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Thorough analysis of consumption tax hike countermeasures; estimate of effects of rising crude oil price

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Summary

- **Thorough analysis of consumption tax hike countermeasures and their effects:** The consumption tax rate will be raised from the current 8% to 10% on October 1. In this report we examine the consumption tax increase and the content of countermeasures, while at the same time taking a comprehensive look at the consumption behavior of households as of this point in time, and examining the effects which the Japanese economy is likely to undergo after October.

- First we examine the income effect in relation to the tax hike. A portion of household burden associated with the tax hike will be offset by the introduction of a reduced tax rate and social security enhancement measures such as free education. As a result, the net fiscal austerity effect is expected to be approximately Y2 tril less than the last time the consumption tax was raised (approximately Y8 tril). The negative income effect is expected to be resolved by various countermeasures, but the effect of these measures will gradually disappear through FY2020, giving way to the lingering effect of intermittent restraints on consumption.

- The substitution effect associated with the tax hike shows a good possibility of being limited in comparison to the last time the consumption tax was raised. However, last-minute shipping has been generated in anticipation of last minute demand. Last-minute shipping in industries including motor vehicles, consumer electronics, pulp, paper & paper products, and chemicals has been especially conspicuous, as well as housing (measured in housing starts). It should be noted that it is highly likely the effect this has on increasing growth will disappear after the tax hike and move into a reactionary decline.

- **Estimating the effects of the rising price of crude oil:** The situation in the Middle East has become increasingly uncertain after the drone attacks on two Saudi Arabian oil facilities which account for half of that country's oil production capacity. There are now fears of tightening oil supplies worldwide. In response to this situation, the WTI price of crude oil has gone from the low 50s (USD/bbl.) to over 60 USD/bbl. at this time. In this report we estimate the effects of a 10 USD/bbl. rise in the WTI price of crude oil.

- Using an industrial input-output table we estimated the effects on corporate business results. Our results show downward pressure of 0.8 trillion yen on operating surplus on an all industry basis. Looking at results by industry, we see downward pressure of 0.2 trillion yen on the manufacturing industry and 0.6 trillion yen on non-manufacturing. Next we used a macro model to estimate the effects on the Japanese economy overall. Our result shows downward pressure of 0.11% on real GDP and 0.48% on nominal GDP.

1. Thorough analysis of consumption tax hike countermeasures and their effects

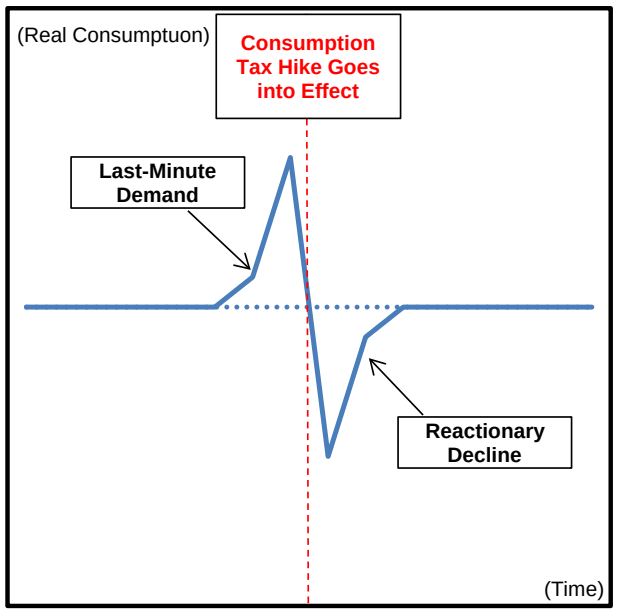
The consumption tax rate will be raised from the current 8% to 10% on October 1. This time around a variety of countermeasures will be implemented in association with the tax hike, in addition to the introduction of a reduced tax rate and free education. Hence many outlooks expect the effects on consumption and the overall economy after October to be limited. On the other hand, being the fact that the downturn in consumption was more severe than expected after the last time the consumption tax was increased in April 2014, doubts have not been completely done away with.

In this report we examine the consumption tax increase and the content of countermeasures, while at the same time taking a comprehensive look at the consumption behavior of households as of this point in time, and examining the effects which the Japanese economy is likely to undergo after October.

There are two ways in which a consumption tax hike influences household consumption

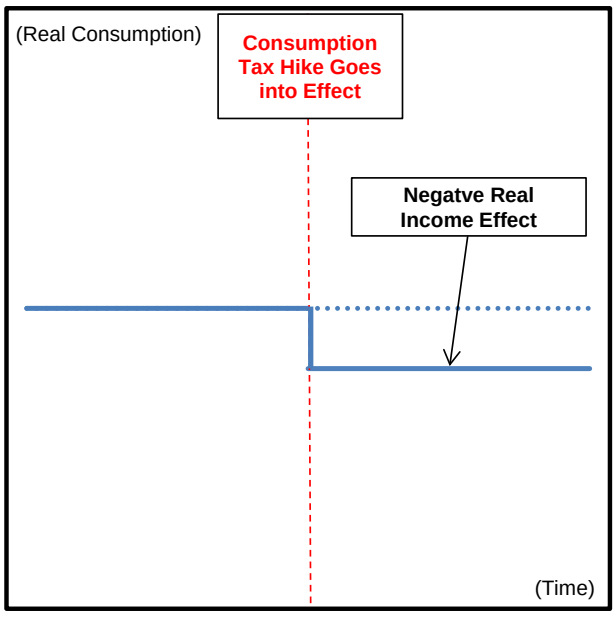
Before going into more detail, we should mention the major assumption behind our estimates. That is the fact that a consumption tax hike influences consumption via two effects – the substitution effect and the income effect. The substitution effect consists of last minute demand before the consumption tax hike and the reactionary decline occurring afterwards (Chart 1). Since last minute demand and reactionary decline are more or less equivalent, when all is averaged out in the end there is really not that much influence on household consumption. The component having intrinsic importance here is the income effect. Real income declines at the same rate that prices of various products rise as a result of the consumption tax hike. This causes a long-lasting inhibiting effect on consumption (Chart 2).

Substitution Effect Associated with Increase in Consumption Tax **Chart 1**



Source: Compiled by DIR.

Income Effect Associated with Increase in Consumption Tax **Chart 2**



Source: Compiled by DIR.

The income effect could inhibit consumption intermittently, even if by a small amount, but younger age groups stand to gain more in benefits

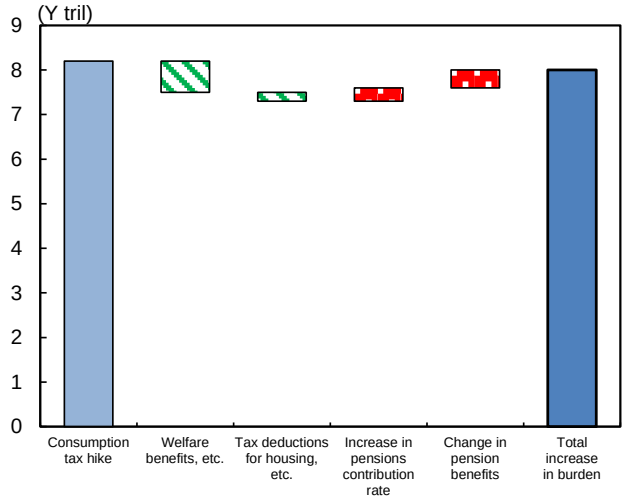
Growth in net household burden shows a major decline in comparison to the last tax hike

First of all, let's take a look at the concrete figures associated with the income effect. Quoting estimates of the Bank of Japan[1], the last time the consumption tax was raised in April 2014 (rate increased from 5% to 8%), household burden grew by 8.2 trillion yen. While the government did implement measures such as payment of benefits and a reduction of taxes on housing loans, but the effects of these measures were offset by the decision during the same fiscal year to increase the social security burden. The result was that household burden grew by approximately 8 trillion yen (Chart 3).

In comparison, the amount of increase in household burden this time around (consumption tax increase from 8% to 10% in October 2019), to quote an estimate by the Ministry of Finance[2], will be 5.7 trillion yen. In addition, the increase in financial burden associated with the securing of financial resources such as reviewing the tobacco tax and income tax is said to be at around 0.6 tril yen. The burden is offset somewhat by implementation of a reduced tax rate policy which reduces financial burden by around 1.1 tril yen, which is expected to bring the total amount of tax burden to around 5.2 tril yen. To this is added an expected 3.2 tril yen in increased benefits such as free early childhood education and social security enhancements. To sum it all up, the net reduction in Japan's budget (the fiscal austerity effect) is estimated to be at around 2.0 tril yen (Chart 4).

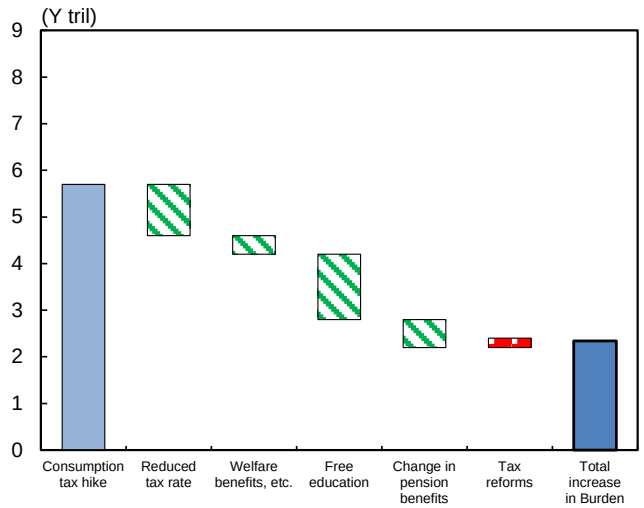
In addition to this, a variety of economic measures will also be implemented. Overall, the amount is expected to be at around 2.3 tril yen[3] – an amount which is larger than six months' worth of the fiscal austerity effect (Oct. 2019 – Mar 2020, approximately 1.0 tril yen). However, more than half of the consumption tax-hike countermeasures will go toward public investment in areas such as disaster prevention and reduction, and national resilience (a total of 1.35 tril yen) (Chart 5). Therefore, the emphasis is expected to be more on construction and related areas rather than on benefits going directly to households. But of course, the effects of the various consumption tax hike countermeasures will disappear after FY2020.

Household Burden (April 2014 Tax Hike) **Chart 3**



Source: Ministry of Finance, Ministry of Health, Labour and Welfare, Bank of Japan; Compiled by DIR.

Household Burden (October 2019 Tax Hike) **Chart 4**



Source: Ministry of Finance, Bank of Japan; Compiled by DIR.

[1] For details see Bank of Japan Outlook for Economic Activity and Prices, April 2018, pp. 41-42
http://www.boj.or.jp/en/mopo/outlook/gor1804b.pdf
[2] For details see Ministry of Finance Report on FY2019 budget,
https://www.mof.go.jp/english/budget/budget/fy2019/01.pdf
[3] Based on FY2019 budget. Note that FY2020 budget is not included here.

Negative income effect associated with consumption tax hike to inhibit consumption throughout FY2020

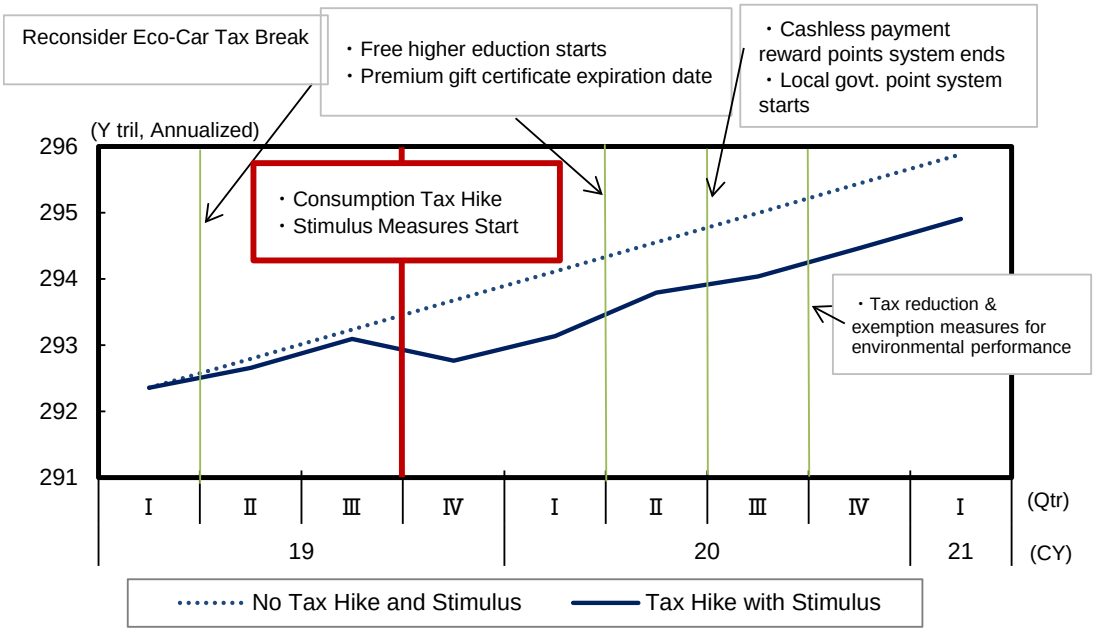
Meanwhile, the fact is that there is still the problem of the approximately 2 trillion yen negative income effect, which, though small in comparison to the last time the consumption tax was increased, will still bring Japan's overall consumption down by approximately 0.7%, while also pulling down GDP by approximately 0.4%. In light of the arguments presented in the previous section, a fairly large negative income effect will be generated in October 2019 accompanying the consumption tax hike, and as the effects of countermeasures gradually disappear throughout FY2020, consumption is expected to come under intermittent restraint (Chart 6).

Summary of Consumption Tax Hike Countermeasures **Chart 5**

Consumption Tax Hike Countermeasures		Description	Period	Scale (Yen Tril)
Auto Related	Tax Rate Cut for Environmental Tax	Tax rate to be reduced by 1% on motor vehicles including light-weight vehicles purchased for private use during the period.	For period of one year starting at time of tax hike (till Sept. 2020).	0.11
	Motor VehicleTax Cut	Reduction of tax rate on vehicles not including light-weight vehicles purchased during the period.	Permanent tax reduction starting at time of consumption tax hike.	
	Reduction of Eco-Car Tax Break (tax hike)	Reduction of tax break on acquisition tax. Review ratio of reduction of weight tax. Tax-free second car registration to be limited to electrical and hybrid vehicles.	Reduction of tax break on acquisition tax: Apr.-Sept. 2019.Reduction of tax break on weight tax: Starting in May 2019 (Permanent)	
Housing Related	Tax Reduction on Housing Loans	Write-off period extended on residences where move-in has taken place between Oct. 1, 2019 and end December 2020.	Current 10-year period extended to 13 years.	0.11
	Benefits for Housing Purchase "Sumai Kyu-fu kin"	Maximum benefit increased from current 300,000 yen to 500,000 yen. Annual income guideline increased from under 5.1 mil yen to under 7.75 mil yen.	Two years and three months from time of tax hike on current period (till end December 2021).	0.08
	Point Reward System for Promoting Innovative Housing	Points rewarded for remodeling projects oriented toward energy-saving, earthquake safety, barrier-free performance, and improvements for ease of housework and nursing care.	Start-time unknown as no information has appeared in news. Application period lasts through FY2019.	0.13
Point Rewards to Consumers via Small and Medium-sized Retail Businesses, etc.		Reward points for users of cashless payment will be 5% at small to middle-sized stores, and 2% at major chain-store franchises.	Period of 9-months starting at time of tax hike (till end June 2020).	0.28
Vouchers with premiums for Low-income and Child-rearing Households		Gift certificates worth 20,000 yen on shopping of up to a maximum of 25,000 yen available to low-income households and households with children age 0-2 who do not have to pay local tax.	Validity period of gift certificates is six months starting at time of tax hike (till end March 2020).	0.17
Local Shopping District Stimulus		Support provided to local shopping districts set up to effectively handle new demand source in inbound tourism.	FY2019	0.01
Public Investment		National land resilience countermeasures against natural disasters.	Implementation focuses on 3-year period beginning in FY2018.	1.35
Total				**2.24**

Source: Ministry of Finance, News Reports; compiled by DIR.
Notes: 1) Budget measures are total of FY2019 draft budget proposal. Tax measures are for tax reduction on a fiscal year basis, and on both a national and regional basis.
2) Scale of auto related measures is the net tax reduction amount after subtracting amount of tax increase due to reduction of Eco-Car tax break.

Effects of Consumption Tax Hike and Related Countermeasures on Consumption (Illustration) Chart 6



Source: Cabinet Office, News Reports; compiled by DIR.
Notes: 1) The effect of local government points is assumed to be the same as premium gift certificates.
2) Stimulus Measures associated with tax hike do not take last minute demand or reactionary decline into consideration.

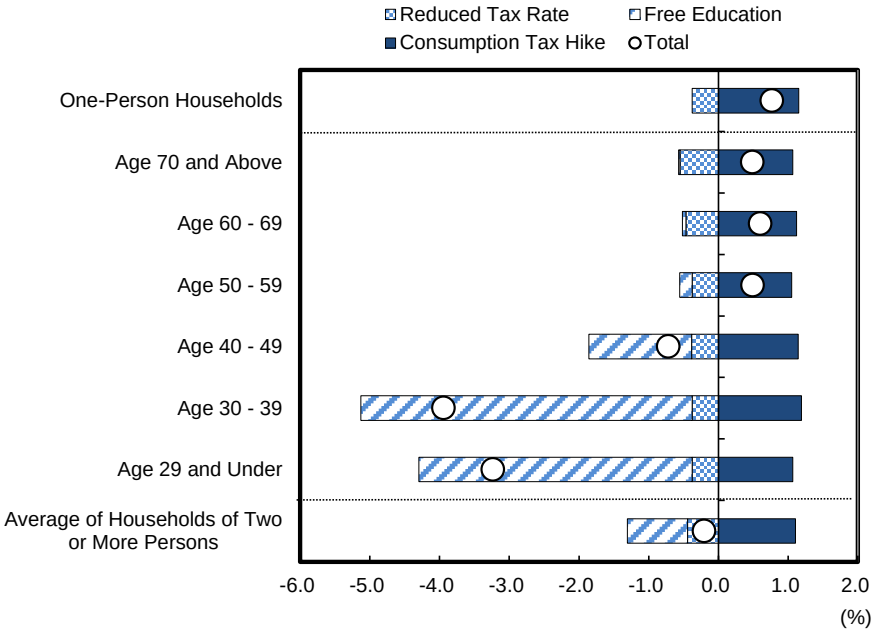
In balance between consumption tax hike and free education, some age groups will be winners, while others will lose out

As was mentioned previously, a negative impact remains for households overall, and consumption is expected to be somewhat inhibited on a macro basis throughout FY2020. However, when we examine the situation on a micro basis, we find that, depending on various factors, there are some households whose income will actually improve.

Chart 7 shows the results of calculating the extent to which household financial burden will differ based on age group in association with the factors at play – the increase in consumption tax, the reduced tax rate available to households, and free early childhood education (affecting only certain households). Data used is from household surveys, with overall rate of change used for consumption expenditure. In regard to early childhood education (for children age 0-2), only households with the local resident tax exemption are eligible, and there is a limit to support if the school is a private one or is unlicensed. The household survey lists two categories – early childhood education fees and childcare fees. The assumptions of our calculations assume that the consumption amount for these two categories is zero. This means that the results of these calculations are a bit on the high side, and therefore should be taken with a certain grain of salt.

The results of our calculations indicate that it would be households of two or more persons under the age of 49, in other words almost equivalent to the age group with children ages 3 to 5, that would benefit the most from free education and avoid overly much financial burden due to the tax increase. Of this general age range, it will be households consisting of two or more persons under age 29 and between ages 30 and 39 that will gain the most in benefits[4]. On the other hand, the age groups which will receive the least in benefits are households of two or more persons age 50 or more, and one-person households. In other words these latter two age groups and types of households will experience increased financial burden.

Effects of Consumption Tax Hike and Free Education by Age Group (rate of change used for consumption expenditure) **Chart 7**

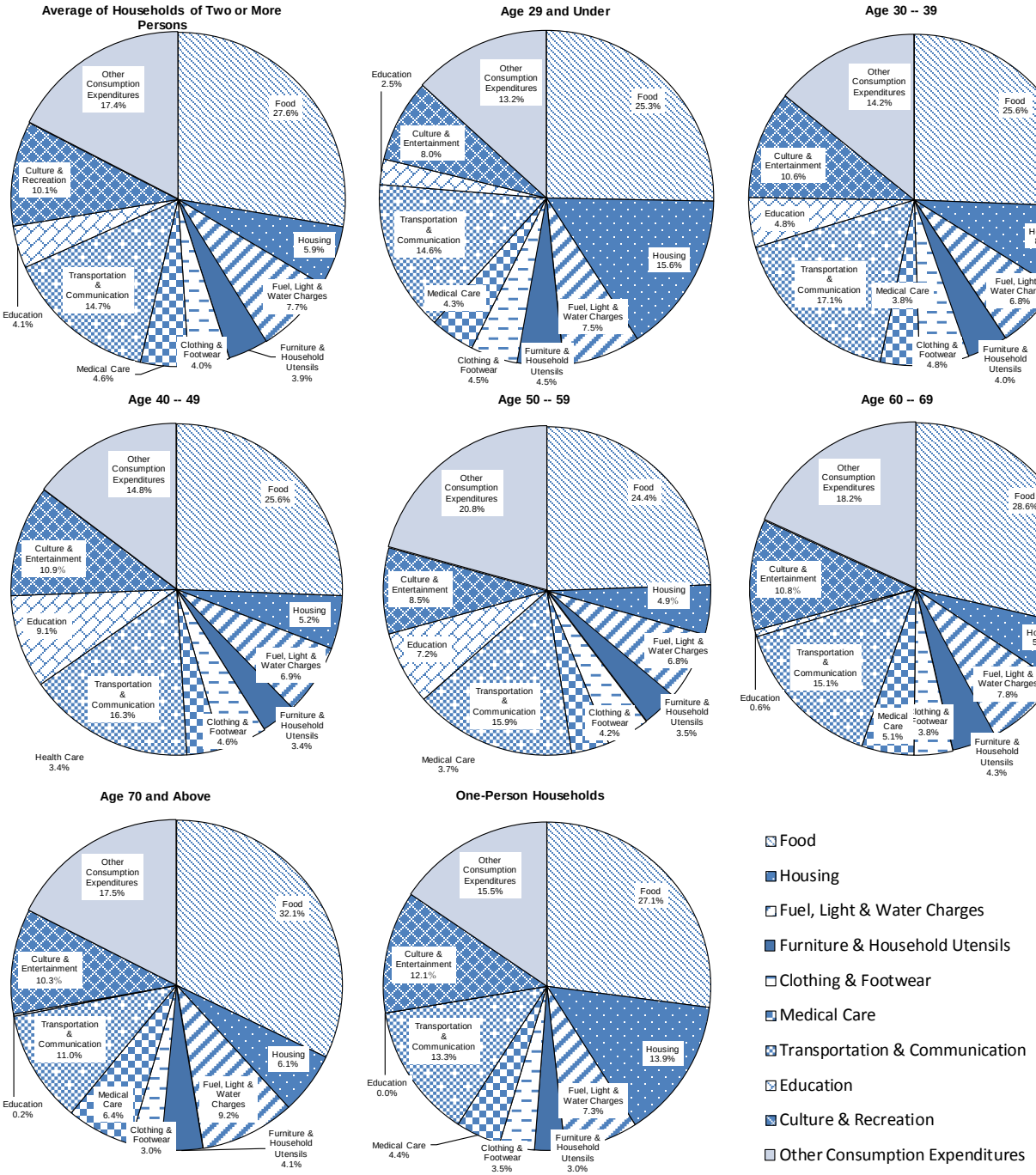


Source: Ministry of Internal Affairs and Communications; compiled by DIR.
Note: Data from 2018.

[4] In addition, low-income households are eligible for free higher education. There are also vouchers with premiums for low-income households and households with children ages 0 to 2. These households will be eligible for even larger benefits. Meanwhile, there is also support for people purchasing autos or houses, and one should not ignore the point system for use of cashless payment (see Chart 5).

The wide variation between age groups can also be seen in consumer trends by product category. Looking at consumer trends by age group as shown in Chart 8, we see that housing and transportation & communication expenses carry larger weight in consumption expenditure for households of two or more persons age 29 and under, and age 30-39. Consumption in particular areas such as this suggests that activity may remain relatively favorable in comparison to what we find in the overall macro figures, even after the consumption tax is raised[5].

Consumption by Age Group and Expense Item **Chart 8**



Source: Ministry of Internal Affairs and Communications; compiled by DIR.
Note: Data from 2018.

[5] There is of course a limit to arguments of this sort. First of all, as long as the overall macro figure, which includes all age groups, indicates that the effects of the increase in consumption tax are large, expense items such as housing and transportation & communication expenses cannot avoid negative influence insofar as the overall macro figure is an absolute one. Moreover, the argument that really should be made here is the question of marginal consumption expenditure for these particular age groups. In other words, in what areas will they increase their consumption in the case that their real income experiences growth? However, due to data constraints, this report is forced to rely on where the weight of average consumption expenditure falls.

The substitution effect: The decline in sales will be minor, but caution is advised regarding reactionary decline in shipments and production

We can summarize the results of the previous section's arguments on the negative income effect in three major points: (1) The income effect on a macro basis associated with this year's consumption tax hike is over 2 trillion yen, or about 1/4 what it was after the previous tax hike, (2) This effect will be mitigated to a point by various countermeasures, but the effects of these measures will gradually disappear during the course of FY2020, after which consumption will come under intermittent restraint, and (3) Looking at the effects of the tax hike and countermeasures by age group, we find that younger households may likely gain more benefits, such as free education, making them able to avoid the negative effects of the tax hike.

On the other hand, there is also the substitution effect which must now be examined.

Fluctuations in demand will be smaller than during last tax hike. We expect to see two patterns depending on both the timing and the item.

Deductive reasoning suggests that there is a good possibility that the last minute demand and reactionary decline effect will be limited in comparison to the last time the consumption tax was raised. First of all, the last time the consumption tax was raised, it was initially expected that there would be an increase of 5%pt (5% to 10%). It was on this assumption that last minute demand was generated. Ultimately the tax was raised to only 8%, and this time around it will be raised by only 2%pt (8% to 10%). This may be partially contributing to the more muted demand this time around. Plus stock still remains in both the areas of housing and durable goods, which attracted many purchases five years ago.

In addition, there are a variety of countermeasures being put in place to prepare for this year's consumption tax hike, meaning that in some cases, more savings can be obtained after the consumption tax is raised than before. Examples include housing purchases making use of the major tax reduction on housing loans, the purchase of automobiles with high environmental performance, and reward points for using cashless payment at small to middle-sized retail outlets. There will likely be a split between those goods which attract last minute demand up to the point at which the consumption tax is raised, and those goods which consumers delay purchasing until after the tax is raised, meaning that demand increases after the tax hike.

Last-minute demand cannot be detected using sales statistics alone

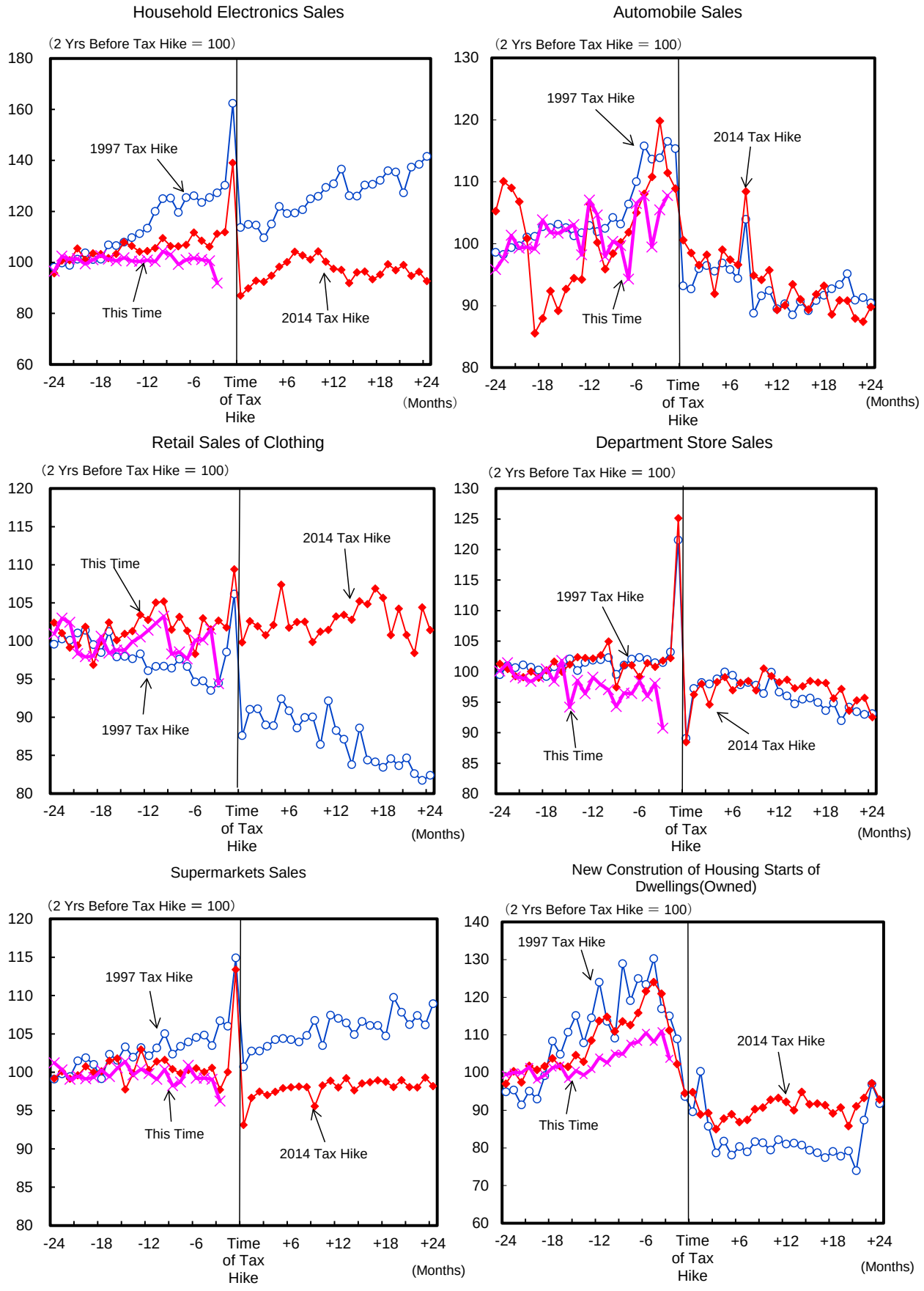
For reference we now take a look at the current figures for last minute demand. As is shown in Chart 9, at the time of the last consumption tax hike in April 2014, as well as the time before that (April 1997), last-minute demand began to appear in sales of consumer electronics and clothing at department stores and supermarkets around one or two months before the tax hike was implemented. This time around, last-minute demand has not yet been observed in statistics available as of July. Looking at the case of automobile sales the last time the consumption tax was increased, as well as the time before that, last-minute demand was seen one to two quarters before tax hike went into effect. However, this time around the government plans "levelling measures" being that the tax increase (or reduction of tax reduction measure) is to occur after April 2019 (see Chart 5). Signs of last-minute demand are small in comparison to the last time the consumption tax was raised.

Unambiguous signs of last-minute demand in housing. However, it is limited compared to last two times the consumption tax was raised

On the other hand, unambiguous signs of last-minute demand have been detected in housing (Chart 9). A variety of housing purchase support measures will be implemented after the consumption tax is raised, but there are many cases in which 2% in consumption tax savings is more than is provided by government assistance. However, the scope of last-minute demand is limited in comparison to the last

two times the tax was raised. The various measures being provided by the government may be leveling out the extent of that demand, but in addition to this factor, it appears that households which had been considering the purchase of a new home in the near future the last time the consumption tax was raised purchased their home at that time, and hence have already experienced a round of last minute demand.

Change in Demand for Items Subject to Tax Increase (Comparison of Past Two Tax Hikes) Chart 9



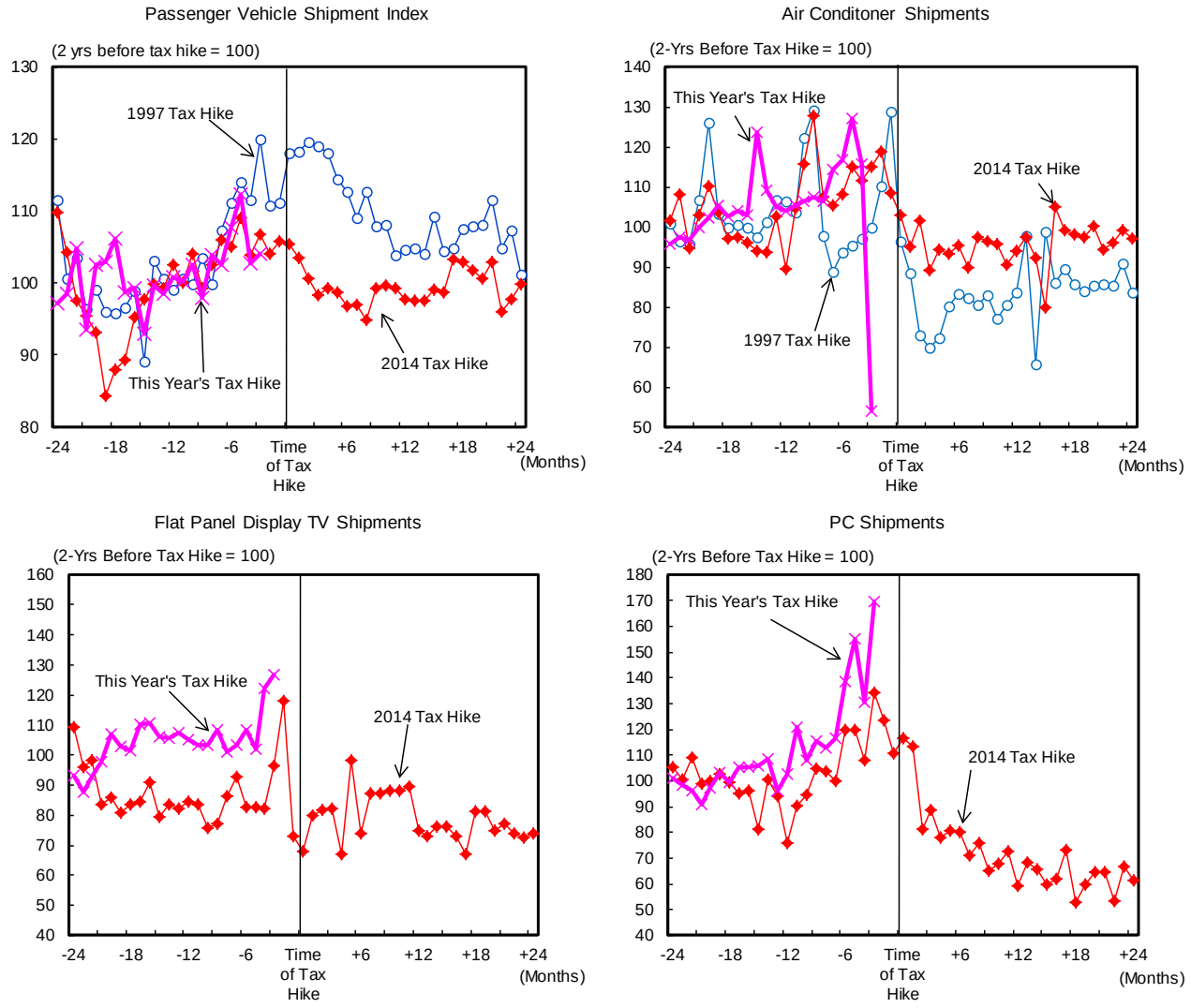
Source: Japan Automobile Dealers Association, Ministry of Economy, Trade and Industry, Ministry of Internal Affairs and Communications, Ministry of Land, Infrastructure, Transport and Tourism; compiled by DIR.
Note: Seasonally adjusted. Seasonal adjustment of new car sales volume by DIR. Other items are real value obtained using CPI and then deflating.

The thing to watch out for is last-minute shipments

Considering the above arguments we can conclude that there is a good possibility that the last minute demand and reactionary decline effect will be limited in comparison to the last time the consumption tax was raised. However, one point of uncertainty remains. This is the fact that last-minute shipments have been generated.

Shipments of automobiles have recently been on the rise (Chart 10). And as was mentioned earlier, this is despite the fact that sales of automobiles have settled down of late. When purchasing an automobile, there are various practical decisions to be made including the question of the upcoming tax hike, but there is actually not much incentive in the last-minute purchase of an automobile before the consumption tax increase (see Chart 5). With the complexity of the government's tax hike countermeasures, depending on the level of awareness of the individual consumer, there are certain items concerning which last-minute purchase actually may not make sense. It has been indicated that in expectation of last-minute demand prior to the consumption tax hike in October, automobile manufacturers may be shipping more items than is warranted, in other words more than actual demand can handle. Meanwhile, as is shown in Chart 10, last-minute shipping is also occurring in the area of consumer electronics (this is likely in anticipation of the reward points system which will go into effect from October).

Motor Vehicle and Consumer Electronics Shipments **Chart 10**



Source: Ministry of Economy, Trade and Industry, Japan Refrigeration and Air Conditioning Industry Association, Japan Electronics and Information Technology Industries Association; compiled by DIR.
Note: Seasonally adjusted. Figures for air conditioners, flat panel display TVs, and PCs were seasonally adjusted by DIR. Consumer electronics sales is a real value obtained using CPI and then deflating.

Pulp, paper and paper products, and chemicals (excluding medicine) also moving toward inventory accumulation

To confirm the situation of production, shipments and inventory by industry we look at Chart 11. The first industry that catches the eye is pulp, paper and paper products. Inventory has gradually accumulated in this industry over the past few months, and plans for production in the future are extremely confident. Inventory accumulation is apparently in anticipation of last-minute demand prior to the October increase in consumption tax centering on tissue and toilet paper.

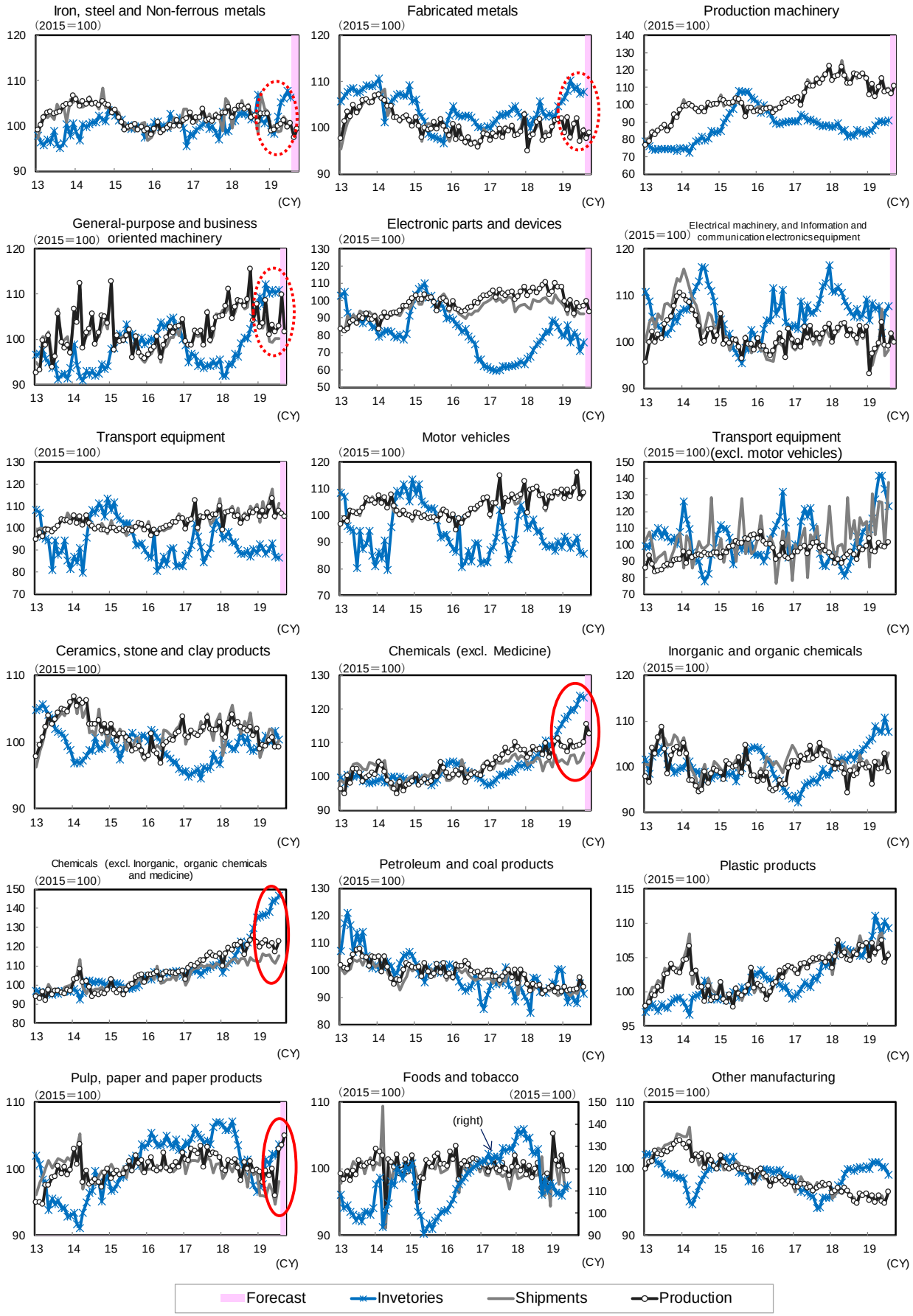
Another industry which catches the eye for the same reasons is chemicals (excluding medicine). The area in this industry which is experiencing inventory accumulation is cosmetics, and it has been pointed out that this may be due to the handling of last-minute demand prior to the increase in consumption tax. However, inventory growth in this industry began in 2017, and since 2018 the process has actually accelerated. Behind this development is the fact that demand for cosmetics products was strong in inbound consumption and in e-commerce (this indicates stock build-up, or intentional inventory accumulation). Since 2018, growth in demand of this sort has come to a standstill (unintentional stock build-up is most likely the reason here)[6]. In other words, inventory growth in this industry is due to more than just measures to handle last-minute demand.

Be aware that a reactionary decline could occur in relation to last-minute production and shipments

Out conclusion upon examining last minute behavior prior to the increase in consumption tax is as follows. As of this point in time, last-minute demand based on available sales statistics has not yet been observed. However, basing our observations on production and shipments, there are three industries which stand out: transport equipment, pulp, paper and paper products, and chemicals (excluding medicine). Housing is also of note basing our observations on housing starts. It should be noted that the effect this has on improving growth will disappear after the consumption tax has been raised, and there will likely be a reactionary decline at that time.

[6] Unintentional stock build-up has been observed in the iron, steel and non-ferrous metals industries, as well as the fabricated metals industry and the general-purpose and business oriented machinery industry. This is due to declining demand associated with the global economic slowdown centering on China.

Production, Shipments, and Inventory by Industry — Chart 11



Source: Ministry of Economy, Trade and Industry; compiled by DIR.
Note: The expected value of the Indices of Industrial Production is from the Manufacturing Industry Production Forecast Survey. The expected value for the chemicals industry (excluding medicine) is from the forecast figures for the entire chemical industry.

2. Estimating the effects of the rising price of crude oil

On September 14 two drone attacks occurred on major Saudi Arabian oil facilities which account for half of that country's oil production capacity. It is expected to take a bit of time to recover from this event, and so there are now fears of tightening oil supplies worldwide. Unknowns remain regarding the complete story behind the attacks, and this has caused the situation in the Middle East to become increasingly uncertain. In response to this situation, the WTI price of crude oil has gone from the low 50s (USD/bbl.) to over 60 USD/bbl. at this time. In this report we estimate the effects of a 10 USD/bbl. rise in the WTI price of crude oil. In this section we estimate the effects of the price of crude oil on Japanese corporate performance and on the Japanese economy as a whole.

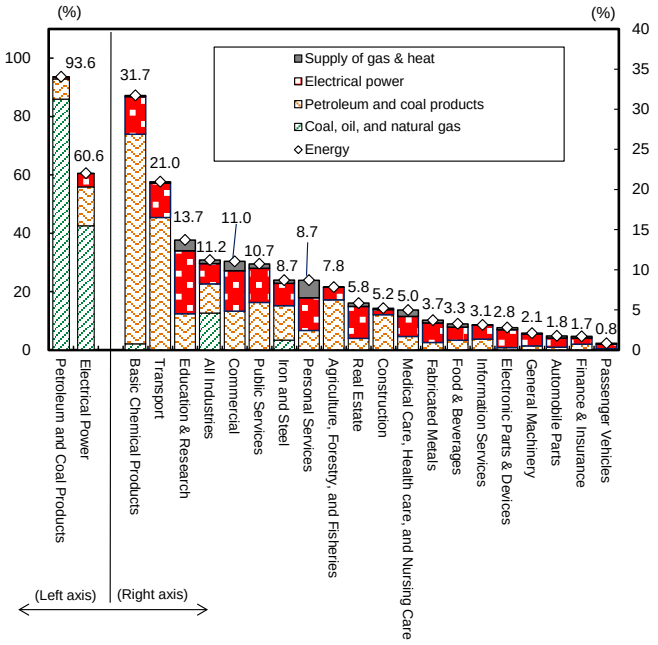
Fluctuation of $10 in the WTI price would have an effect of 0.8 trillion yen on corporate earnings (manufacturing 0.2 tril yen, non-manufacturing 0.6 tril yen)

As for the price of crude oil, we consider the effects of price change on the corporate sector using an input-output table. An increase in the price of crude oil is a negative factor effecting profits in the corporate sector. Japan depends on imports for the majority of its energy needs. Only a small number of Japanese corporations benefits from high oil prices, while for most it means a negative factor. A high in crude oil prices causes the variable cost ratio to increase, which in turn places the break-even point at a higher level, causing earnings to deteriorate.

At the same time, the extent of the effect also depends on the cost structure of particular industries and corporations. The extent of influence is not uniform across all industries and businesses. Chart 12 shows the percentage of intermediate inputs accounted for by energy inputs for all industries. As indicated by the chart, there are only two industries in Japan which carry out direct inputs in crude oil. These are petroleum & coal products, and electrical power. The vast majority of Japanese corporations do not have direct inputs in crude oil, but rather in refined petroleum and coal products and electrical power. Hence most corporations do not experience the immediate effect of high crude oil prices. The effect of a crude oil price high is first experienced at the point of price pass-through in the form of the increasing cost of petroleum and coal products and electrical power.

Percentage of Intermediate Inputs Accounted for by Energy Inputs in All Industries

Chart 12



Source: Ministry of Economy, Trade, and Industry; compiled by DIR.
Note: Figures for 2011 are estimates based on the input-output structure.

Effect of 10% Increase in Price of Crude Oil on Corporate Earnings (Operating Surplus)

Chart 13

	Amount Y bil	Rate of Change %
All Industries	-779	-0.9
Manufacturing	-211	-2.0
Food & Beverages	-11	-0.3
Textiles & Clothing	-2	-3.7
Lumber, Wood Products, and Furniture	-2	-0.8
Pulp, Paper, and Paper Products	-7	-1.7
Printing, Plate-Making & Bookbinding	-2	-0.3
Chemicals	-103	-7.3
Petroleum and Coal Products	20	13.1
Plastic Products	-2	-1.8
Ceramics, Stone, and Clay Products	-10	-2.6
Iron and Steel	-61	-12.9
Non-ferrous Metals	-4	-3.1
Fabricated Metals	-4	-1.1
General Machinery	-6	-0.5
Electrical Machinery	-2	-0.8
Information and communication electronics equipment	-1	-0.8
Electronic Parts and Devices	-3	-3.6
Transport Equipment	-9	-1.2
Precision Machinery	-1	-0.5
Non-manufacturing	-568	-0.8
Agriculture, Forestry, and Fisheries	-15	-0.5
Mining	-3	-11.4
Coal, Crude Oil, Natural Gas	7	62.5
Recyclable Resource Collection & Processing	-1	-2.8
Construction	-47	-10.3
Electrical Power	-101	-12.4
Wholesale & Retail	-70	-0.5
Finance & Insurance	-4	-0.1
Real Estate	-4	-0.1
Transport	-106	-5.0
Information and communication	-11	-0.3
Education & Research	-23	-22.6
Medical Care, Insurance, Social Insurance & Nursing Care	-22	-0.8

Source: Ministry of Economy, Trade, and Industry, Bank of Japan; compiled by DIR.
Note: Figures for 2011 are estimates based on the input-output structure.

Based on this input-output structure, we estimated the effects of a crude oil price increase of $10 per barrel (based on the WTI price) on corporate earnings (operating surplus) shown in Chart 13. Our result on an all industry basis finds that the effect in monetary terms would be 0.8 trillion yen[7].

Increase of $10 in the WTI price would cause real GDP to decline by 0.11%, with nominal GDP down by 0.48%

In addition to the effects on the corporate sector outlined in the previous section, fluctuations in the price of crude oil also affect real income and thus the household sector as well. Here we make use of the DIR macro-economic model to perform an overall analysis of the influence on the entire Japanese economy. Results are shown in Chart 14. According to the results of our simulation, if the price of crude oil were to increase by $10/bbl, real GDP between the first year and the third year would decline as follows: 0.11% in the first year, 0.13% in the second year, and 0.12% in the third year.

Looking at results by demand component, we see that an increase in the price of crude oil would bring a decrease in personal consumption due to the decline in real wages, while housing investment would also be expected to decline. In addition, the decline in corporate earnings would bring downward pressure on capital expenditure. Meanwhile, household income would suffer in relation to the decline in corporate earnings, which would become manifest in the form of a decline in real wages. The decline in corporate income would also contribute to a decline in household demand.

[7] These estimates use the input-output structure as it stood in 2011, as well as the average value of price pass-through of that year, results should be taken with a certain grain of salt.

As for prices in general, the price of imports would increase, bringing upward pressure on the corporate goods price index (CGPI) and core CPI, causing the domestic demand deflator to increase. This would cause the import deflator (a deductible item) to increase considerably, in turn causing the GDP deflator to decrease. As a result, nominal GDP would be forced downwards more than real GDP. Hence nominal GDP between the first year and the third year would be forced downwards as follows: 0.48% in the first year, 0.45% in the second year, and 0.49% in the third year.

Effect of $10/bbl Increase in Price of Crude Oil on Japan's Economy **Chart 14**

		Real GDP %	Real Personal Consumption %	Real Housing Investment %	Real Capital Expenditure %	Real Exports %	Real Imports %	Nominal GDP %	GDP Deflator %
$10/bbl Increase in Price of Crude Oil	1st year	-0.11	-0.18	-0.34	-0.43	-0.09	-0.55	-0.48	-0.37
	2nd year	-0.13	-0.22	-0.51	-0.48	-0.09	-0.66	-0.45	-0.32
	3rd year	-0.12	-0.20	-0.41	-0.52	-0.09	-0.62	-0.49	-0.37

		Current Account Balance / Nominal GDP %pt	Import Prices %	Export Prices %	CGPI %	Core CPI %	Industrial Production %	Indices of Tertiary Industry Activity %	Indices of All Industry Activity %
$10/bbl Increase in Price of Crude Oil	1st year	-0.45	3.76	0.45	0.60	0.21	-0.21	-0.11	-0.12
	2nd year	-0.43	3.79	0.45	0.61	0.31	-0.25	-0.13	-0.15
	3rd year	-0.48	3.80	0.45	0.62	0.29	-0.24	-0.13	-0.14

Source: Compiled by DIR.
Note: Simulation using the DIR macro model. Figures denote rate of deviation and divergence from the standard solution.

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	FY18	FY19 (Estimate)	FY20 (Estimate)	CY18	CY19 (Estimate)	CY20 (Estimate)
Main economic indicators						
Nominal GDP (y/y %)	0.5	1.3	0.8	0.7	1.4	0.8
Real GDP (chained [2011]; y/y %)	0.7	0.8	0.4	0.8	0.9	0.3
Domestic demand (contribution, % pt)	0.8	1.1	0.4	0.7	1.2	0.4
Foreign demand (contribution, % pt)	-0.1	-0.3	-0.0	-0.0	-0.2	-0.1
GDP deflator (y/y %)	-0.2	0.6	0.5	-0.1	0.5	0.5
Index of All-industry Activity (y/y %)*	0.8	0.6	0.5	1.1	0.6	0.5
Index of Industrial Production (y/y %)	0.2	-1.4	0.8	1.1	-1.7	0.6
Index of Tertiary Industry Activity (y/y %)	1.1	1.0	0.4	1.2	1.1	0.5
Corporate Goods Price Index (y/y %)	2.2	1.8	2.0	2.6	1.0	2.8
Consumer Price Index (excl. fresh food; y/y %)	0.8	0.6	0.3	0.8	0.6	0.3
Unemployment rate (%)	2.4	2.4	2.4	2.4	2.4	2.4
Government bond yield (10 year; %)	0.04	-0.16	-0.20	0.07	-0.12	-0.20
Balance of payments						
Trade balance (Y tril)	0.7	-1.1	-1.1	1.2	-0.7	-1.1
Current balance ($100 mil)	1,735	1,778	1,780	1,741	1,759	1,780
Current balance (Y tril)	19.2	19.3	19.2	19.2	19.1	19.0
(% of nominal GDP)	3.5	3.5	3.4	3.5	3.4	3.4
Real GDP components (Chained [2011]; y/y %; figures in parentheses: contribution, % pt)						
Private final consumption	0.4 (0.2)	0.7 (0.4)	0.3 (0.2)	0.3 (0.2)	0.7 (0.4)	0.3 (0.2)
Private housing investment	-4.3 (-0.1)	0.6 (0.0)	-0.8 (-0.0)	-5.8 (-0.2)	1.3 (0.0)	-1.2 (-0.0)
Private fixed investment	3.5 (0.6)	1.1 (0.2)	0.7 (0.1)	3.9 (0.6)	1.7 (0.3)	0.7 (0.1)
Government final consumption	0.9 (0.2)	1.3 (0.3)	0.6 (0.1)	0.8 (0.2)	1.3 (0.3)	0.7 (0.1)
Public fixed investment	-4.0 (-0.2)	3.4 (0.2)	0.6 (0.0)	-3.3 (-0.2)	1.3 (0.1)	2.0 (0.1)
Exports of goods and services	1.5 (0.3)	-1.9 (-0.3)	0.3 (0.0)	3.4 (0.6)	-2.2 (-0.4)	-0.2 (-0.0)
Imports of goods and services	2.1 (-0.4)	-0.2 (0.0)	0.4 (-0.1)	3.4 (-0.6)	-0.9 (0.2)	0.6 (-0.1)
Major assumptions:						
1. World economy						
Economic growth of major trading partners	3.6	3.2	3.4	3.9	3.1	3.4
Crude oil price (WTI futures; $/bbl)	62.9	57.0	56.0	64.9	56.7	56.0
2. US economy						
US real GDP (chained [2012]; y/y %)	2.9	2.2	1.9	2.9	2.4	2.0
US Consumer Price Index (y/y %)	2.3	2.0	2.1	2.4	1.8	2.2
3. Japanese economy						
Nominal public fixed investment (y/y %)	-2.3	4.9	1.5	-1.6	2.8	3.1
Exchange rate (Y/$)	110.9	107.7	107.0	110.4	108.5	107.0
(Y/€)	128.3	119.5	118.0	130.0	121.3	118.0

Source: Compiled by DIR.
Note: Due to rounding, actual figures may differ from those released by the government.
* Excl. agriculture, forestry, and fisheries.
Estimate: DIR estimate.