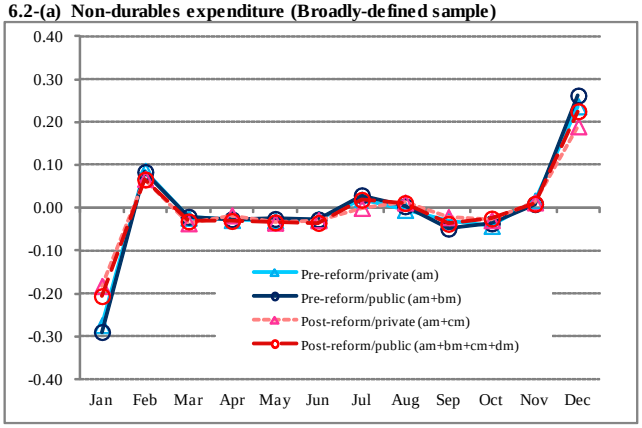
6.1-(a) Services expenditure (Broadly-defined sample)



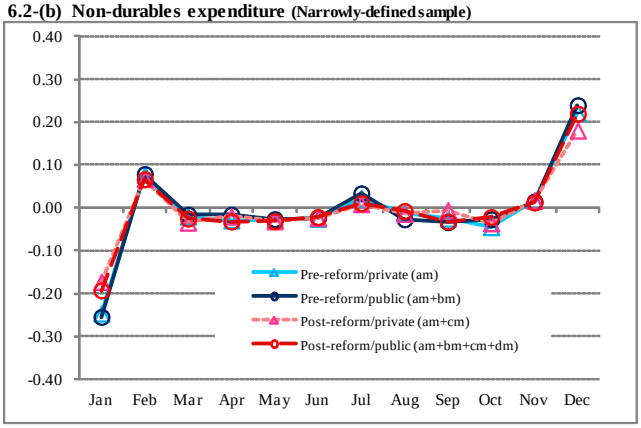
6.1-(b) Services expenditure (Narrowly-defined sample)



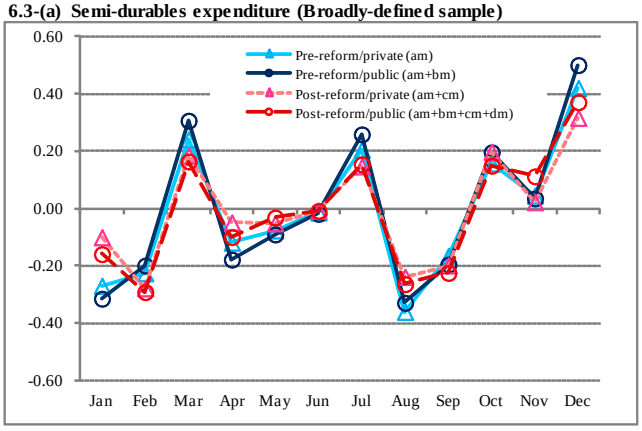
6.2-(a) Non-durables expenditure (Broadly-defined sample)



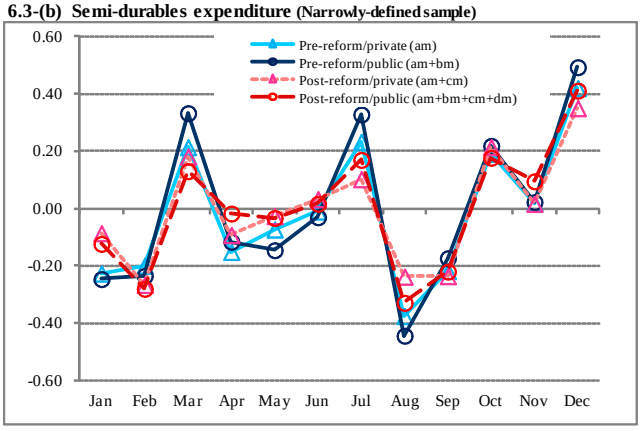
6.2-(b) Non-durables expenditure (Narrowly-defined sample)



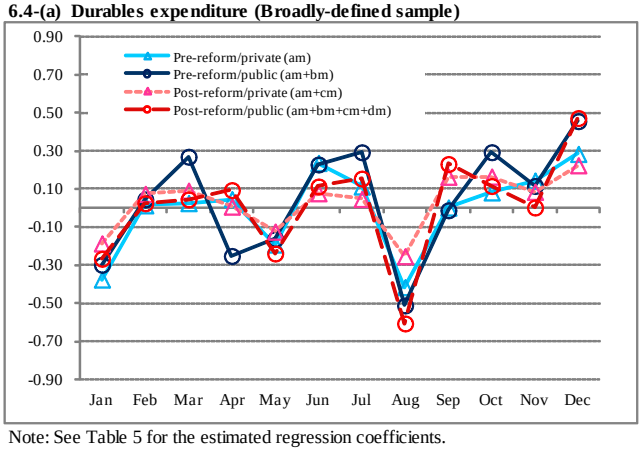
6.3-(a) Semi-durables expenditure (Broadly-defined sample)



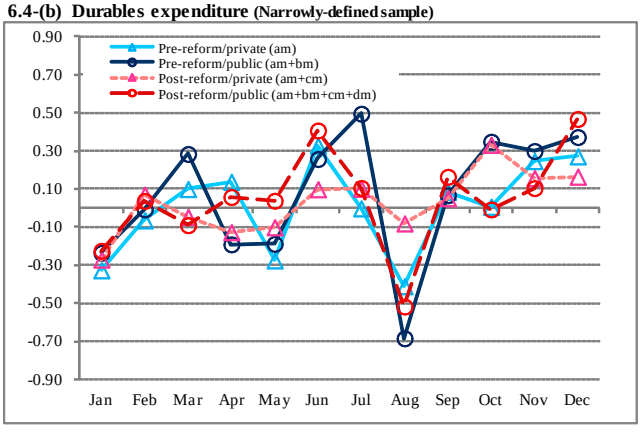
6.3-(b) Semi-durables expenditure (Narrowly-defined sample)



6.4-(a) Durables expenditure (Broadly-defined sample)



6.4-(b) Durables expenditure (Narrowly-defined sample)



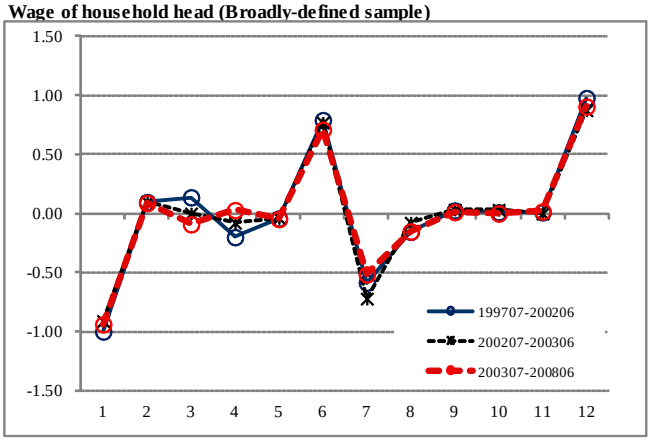
Note: See Table 5 for the estimated regression coefficients.

Appendix 1. Month-on-month change in income/expenditure for public employee households during the phase-out period

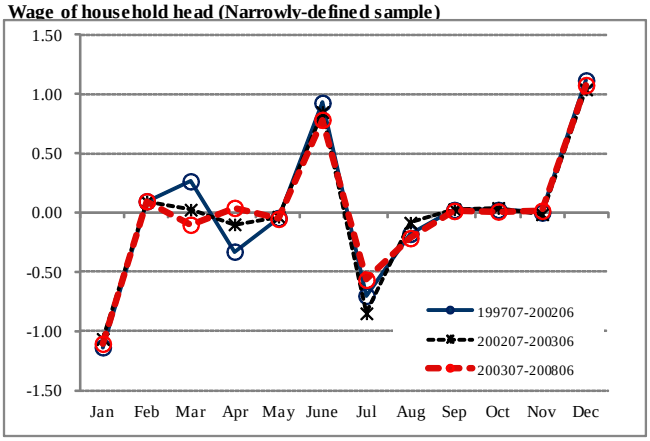
Pre-reform (1997/07-2002/06) vs. Phase-out (2002/07-2003/06) vs. Post-reform (2003/07-2008/06)

We omitted observations during the phase-out period (between July 2002 and June 2003) from our analyses in the main text, as including the phase-out period, when the abolition of the March bonus was announced as a news, would obscure the point of our study on the effect of an anticipated income change. For readers interested in what happened in the phase-out period this appendix compares the pattern during the phase-out period with those of pre-reform and post-reform periods.

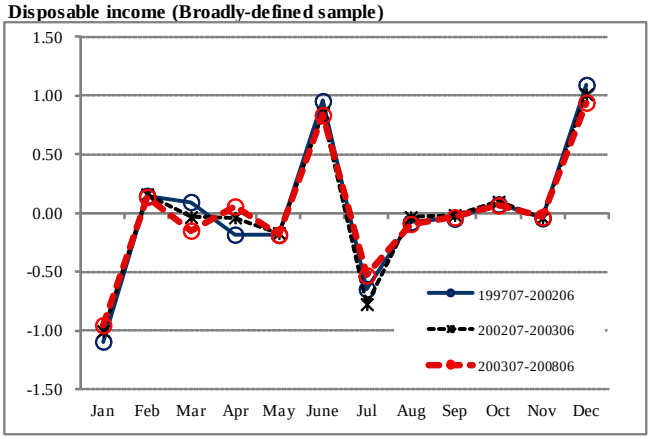
Wage of household head (Broadly-defined sample)



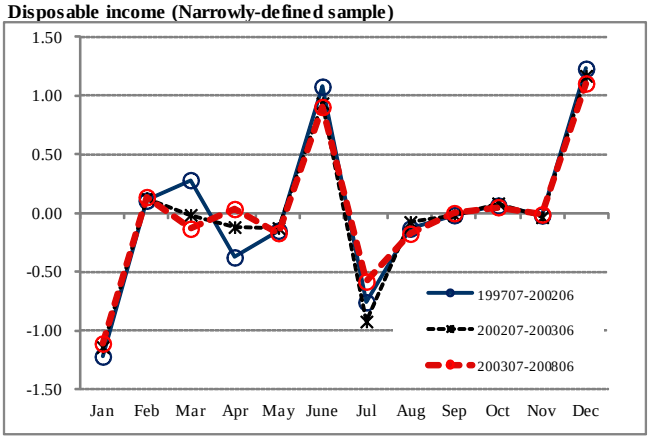
Wage of household head (Narrowly-defined sample)



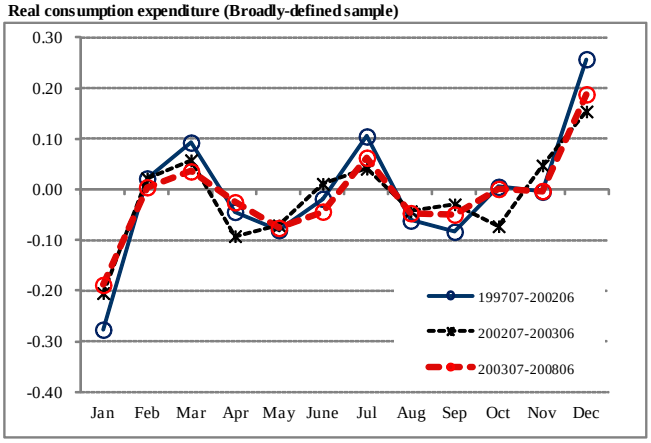
Disposable income (Broadly-defined sample)



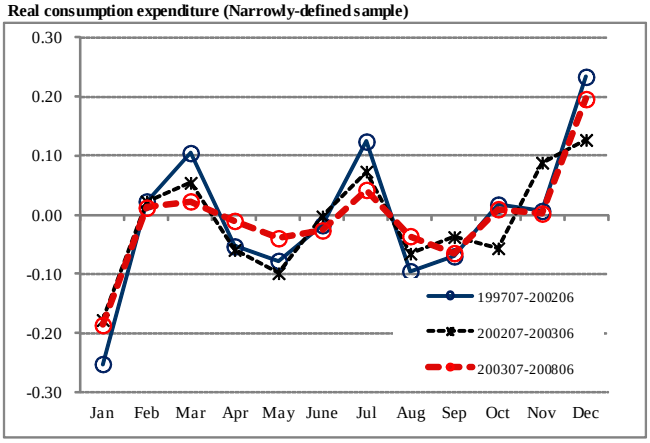
Disposable income (Narrowly-defined sample)



Real consumption expenditure (Broadly-defined sample)



Real consumption expenditure (Narrowly-defined sample)



Appendix 2. Classification of expenditure categories

The classification of expenditure categories in this study follows that used by the Ministry of Internal Affairs and Communications (various years) in the published tabulations of the FIES.

Durables: household durables, automobiles, communication equipment, and recreational durable goods.

Semi-durables: clothing, footwear, sporting goods, video games, computer hardware and software, and books.

Non-durables: food (except eating out), fuel, light, and water charges, medicines, film, plants and gardening goods, and tobacco.

Services: eating out, rent for housing, medical expenses, public transportation, communication (except communication equipment), education (except school textbooks and reference books), recreational services and personal care services.

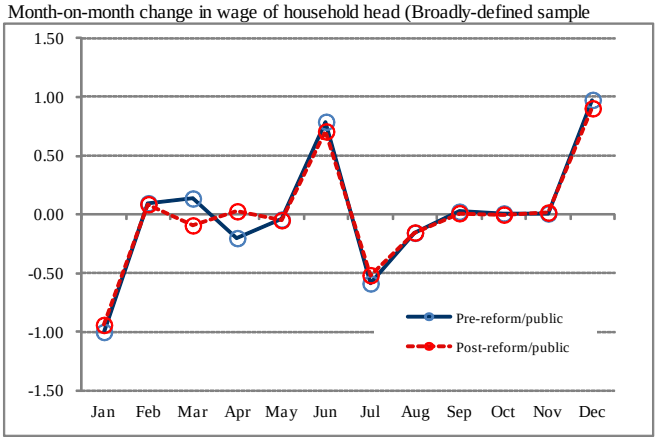
Appendix 3. Sample average based seasonal patterns of income and expenditures

Pre-reform (199707-200206) vs. Post-reform (200307-200806)

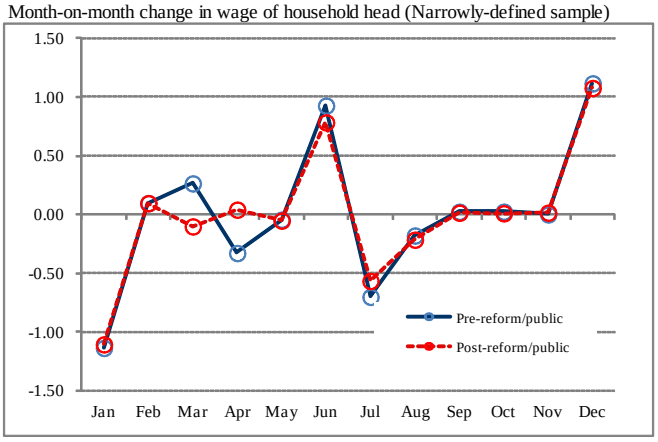
All figures reported in the main text are based on the regression results, which imposes some artificial restrictions. To confirm that the findings of this paper result from those artificial restrictions, this appendix reports similar month-on-month change figures based on simple sample average.

(a) Public worker households

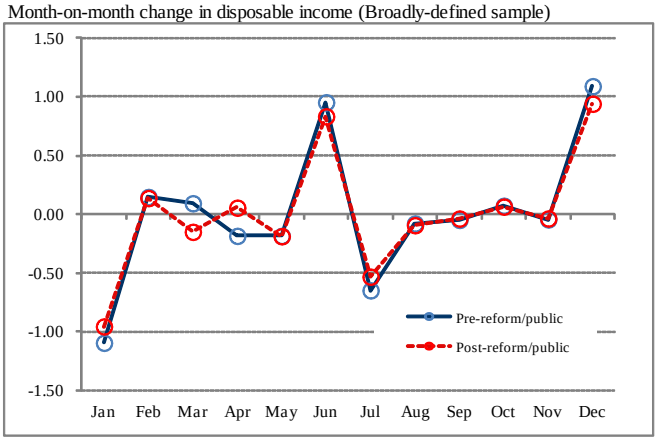
Month-on-month change in wage of household head (Broadly-defined sample



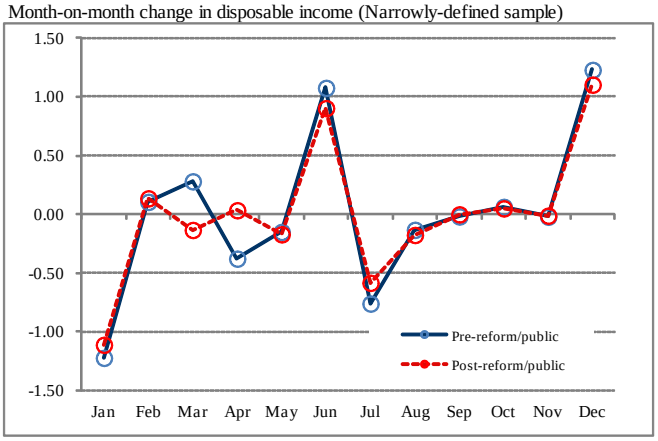
Month-on-month change in wage of household head (Narrowly-defined sample)



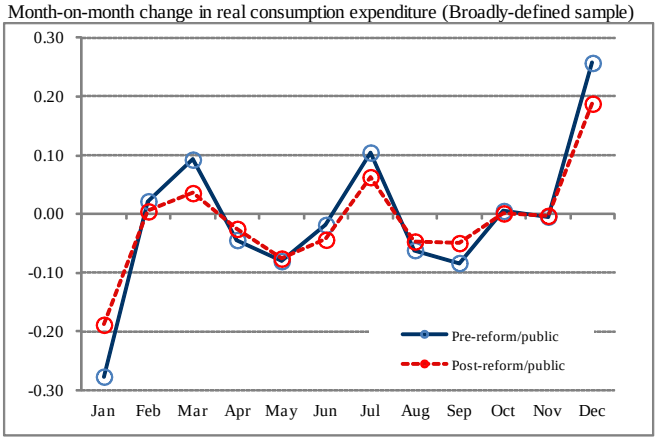
Month-on-month change in disposable income (Broadly-defined sample)



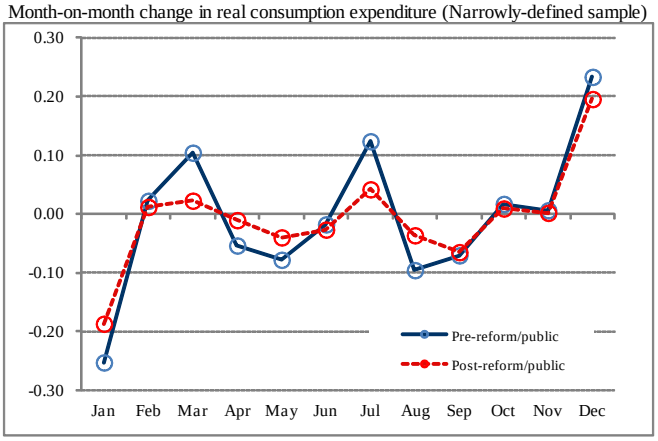
Month-on-month change in disposable income (Narrowly-defined sample)



Month-on-month change in real consumption expenditure (Broadly-defined sample)



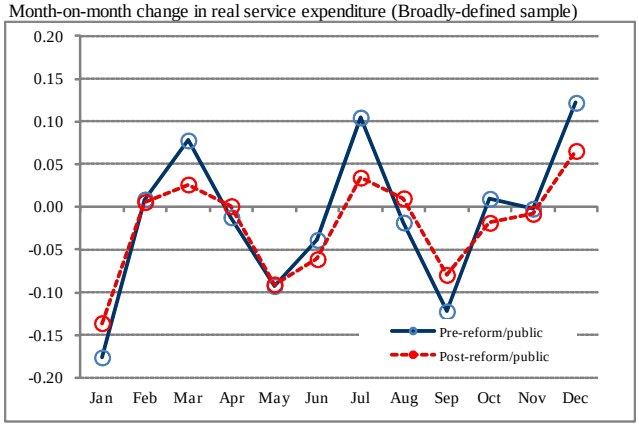
Month-on-month change in real consumption expenditure (Narrowly-defined sample)



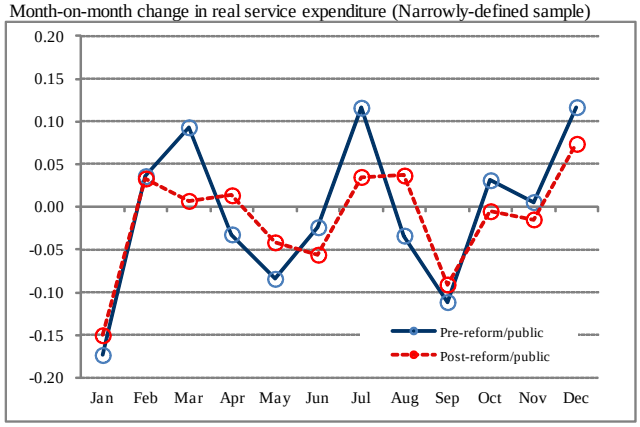
Appendix 3. Sample average based seasonal patterns of income and expenditures (continued)

(a) Public worker households (continued)

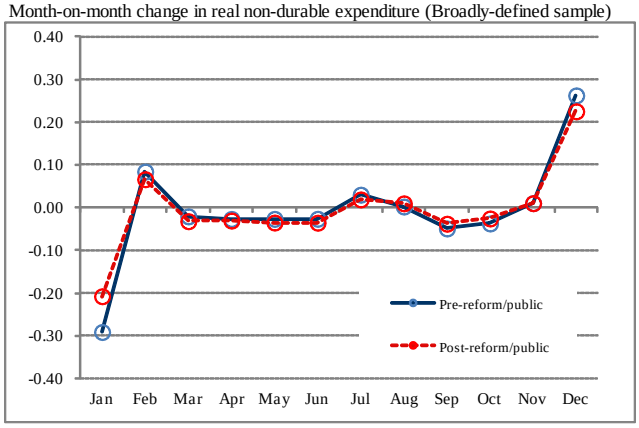
Month-on-month change in real service expenditure (Broadly-defined sample)



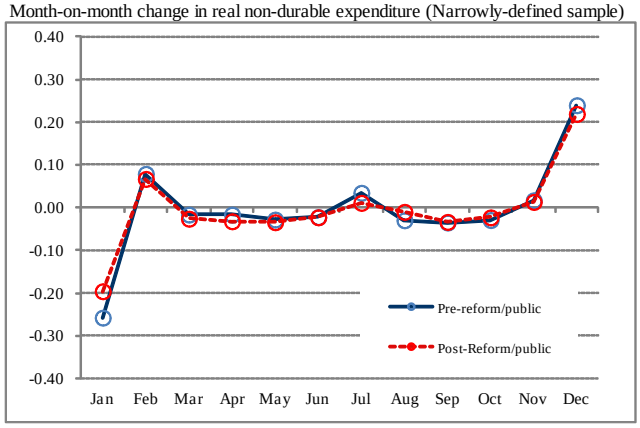
Month-on-month change in real service expenditure (Narrowly-defined sample)



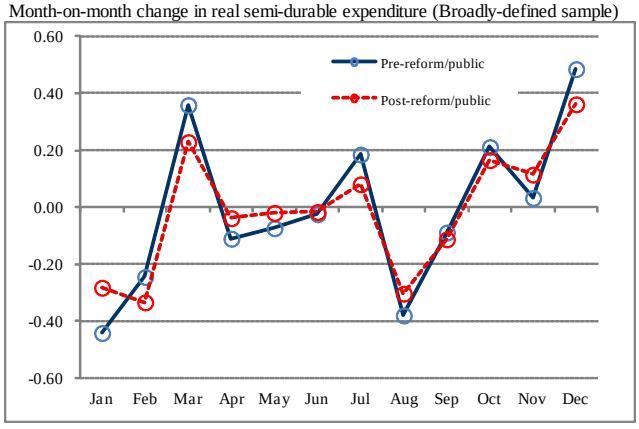
Month-on-month change in real non-durable expenditure (Broadly-defined sample)



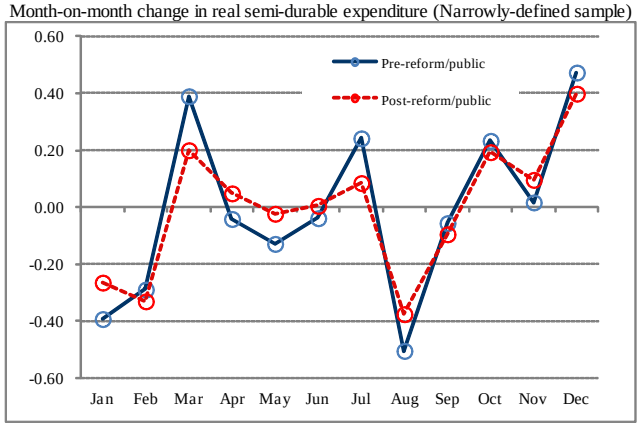
Month-on-month change in real non-durable expenditure (Narrowly-defined sample)



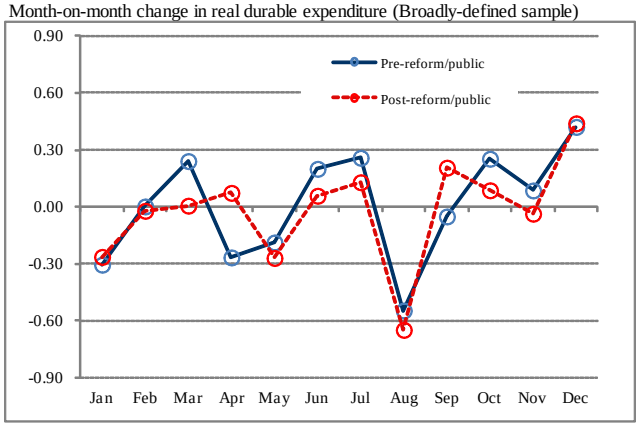
Month-on-month change in real semi-durable expenditure (Broadly-defined sample)



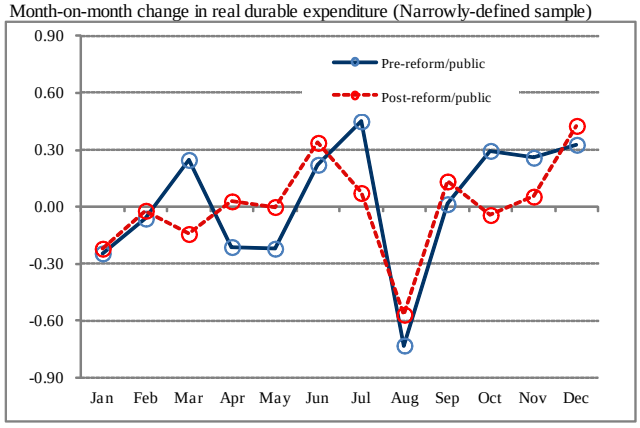
Month-on-month change in real semi-durable expenditure (Narrowly-defined sample)



Month-on-month change in real durable expenditure (Broadly-defined sample)



Month-on-month change in real durable expenditure (Narrowly-defined sample)

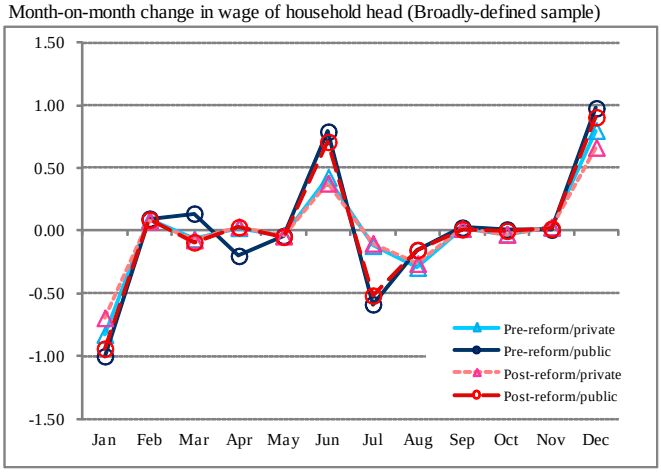


Appendix 3. Sample average based seasonal patterns of income and expenditures (continued)

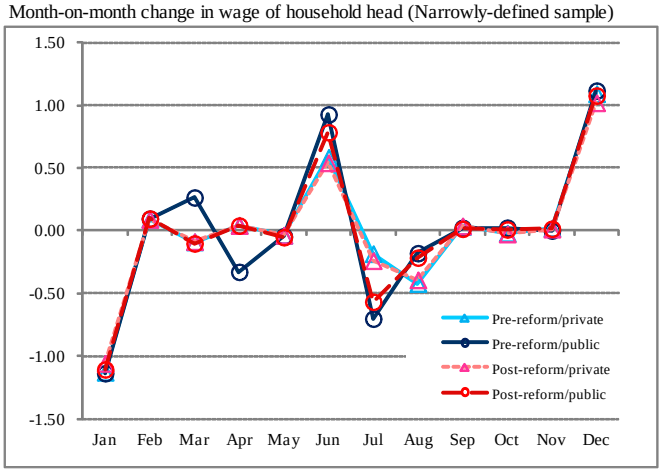
Pre-reform (199707-200206) vs. Post-reform (200307-200806)

(b) Private & large firm office worker households vs. Public worker households

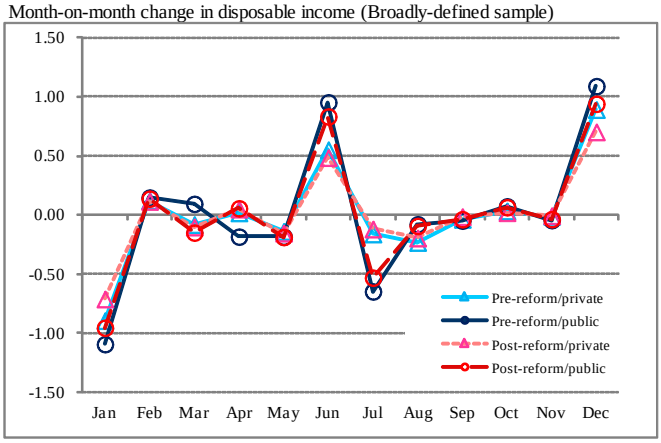
Month-on-month change in wage of household head (Broadly-defined sample)



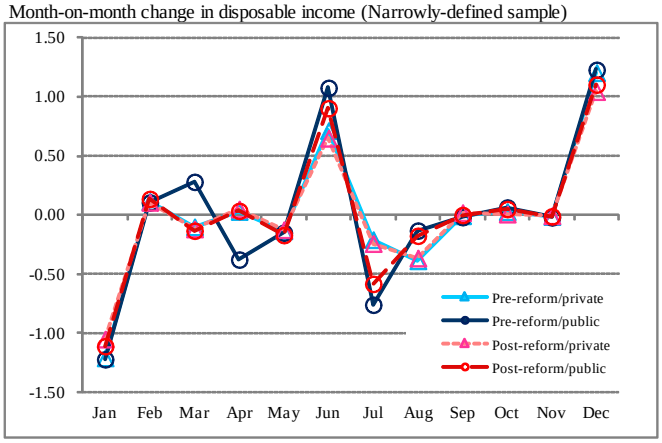
Month-on-month change in wage of household head (Narrowly-defined sample)



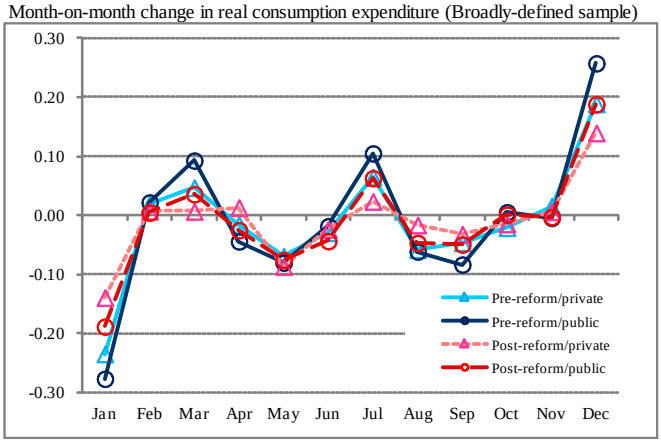
Month-on-month change in disposable income (Broadly-defined sample)



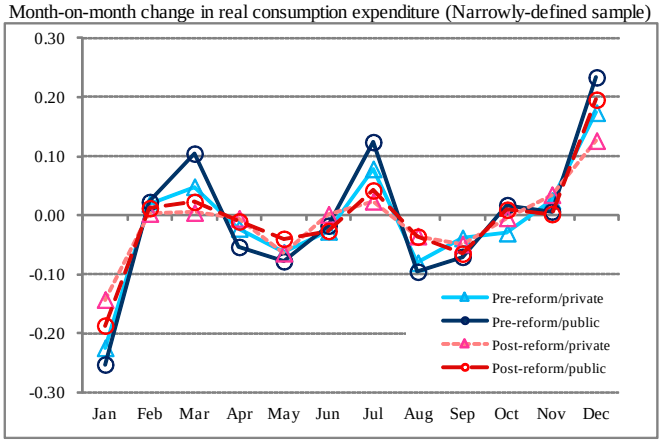
Month-on-month change in disposable income (Narrowly-defined sample)



Month-on-month change in real consumption expenditure (Broadly-defined sample)



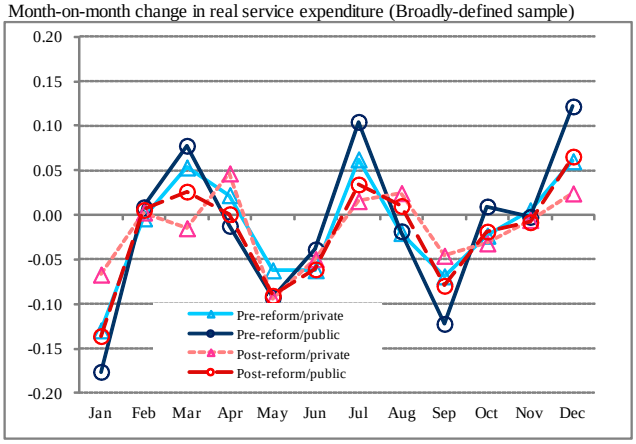
Month-on-month change in real consumption expenditure (Narrowly-defined sample)



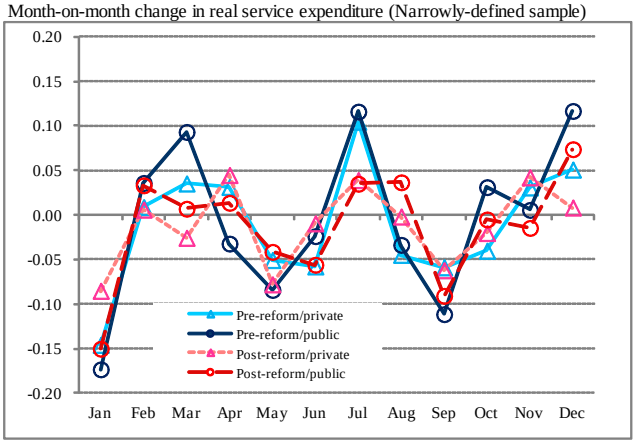
Appendix 3. Sample average based seasonal patterns of income and expenditures (continued)

(b) Private & large firm office worker households vs. Public worker households (continued)

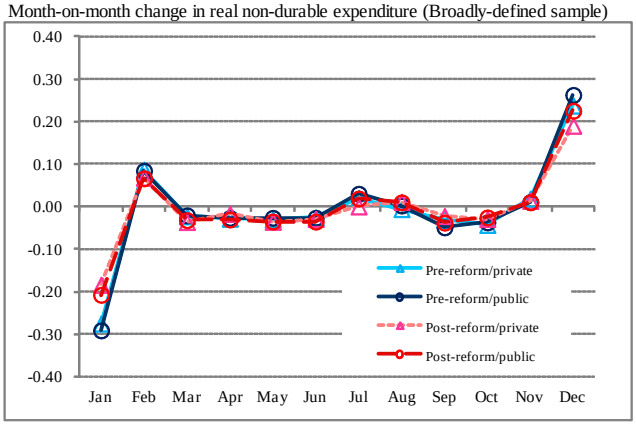
Month-on-month change in real service expenditure (Broadly-defined sample)



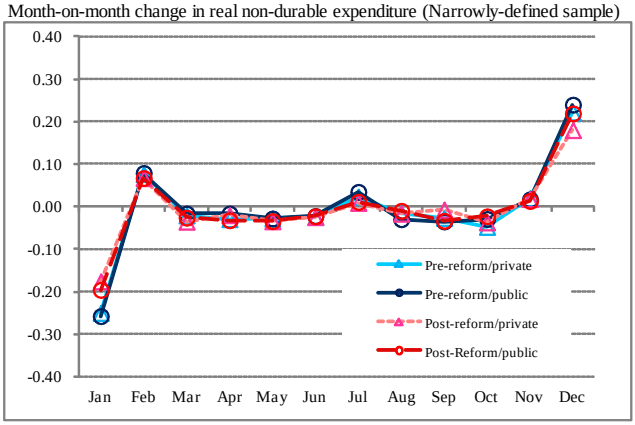
Month-on-month change in real service expenditure (Narrowly-defined sample)



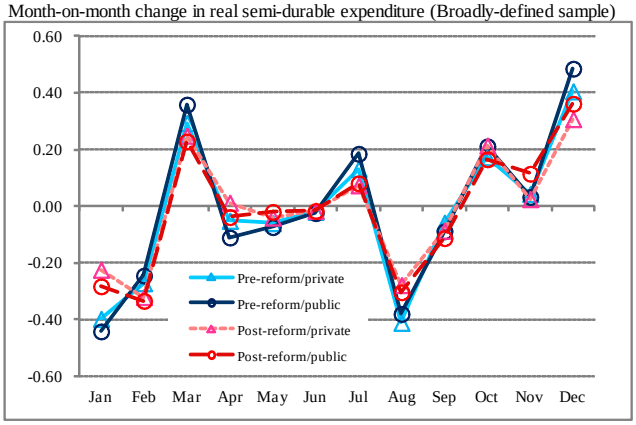
Month-on-month change in real non-durable expenditure (Broadly-defined sample)



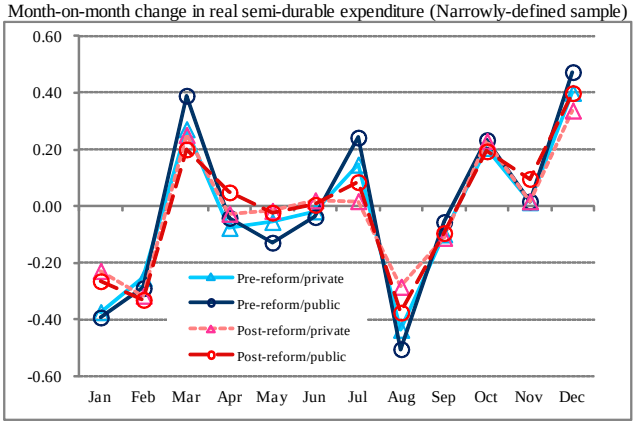
Month-on-month change in real non-durable expenditure (Narrowly-defined sample)



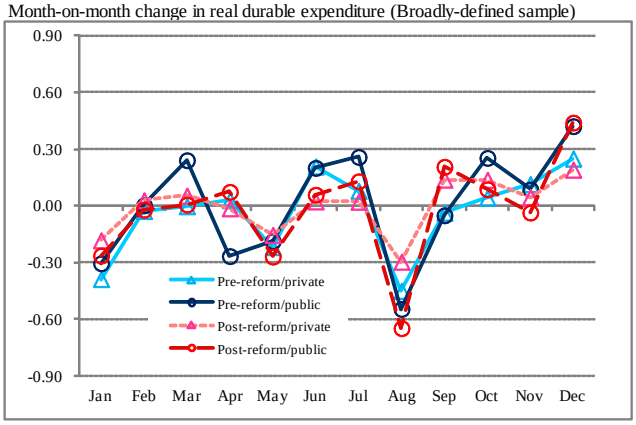
Month-on-month change in real semi-durable expenditure (Broadly-defined sample)



Month-on-month change in real semi-durable expenditure (Narrowly-defined sample)



Month-on-month change in real durable expenditure (Broadly-defined sample)



Month-on-month change in real durable expenditure (Narrowly-defined sample)