JAPAN

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JAPAN

CONTENTS

DISAPPEARING CITIES: DEMOGRAPHIC HEADWINDS AND THEIR IMPACT ON JAPAN'S HOUSING MARKET[1]

Japan's population is rapidly aging and shrinking, and doing so unevenly across regions. Large cities, notably the Greater Tokyo area, are experiencing net migration inflows, while other regions are experiencing net migration outflows. In this chapter, we assess the regional differences in population dynamics and their implications for house price developments in Japan. Due to the durability of housing compared to other forms of investment, the magnitude of house price declines associated with population losses is larger than that of house price increases associated with population gains. These model-based predictions are likely to underestimate the actual fall in house prices associated with future population losses, as expectations of lower housing prices in the future could trigger more population outflows and disposal of houses, especially in rural areas. We suggest policy measures to help close regional disparities and avoid potential over-investment by taking account of demographic trends for housing supply.

A. Motivation

1.   Japan is at the leading edge of global demographic change, facing not only a shrinking, but also a rapidly aging population. According to official projections, Japan's total population will continue to decline, after reaching a peak in 2010. In addition to its shrinking population, another demographic challenge for Japan is its aging population. The old age dependency ratio (measured as old-age population as a share of working-age group) has been on the rise—the ratio exceeded 40 percent in 2014 and is expected to accelerate, reaching above 70 percent in the next 50 years.

2.   Rural areas are facing more adverse population trends than urban areas. Different regions in Japan are experiencing the demographic transition (an aging and shrinking population) at a different pace. Large cities, particularly the Greater Tokyo area, are experiencing net migration inflows, driven by younger Japanese seeking education and jobs. For other regions of Japan, population is declining and aging rapidly, as low fertility and outflows of the young exacerbate adverse demographic trends. Altogether, the regional disparities are growing, led by the divergence of demographic trends across regions.

3.   Housing market and real estate prices are one important channel through which demographics affect the macroeconomy. According to Japan's National Survey of Family Income and Expenditure of 2014, dwelling-related liabilities (purchase of house and/or land) consists of about 75 to 90 percent of total household liabilities. In addition, land and real estate are strong collateral for household and business lending. Therefore, a fall in housing prices has important implications for household wealth and the health of household and bank balance sheets.

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[1] Prepared by Yuko Hashimoto (RES), Gee Hee Hong (APD), and Xiaoxiao Zhang (University of Cambridge).

4.   This chapter assesses the relationship between demographic trends and housing prices in Japan. Among various issues in the context of regional disparities, we focus on regional differences in population dynamics to try and understand to what extent demographic trends have influenced housing market prices in Japan in the past twenty years. First, we document how demographic trends and housing prices have evolved over time across Japanese regions. Second, we ask to what extent demographic trends are drivers of housing price dynamics in Japan and how this relationship has evolved over time. We then look at the potential drivers of uneven population growth across regions and offer policy recommendations to help address regional disparities in housing price developments.

B.   Demographics and Housing Prices in Japan

5.   Japan's declining and aging population generates an oversupply of houses, particularly in rural areas. According to the Ministry of Infrastructure, Land, and Transportation, nearly 13 percent of Japan's total dwellings are vacant. These unoccupied houses are referred to as "Akiya" and are sold for free (or at a negative price). In the next 15 years, the number of vacant houses will increase to a staggering 21.7 million houses, or about one-third of total dwellings in Japan. This phenomenon is observed in all parts of Japan, but particularly in rural areas, where the population is shrinking at a faster pace than in urban areas.

6.   Japanese are moving to the four largest cities—Tokyo, Osaka, Nagoya and Fukuoka. Population change at the prefecture-level can be characterized by inflows of people into these cities. In the past two decades, the population of the Greater Tokyo area, including Tokyo, Saitama, Chiba and Kanagawa prefectures, grew by about 10 percent, while Hokkaido lost about 6 percent of its population (Figure 1). As a result, prefecture-level population concentration increased in the four cities, with Tokyo's population increasing by the largest magnitude of 1.3 percentage points, and Hokkaido decreasing by the largest magnitude of 0.3 percentage points.

Figure 1. Japan: Population Change by Prefectures Between 1996-2015 (in percent)

In the past two decades, population declined in rural areas, but concentrated in large cities.

Sources: Statistics Bureau of Japan, Cabinet Office
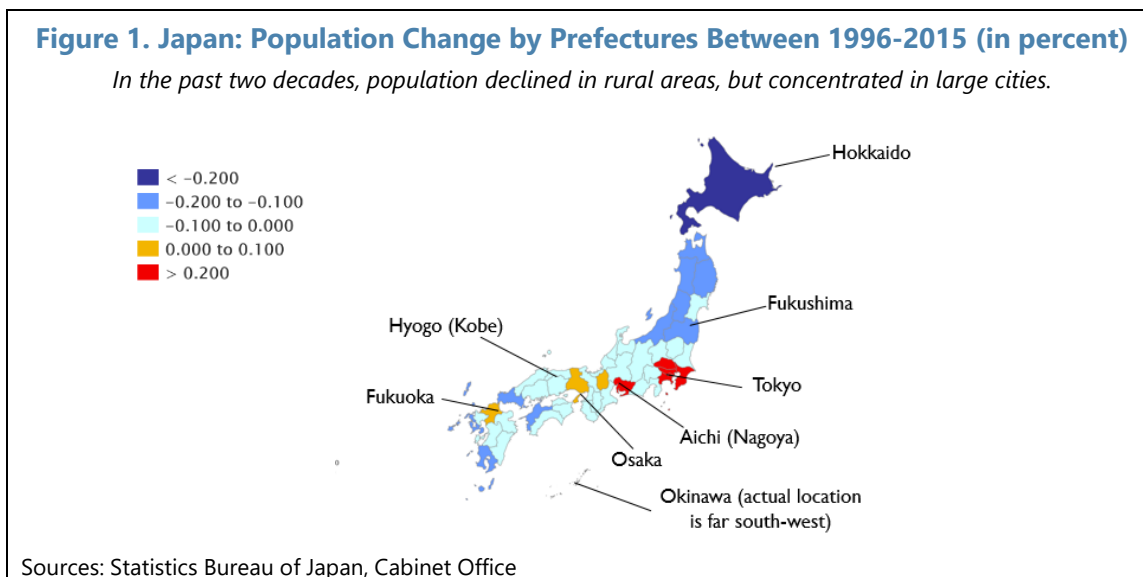
7.   Despite the shrinking population, the total number of households in Japan has not declined (see Figure 2). The number of households increased by 76 percent from 1970 to 2015. During this period, the increase was greater for large cities (which increased by 116 percent) than for rural areas (which increased by 18 percent). As a result, the total number of households in 2018 stands at around 50 million. However, the average size of a family has declined steadily, with an increase in both the shares of the nuclear family and one-person family.

Figure 2. Japan: Household Statistics

Japan: Number of Households

Japan: Households and Family Members
(Percent change between 1970 and 2015)

Source: Statistics Bureau of Japan.

Source: Statistics Bureau of Japan.
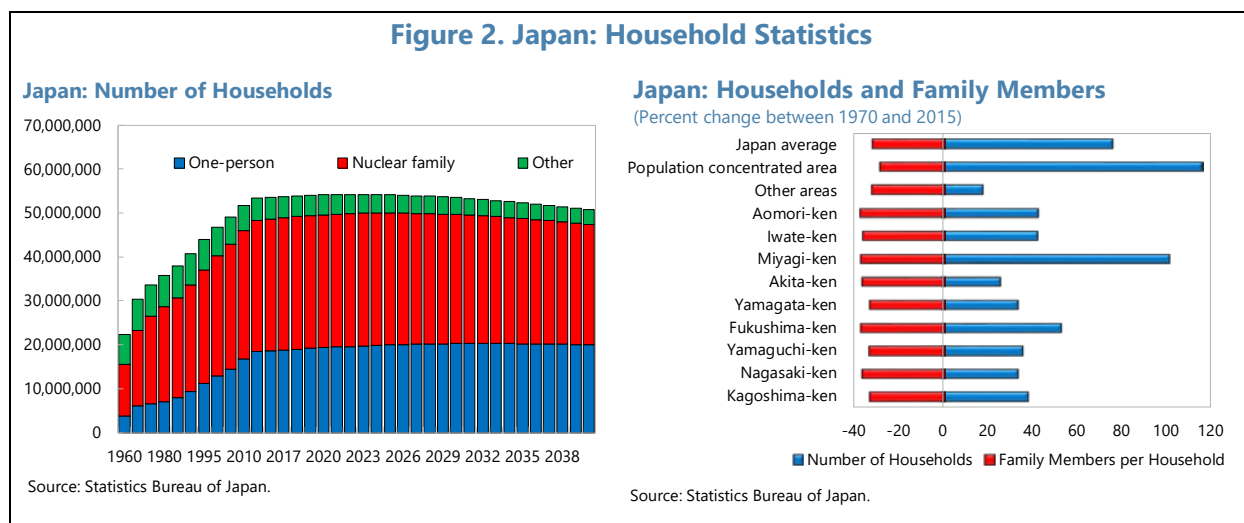
8.   Japan's housing prices have gone through a large swing since the early 1990s.[2] Housing price movements in Japan can be grouped into five time periods: (1) pre-bubble period, (2) post-bubble period until 2001, (3) mini-bubble between 2002–08, (4) pre-Abenomics and (5) Abenomics period. With the economic expansion experienced in the 1970s and 1980s, housing prices in Japan increased until the years leading up to the so-called 'Bubble Period' of the early 1990s. Beginning in 1988, price appreciation intensified, increasing by 6 percent annually on average. The bubble collapsed with a sharp decline in housing prices until 1994. The price has been on a declining trend since then, with a short-lived period of a "Mini bubble (2002–08)", and a recent minor recovery in housing prices after 2014. Since the beginning of Abenomics, prices

Japan: Residential Land Price
(Yen/m^2, Average Across Prefectures, Public Assessment Value)

Source: Ministry of Land, Infrastructure, Transport and Tourism.

have started to increase gradually (increasing by 2.7 percent since 2014 and by 0.7 percent in 2018). With the recent increase in housing prices, they have recovered to the level last observed in 2013.

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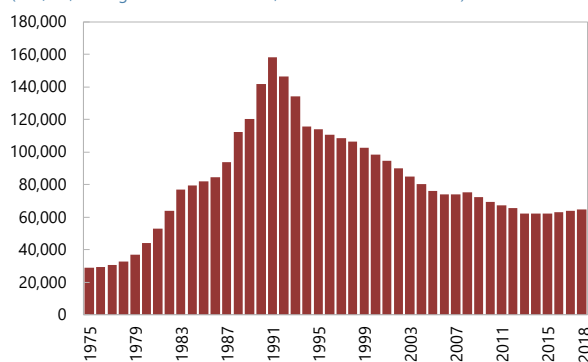
[2] Throughout the chapter, with the exception of Box 1, residential land prices are used as a proxy for housing prices.

9. **There is a clear regional dispersion in terms of housing price changes since the Bubble Period burst in the early 1990s.**[3] Figure 3 shows the growth rate of housing prices across prefectures. The map on the left shows the price change since 2002, demonstrating that all prefectures, except for Tokyo, experienced a decline in housing prices (by between -5 to -15 percent). The map on the right shows prefecture-level house price changes since 2014. Compared to the left map, numerous prefectures experienced house price appreciation in recent years (average 1.9 percent nationwide since the beginning of Abenomics in 2013). The range, however, varies greatly: largest gains are seen in Miyagi and Fukushima prefectures by 18 percent (likely related to the reconstructions after the earthquake), followed by Tokyo (16 percent), while large losses are seen in Akita (-6.5 percent), Shimane (-5.5 percent) and Yamanashi (-4.8 percent) prefectures. See Box 1 for recent developments in housing prices in Japan and their potential drivers.

Figure 3. Japan: House Price Change by Prefecture
(in percent)

2002–2018: *Tokyo-to is the only prefecture with an increase in house prices since 2002.*

2014–2018: *Since 2014, an increase in house prices is observed for other prefectures.*

Source: Ministry of Land, Infrastructure, Transport and Tourism.
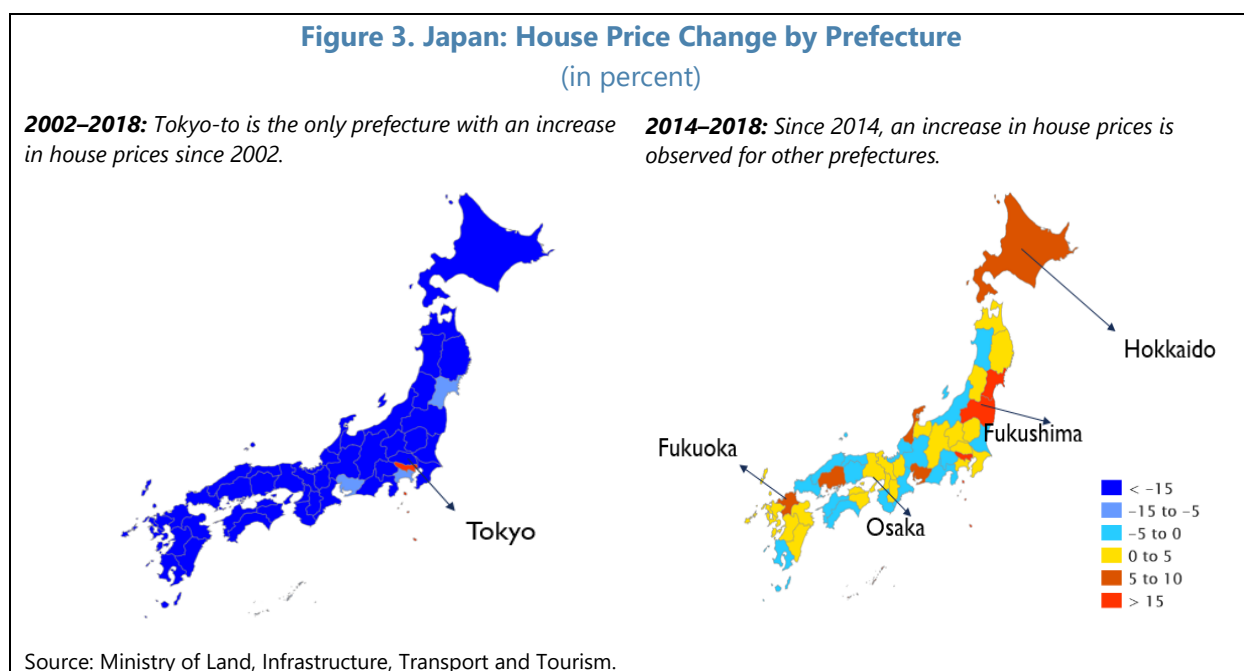
C. Modeling Population Growth and Housing Prices

In this section, we assess the long-term relationship between population growth and housing prices using prefecture-level data, motivated by the 'durable housing' model developed by Glaeser and Gyourko (2005).

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[3] According to the National Survey of Family Income and Expenditure (2014, for two-person households), there is great variation across prefectures as to how much household wealth can be explained by housing. With housing accounting for an average of 66 percent of household wealth (nationwide, likely exaggerated as it focuses on two-person households, who are likely to have a house), this is somewhat lower than other advanced economies – United States about 70 percent, Spain, Greece, Italy around 80 percent. For Japanese prefectures, this ranges from 52 percent (Shinamane prefecture) to Tokyo (80 percent), and Okinawa (above 90 percent).

10.   A simple durable housing model proposes a nonlinear relationship between changes in housing prices and population growth. The non-linear relationship is that the magnitude of the fall in housing price associated with population decline is larger than that of housing price rise from population increase of the same magnitude. The 'durable housing' model by Glaeser and Gyourko (2005) suggests that such an asymmetric relationship is due to the durability of housing, where housing supply is elastic when new houses are built, while not elastic when houses need to be demolished. This leads to a kinked supply-curve of housing. In this model, net inflows of population increase demand for houses, and housing prices increase (P2). On the other hand, population outflows of the same magnitude lower the demand for houses (P3), where the change in housing price is larger than that with net inflows. If at the same time the supply of houses increases due to sales by owners who move out from the region, a further decline in housing prices can be expected (P4) (Figure 4).

Figure 4. Japan: Population Growth and Housing Price Change
(Glaeser and Gyourko (2005))

Source: Glaeser and Gyourko (2005).
Note: MPPC is minimum profitable production costs.
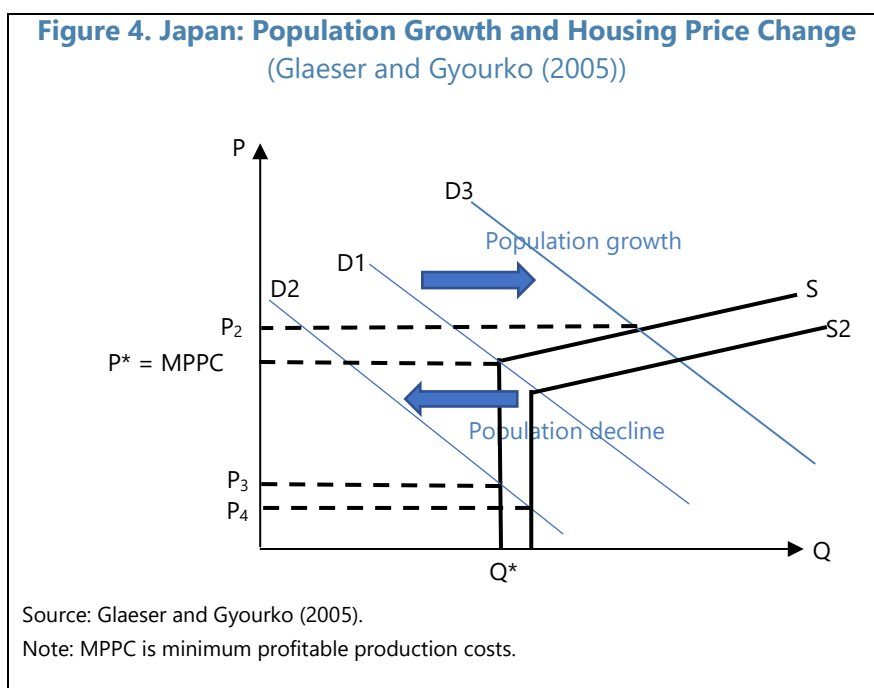
11.   The theoretical model predicts that cities with negative population growth experience a large decline in housing prices. Following Glaeser and Gyourko (2005), we run the following regression:

$$\Delta P_{i,t} = \alpha + \beta * POPLOSS_{i,t-1} + \gamma * POPGAIN_{i,t-1} + \varepsilon_{it},$$

where P is the publicly-assessed residential land price adjusted for inflation (in Yen/meter^2) as a proxy for housing prices; POPLOSS variable takes on a value of zero if prefecture i's population grew during period t and equals the prefecture's actual percentage decline in population if the prefecture lost population during the period. Similarly, POPGAIN variable takes on a value of zero if prefecture i experienced population loss during period t, and equals the actual population growth rate if the prefecture gained population. The expected signs of coefficients of β and γ are positive, and that β >

γ. This implies that a price decline is larger (β) for a given loss of population (POPLOSS <0) than a price increase (γ) for a given population increase (POPGAIN >0). In order to account for the lagged impact of population on housing price, we use POPLOSS and POPGAIN of *t-1* in the regressions. We also add the variables "old dependency ratio" and "vacancy rate" (both in percentage change with one lag) to control for other factors that might affect demand for and supply of houses. Figure 5 shows a simple correlation between housing price change and net migration flows over the period of 1996–2018. This simple correlation supports the prediction of non-linearity (orange line), as housing price growth in Tokyo-to is much lower than what is predicted by the relationship between the two variables in other prefectures (dotted red line).

Figure 5. Japan: Changes in House Price and Net Migration Flows
(x-axis: thousands of persons, y-axis: percent, 1996-2018)

Source: Ministry of Land, Infrastructure, Transport and Tourism.
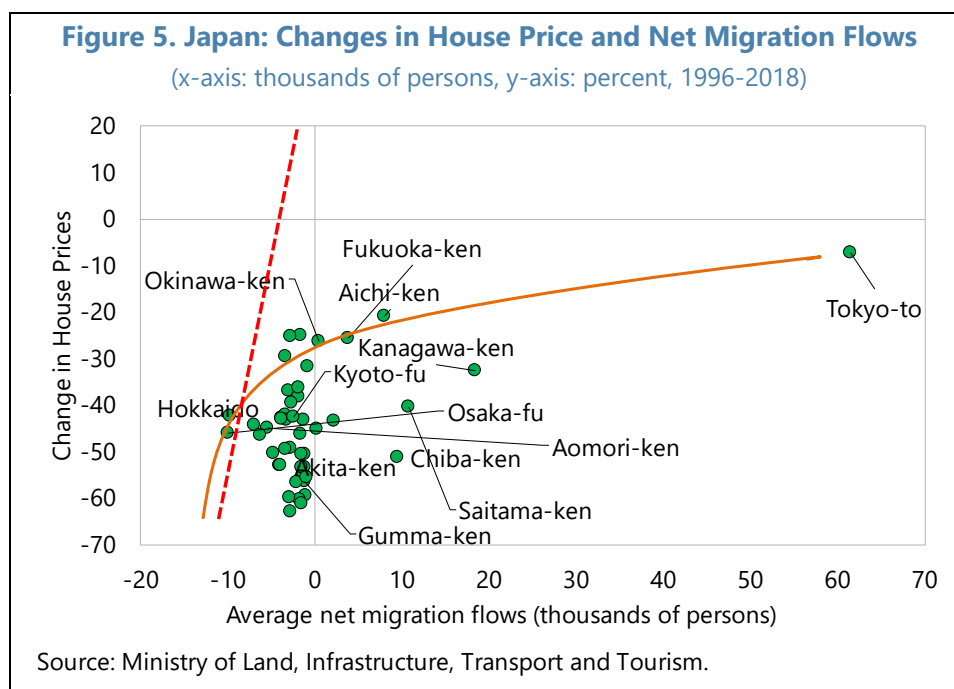
12.   Panel regressions using prefecture-level housing prices and population dynamics confirm this non-linear relationship. Table 1 shows regression results based on panel data of the annual change in population and real land prices across three different time periods: (i) 1970–2015, (ii) the past two decades since the collapse of the asset bubble, covering 1996-2015, and (iii) more recent periods over 2010–15. Results show that during 1970–2015 (column 1), the estimated coefficient for population loss is higher than that of population gain, confirming the prediction by Glaeser and Gyourko (2005) that housing prices fall faster with declining population than they increase with a growing population. However, in more recent periods, while the correlation between housing price decline and population decline stays robust, the relationship between housing price increase and population increase disappears. This confirms the overall decline in housing prices across regions since the early-1990s bubble burst, regardless of the extent of population growth.

13.   In reality, negative effects on housing prices from population decline may be even larger than the model-based predictions. The results suggest a larger decline in housing prices associated

with population loss than a housing price increase with the same size of population gain. The model, however, does not factor in households' expectations on future house price developments and their potential impact on house prices. In fact, residents expecting a housing price decline may sell their houses and have less incentive to own houses, which will add to already-existing oversupply of houses and create further downward pressures on housing prices. This vicious cycle may lead to a larger decline in house prices in regions with declining population more than the model-based predictions.

Table 1. Japan: Empirical Analysis of Land Price and Population Changes

	Dependent variable: %Δ real land price								
VARIABLES	1970-2015			1970-2000			2000-2015		
HHLOSS	5.961	12.44	15.77*	-	-	-	24.01***	23.85***	23.92***
	(4.446)	(7.504)	(8.005)				(4.410)	(4.235)	(4.252)
HHGAIN	3.091***	1.818**	3.011***	7.004***	3.785	7.700**	0.357	0.443	0.567
	(0.783)	(0.819)	(1.097)	(1.559)	(2.321)	(3.203)	(0.797)	(0.851)	(0.809)
Δ ln OLDDEP		-1.516***	-1.721***		-3.047**	-5.279*		-0.177	-0.165
		(0.355)	(0.391)		(1.438)	(2.641)		(0.298)	(0.317)
Δ ln Vacancy rate			-0.305*			-0.425			0.0400
			(0.153)			(0.268)			(0.196)
Constant	-0.145**	0.165*	0.727***	-0.427***	0.244	0.938**	-0.216***	-0.188***	-0.200***
	(0.0606)	(0.0961)	(0.0984)	(0.116)	(0.356)	(0.460)	(0.0375)	(0.0495)	(0.0714)
Observations	376	376	329	188	188	141	141	141	141
R-squared	0.703	0.720	0.747	0.647	0.663	0.720	0.340	0.342	0.343
Number of code	47	47	47	47	47	47	47	47	47
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y	Y	Y	Y	Y

Source: Authors' estimations.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D.   Why are Japanese Moving to Large Cities?

The proximate cause of regional disparities in population dynamics and related housing price dynamics is the continuous inflow of population into large cities. This section explores several factors that influence population concentration in large cities.

14.   Large cities offer jobs and education for younger Japanese. There exists a large variation across prefectures in terms of the share of population with higher education—for rural prefectures such as Akita and Aomori, the share of population with university degrees or higher make up about 5 percent of the population. This contrasts with Tokyo or Kanagawa (a prefecture in the suburbs of Tokyo) that has close to 20 percent of its total population with higher education (university degree or above). The chart below shows that higher education opportunities are also far greater in large cities (colored bars) than in others: this is one factor that underpins the younger generation moving out from their home prefectures (Figure 6, left chart).

15.   Some studies show that skilled workers are better at generating growth in endogenous amenities, increasing the value of housing (Shapiro, 2006; Glaeser and Saiz, 2004). Service amenities, including health care and retail stores, are also concentrated in large cities. These factors compose a core part of the local standard of living, and it is natural that people would prefer to live in areas which have easy access to these amenities. For example, according to 2016 data of social indicators by Statistics Bureau of Japan, the number of general hospitals (per 100 square kilometers of habitable area) was 6 for Japan on average, of which the largest was 42.4 for Tokyo and the lowest was 1.7 for Akita prefecture. Demand for amenities can explain the positive correlation between housing price changes and the share of the educated population (Figure 6, right chart), as affordability of these services increases with income.

Figure 6. Japan: Education and House Prices

Higher-education facilities are concentrated in four major cities.

Japan: Number of Colleges and Universities by Prefecture

Housing price growth is positively correlated with the share of the population with higher education qualifications.

Japan: Human Capital and Housing Price Change
(X-axis: Change of Housing Prices Between 2011-2018, Y-axis: Share of University and Graduate Degrees)

Source: Statistics Bureau of Japan, 2017

Source: Statistics Bureau of Japan; and IMF Staff Calculations.

E.   Policy Implications

16.   Policies to address regional disparities are crucial to prevent an excessive fall in housing prices in rural areas. In 2014, the Abe administration established the headquarters for regional revitalization in the Cabinet Office to promote even growth between rural and urban areas, and help retain population and talents in rural areas. To assist rural areas, the government introduced tax incentives for companies that either shifted their core functions or expanded the operations of their headquarters already located in other parts of the country. Also, tax incentives were provided to households who moved outside the capital area.

17.   Forward-looking policies on housing supply and real estate investment that incorporate demographic trends are necessary to prevent a further decline in housing prices. Vacant houses create various social issues, but also have negative externalities in terms of prices, as

the presence of vacant houses tends to bring down the value of other houses in the neighborhood.[4] A regional supply of housing that factors in future demographic trends would help avoid potential over-investment in real estate, decrease the number of vacant houses, and help place upward pressure on housing prices.

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[4] It used to be that the tax rate on land is reduced to one sixth of the appraised value if there remains a residential structure on the land. The initial motivation for this regulation was to accelerate the high utilization of land by giving an incentive to home construction during the years when the population grew. However, this tax incentive is one of the causes of the high vacancy rate in Japan, as the owner of the property had an incentive to leave the property as is, without demolishing the structure, to benefit from the lower property tax rate. New legislation was enacted in 2014 to accelerate the demolition of vacant houses.

Box 1. Recent Developments in Residential Property Prices in Japan

Prices of high-rise condominiums in some Japanese cities have risen notably in recent years. According to the annual survey of commercial and residential land price by the Ministry of Land, Infrastructure, Transport and Tourism, which was released in July, the national average of residential land prices declined by 0.1 percent. However, prices rose in Tokyo, Osaka and Nagoya by 0.9 percent on the back of solid demand for condominiums and offices.

Condominium prices have appreciated since the beginning of Abenomics in 2013. Prices of certain types of housings in large cities and some tourist destinations have appreciated rapidly (text figure). Condominium prices have increased by 23 percent at the national level since 2013. Prices for new condominiums in the Greater Tokyo area in 2018 averaged ¥71.4 million (about $650,000), according to data from the Real Estate Economic Institution.[1]

Recent Developments in Japan's Residential Property Prices

Condominium Prices
(2010=100, NSA)

Tokyo including suburbs
Osaka including suburbs
Hokkaido
Tohoku
Kyushu-Okinawa
Japan (nationwide)

Source: Ministry of Land, Infrastructure, Transport and Tourism

Residential Property Price Index
(2010=100, NSA)

Residential Property
Residential Land
Detached House
Condominiums

Source: Ministry of Land, Infrastructure, Transport and Tourism

Potential drivers of property price appreciation are the ultra-low interest rate environment, an increase in tourism, and the inheritance tax. The prolonged low interest rate environment incentivizes Japanese banks, mostly serving domestic clients, to increase real estate lending. An influx of foreigners in tourist destinations has also led to increased investment in real estate. Finally, demand for condominiums to avoid the inheritance tax is also generating upward price pressures.[2]

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[1] IMF (2017) concluded that condominium prices appear to be moderately overvalued in Tokyo, Osaka, and several outer regions, exceeding the values predicted by fundamentals by 5 to 10 percent.

[2] There is anecdotal evidence that valuations for tax assessment purposes make condominiums an attractive bequest compared to financial assets, as condominium prices are evaluated below market value and financial assets are evaluated at market value. So, there is a strong tax incentive for Japanese households to hold real estate and take out housing loans, since the latter is tax deductible at market value if one is to carry out a bequest.

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IS AUTOMATION THE ANSWER TO JAPAN'S DEMOGRAPHIC CHALLENGES?[1]

Japan's demographic transition will pose grave challenges for fiscal sustainability under the current social security system. At the same time, Japan's shrinking and aging population is expected to worsen inequality in terms of market income. Automation and artificial intelligence technology have been seen as a potential answer to the macroeconomic issues generated by population aging, though it is not clear to what extent the new technology will mitigate the impact of demographic change on growth and income distribution. Simulation results from a calibrated multi-sector general equilibrium overlapping generations model suggest that automation can potentially offset the impact of population aging on real output, but cannot fully eliminate fiscal pressures arising from demographic transition. Nonetheless, for an aging society such as Japan, automation may improve distributional outcomes.

A.   Motivation

1.   Adverse demographic trends in Japan have serious implications for its long-term growth prospects and fiscal sustainability. Official projections anticipate that Japan's population will decline by 25 percent in the next 40 years. A rapidly shrinking and aging population and labor force constitute severe demographic headwinds to future productivity and growth. IMF staff simulations estimate that under current policies, the level of Japan's real GDP will decline by over 25 percent in about 40 years due to demographics relative to a projection for real GDP where productivity and population grow at their recent pace (Colacelli and Fernandez-Corugedo, 2018). Adverse demographic trends place significant pressures on fiscal sustainability, as age-related public expenditures rise while tax revenues shrink with the declining labor force (IMF 2018, Kitao, 2015 and McGrattan et al. 2018).

Japan: Population Decline 2012−57; Estimated City Size Loss

2012-2017 Japan population loss: equivalent to Stockholm	1,067,630
2017-22 loss: Havana	2,222,131
2023-27 loss: Madrid	3,070,546
2028-32 loss: Berlin	3,623,532
2033-37 loss: Los Angeles	4,081,318
2038-42 loss: Melbourne	4,404,281
2043-47 loss: Chennai	4,514,918
2048-52 loss: Sydney	4,480,750
2053-57 loss: Kolkata	4,513,098

Sources: Japan National Institute of Population and Social Security Research; United Nations Statistics Division, IMF (2018)

2.   Income inequality in Japan has been increasing, and population aging might exacerbate this trend. As in other advanced economies, inequality in Japan, especially income inequality, has been rising (Colacelli and Le, 2018). Intergenerational inequality is an important

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aspect of growing inequality in Japan. Pre-tax and transfers income inequality is higher among older generations than among younger generations. Elderly Japanese are wealthier than younger Japanese, where the old have more saving and benefit more from fiscal redistribution (via taxes and transfers). Such intergenerational inequality may be worsened in the context of an aging population.

3.   **The Japanese government envisages automation and artificial intelligence (AI) technology as offsetting its declining population and labor force.** The Japanese government's 2014 "Japan Revitalization Strategy," envisaged a "New Industrial Revolution Driven by Robots." The Japanese government launched the 'Society 5.0' initiative in 2019, with the aim to better utilize and disseminate robots across Japan.[2] The initiatives highlighted several sectors that will benefit from greater usage of robots and AI technology. These sectors include health care, transportation, infrastructure, and FinTech.

4.   **This chapter aims to quantitatively assess the macroeconomic and distributional implications of automation in Japan.** Labor saving technologies—automation and AI technology—change the way production takes place and by so doing can potentially increase productivity levels in the economy. At the same time, these technologies can disrupt labor market dynamics and displace labor in certain productive sectors, while expanding labor demand in other sectors. As the impact of automation and AI technologies is expected to differ for different types of workers, the widespread adoption of these technologies might further increase market income inequality and can result in increased income polarization. A proper assessment and quantification of the macroeconomic and distributional outcomes requires a general equilibrium framework that can account for the direct and indirect effects that these new technologies have on labor demand, labor incomes, private investment and aggregate economic activity.

B.   Framework of Analysis

5.   **The analysis is based on a multi-sector general equilibrium overlapping generations model developed for the quantitative analysis of the macroeconomic and distributional effects of aging.**[3] This model has a rich production structure that encompasses manufacturing, low tech-services and the high-tech services sector.[4] We assume that goods in these sectors are produced using different combinations of factors (tangible and intangible capital, as well as low-, mid- and high-skill labor)—see text figures below. Households vary by generation and skill level, and face different levels of taxation and transfers. On the spending side, households receive age-dependent transfers—pension benefits as well as health and long-term care. On the other hand, financing instruments include time-varying progressive labor income taxation (including social security contributions), consumption or value-added tax (VAT), corporate income tax, and

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[2] The 'Society 5.0' initiatives are to create a society that address various social challenges that Japan faces by incorporating the innovations of the fourth industrial revolution into every industry and social life (https://www.japan.go.jp/abenomics/_userdata/abenomics/pdf/society_5.0.pdf).

[3] For details on such a model tailored to Japan, see McGrattan et al. (2018) and Hong, Lizarazo Ruiz, Peralta-Alva and Yao (forthcoming).

[4] The sectorial structure assumed for this model is similar to Lizarazo Ruiz et al. (2017).

government debt. These instruments and related parameters are tailored to Japan's data at the macro and micro level, building upon McGrattan et al. (2018). In addition, the model's assumed demographic transition closely follows the Japanese authorities' own projections to capture the dynamics of age-related costs. The analysis considers a *baseline steady-state scenario* that corresponds to the period 2000–11, before Japan's population started to decline, which began in 2012. This period is used to calibrate the model to Japan.

Japan: Industry Characteristics in Three Sectors
(in percent)

Japan: Skill distribution by Sector
(in percent)

Sources: Ministry of Economy, Trade and Industry, IMF Staff calculations.

Source: IMF Staff calculations.
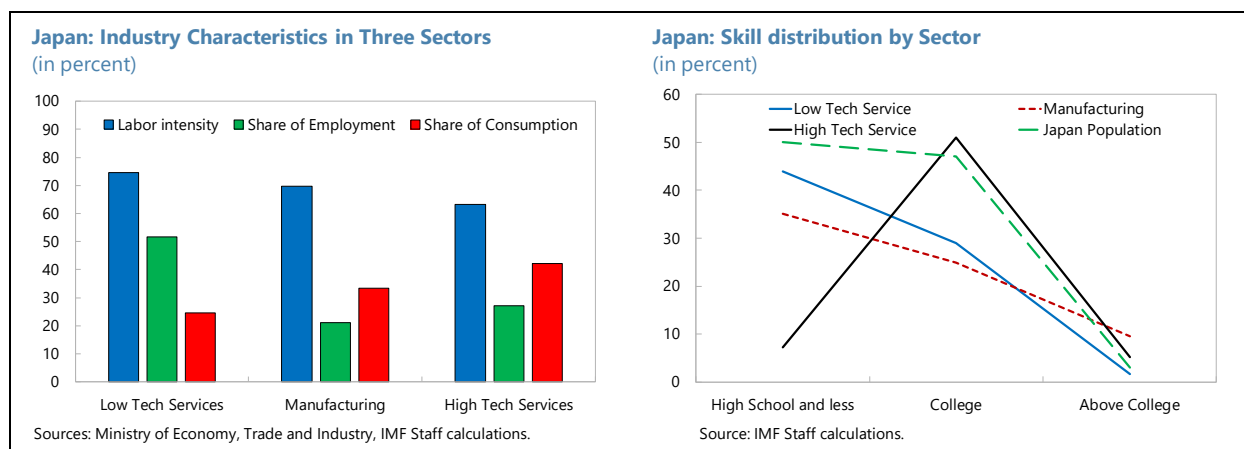
6.   The first scenario (labeled as 'Aging') considers a long-term scenario in which annual population growth is shrinking by 1 percent. Under this scenario, social security system (transfers, pensions and health expenditures), tax rates (except for VAT rates), and the public debt-to-GDP ratio are anchored at their 2019 levels; age-related fiscal costs of supporting the social security system are financed through permanent VAT rate increases. A comparison of this scenario with the baseline scenario permits an assessment of the macroeconomic and distributional impact of aging.

7.   The second scenario (labeled as 'Aging + Robots') allows for the introduction of automation and technological change in addition to aging. This scenario has the same underlying assumptions about negative population growth, the social security and taxation system, and public debt-to-GDP ratio as the 'aging' scenario. In addition, we introduce a higher elasticity substitution of low- and mid-skilled labor by capital in manufacturing and the high-tech services sector. This allows some tasks that had to be previously undertaken using labor can now be done using capital. We also introduce a reduction in the relative price of capital to wages to represent the fact that with technological change, capital (robots) becomes more affordable. As the exact pace of technological progress in the future is unknown, we assume that this process will be such that in the next 40 years, Japan's share of labor income in GDP will fall by the same amount it fell between 1980 and 2012 (approximately 5 percentage points) and that the relative price of capital goods (robots) to average wages will fall at an average of 0.5 percent per year. The latter corresponds to the average decline in the relative price of all private fixed assets to wages between 2000 and 2012 in the United States.

C. Main Findings

8.   In the baseline scenario, the long-term macroeconomic costs of Japan's declining and shrinking population are substantial. Even if we assume that total factor productivity growth is not affected by a decline in population growth, the level of GDP will fall by 8 percent with respect to the levels observed between 2000 and 2010. Less workers and less demand due to an aging and shrinking population will lead to a decline in total output. On the other hand, fiscal spending will increase largely due to age-related spending. VAT

Japan: Impact of Aging on GDP Level and VAT rate
(Percent change and percentage point change)

rates (or consumption tax rates) will have to increase permanently by 10 percentage points to maintain the debt-to-GDP ratio at the level observed in 2019 (that is, at about 230 percent).
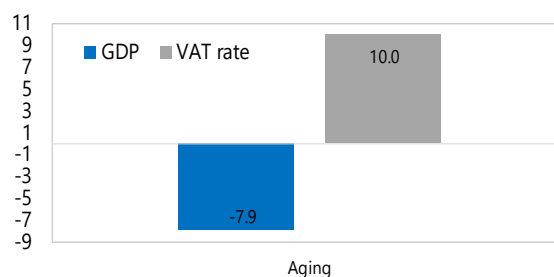
9.   The distributional effects of the demographic transition are troublesome. Our analysis shows that even though the wages of low-skilled workers increase with aging, market income inequality rises dramatically, with the Gini coefficient rising by five points (see text charts below).[5] The increase in market income inequality is the net result of two opposing forces: on the one hand, labor income becomes slightly more equally distributed, but on the other hand, the share of those whose total income is mainly determined by labor income (young households) falls, while the share of those whose total income is mainly determined by asset and wealth (older households) increases. As the distribution of wealth is much more unequal than the distribution of wages (as period by period differences in wages compound through time), market income distribution becomes much more unequal as a result of the demographic transition.

Japan: Wages by Skill Level (Aging Scenario)
(Percent change)
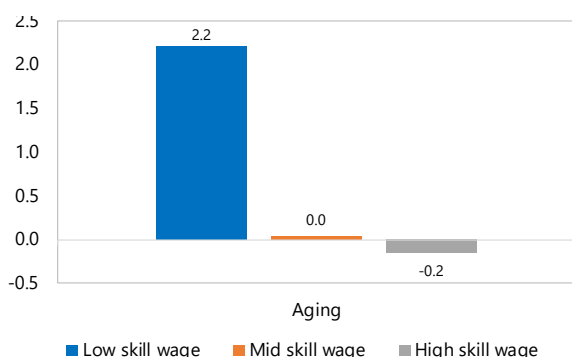
Japan: Distribution of Income (Aging Scenario)
(Percentage point changes)
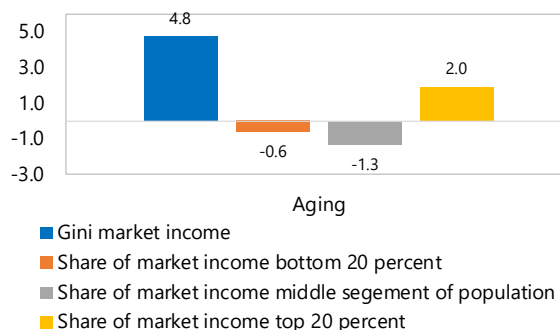
Source: IMF Staff calculations.

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[5] According to the OECD, Japan's last observed (2015) market income Gini coefficient was 50.4—almost identical to the market Gini coefficient for the United States in 2015 (50.6).

10.   If technological change continues at its current speed, automation could offset the impact of population aging on per-capita GDP. Automation ("aging + robots" scenario) might raise per-capita GDP by 4 percentage points above the average level seen during the period 2000–11 (see left panel of text chart below). However, automation will not suffice to eliminate fiscal pressures. Higher aggregate levels of age-related fiscal expenditures will still require an increase in VAT rates, though the necessary VAT rate increase is half that without automation, rising by 10 percentage points (Aging scenario) and by only 5 percentage points (Aging + Robots scenario).

Japan: GDP Levels - Different Scenarios
(In percent)

Source: IMF Staff calculations.

Japan: Increase in VAT Rate Needed for Fiscal Sustainability
(Percentage point change)

Source: IMF Staff calculations.
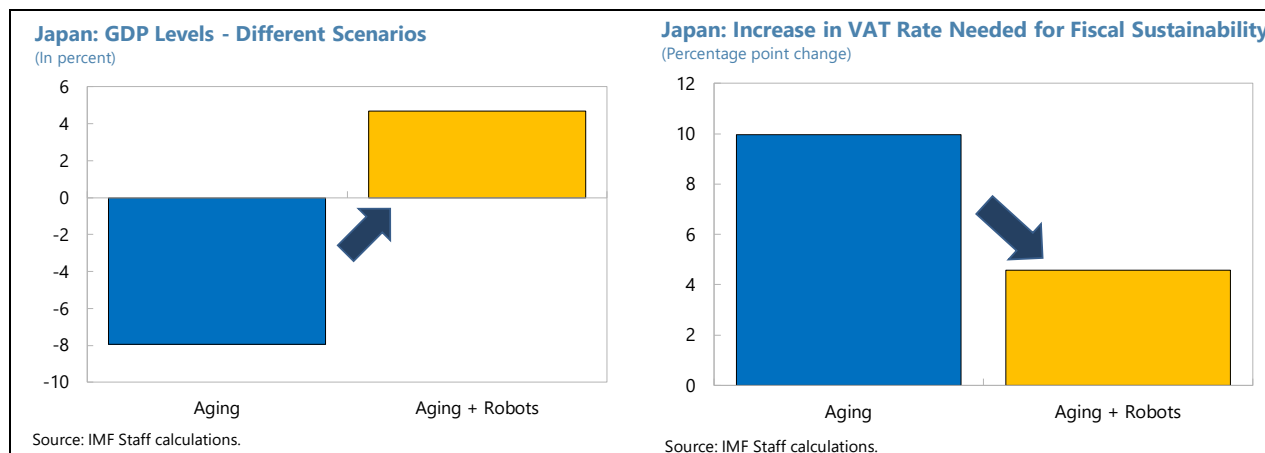
11.   In an aging society, automation could reduce market income inequality. While the direct impact of automation implies the replacement of workers with robots, the indirect effects of automation—between-industry shift effects and final demand effects—allow for an important increase in labor demand that pushes up wages for all workers (Autor and Salomons, 2018). In our analysis, automation leads to a reduction in market income inequality (see left panel in text chart below). This is due to the differentiated increase in wages by skill levels. With automation, the share of market income for the top 20 percent of the population increases, but the increase is smaller than in the aging-only scenario. The share of market income for middle segment declines with automation, but the decline is smaller than in the aging-only scenario (see right panel in text chart).

Japan: Changes in the Gini Index (Market Income)
(Percentage point change compared to the baseline)

Source: IMF Staff calculations.

Japan: Changes in the Share of Market Income by Income Group
(Percentage point change compared to the baseline)

■ Share of market income bottom 20 percent
■ Share of market income middle segement of population
■ Share of market income top 20 percent

Source: IMF Staff calculations.

12. **Through its impact in facilitating the financing of the social security system, automation can help reduce disposable income (and consumption) inequality.** As automation improves market income and makes possible the financing of the social security system with a smaller increase in VAT tax rates (making the impact of such increases less regressive), automation improves the distribution of consumption, with the Gini index using disposable income falling by 2 percentage points (see left panel of text chart below).[6] The share of consumption for the bottom 20 percent and middle-segment of the population increases in the aging scenario, but the increases are larger with automation (see right panel of text chart).

Japan: Changes in the Gini Index (Consumption)
(Percentage Point Change Compared to the Baseline)

Source: IMF Staff calculations.

Japan: Changes in the Share of Consumption by Income Group
(Percentage Point Change Compared to the Baseline)

Source: IMF Staff calculations.
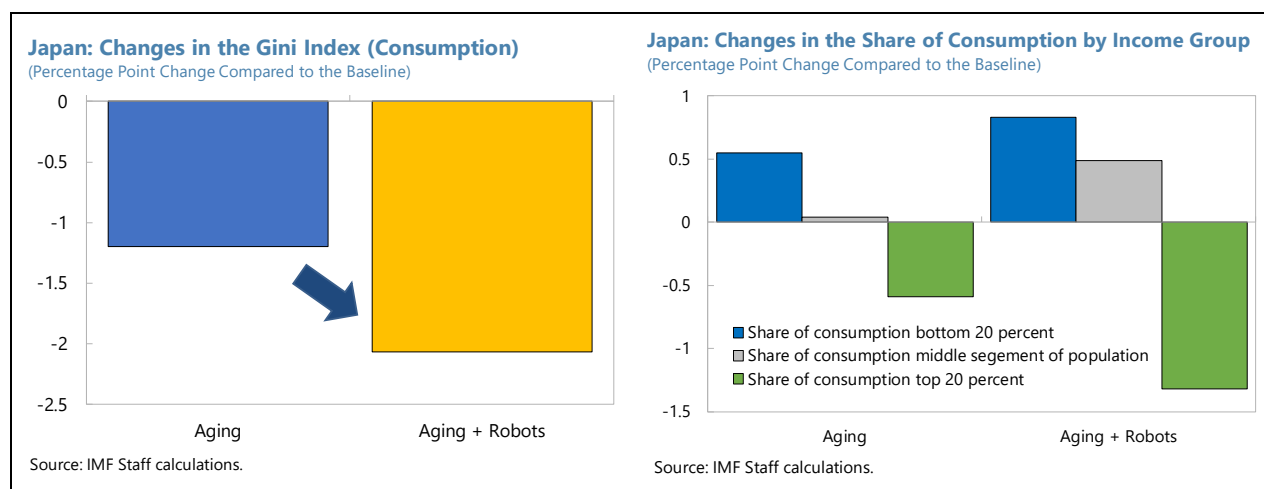
D. Conclusions

13. **The extent to which automation can help mitigate the challenges brought by the demographic transition in Japan depends on whether or not technological change occurs at its current speed of progress and breadth of reach.** Our analysis hinges critically on the assumptions made on the nature and speed of future technological progress. There is a great deal of uncertainty as to how this progress will unfold, but recent studies show that our assumption that technological progress will be as fast as past years may be an upper bound. Nordhaus (2015) discusses that in recent periods, technological change—measured by the rate of decline of capital prices to labor wage rate—does not seem to be accelerating and may even be slowing. In a similar fashion, IMF (2017) finds that the growth rate of cyclically-adjusted total factor productivity for advanced economies between 2008–14 is about half the rate of growth observed between 2003–07, and approximately one fifth the rate of growth observed between 1990 and 2002.

14. **To reap the maximum benefits from automation to offset the adverse impact of a declining population, investment in technology, innovation and education will need to have a high rate of return.** If the future growth rate of technological change is only one half that observed between 2000–12 (also half the assumed rate underlying our analysis), automation would not suffice

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[6] According to the OECD, Japan's disposable income Gini was 33.9 in 2015.

to prevent the fall of per-capita GDP caused by the demographic transition in Japan. This suggests that measures that help ensure that technological innovation is successful will have a large economic dividend. Efforts should be made to encourage spending on research and development, and improve education levels, to help familiarize workers with new technologies and enhance their labor productivity.

15.   At the same time, policies to address the distributional consequences of automation are important. One aspect not yet considered in this analysis, which deserves further attention, is the impact of automation on gender inequality and inequality across generations. Hamaguchi and Kondo (2018) estimate that female workers in Japan are exposed to higher risk of being replaced by 'computerization' than male workers. Similarly, elderly workers often enter the work force as part-time workers in sectors that require low-skills, and are thus more likely to be replaced by automation. Strong and effective social safety nets will be crucial to protect these workers, since disruptions of some traditional labor and social contracts due to automation are highly likely during Japan's demographic transition.

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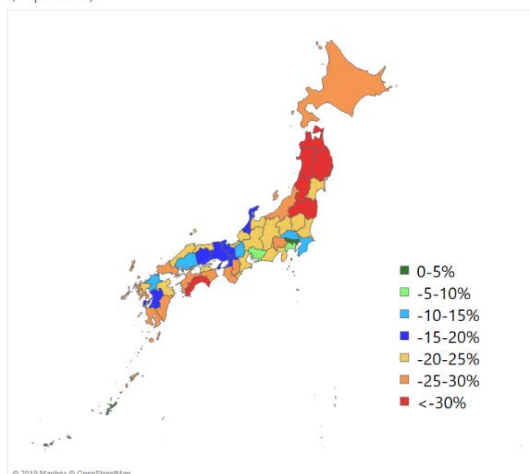
JAPAN'S FERTILITY RATE[1]

Japan's population is projected to decline by more than 25 percent in the next 40 years, if the current low fertility rate persists. This overwhelming demographic challenge ahead of Japan leads to consideration as to whether there are policies the authorities can implement to affect the fertility rate. This chapter takes stock of recent developments with respect to Japan's fertility rate, and argues that a combination of policies could raise the fertility rate if implemented in a coordinated and sustained manner.

A. Introduction

1.   Japan's population is projected to decline by more than 25 percent in the next 40 years, if the current low fertility rate persists. Japan's total fertility rate (sum of the age-specific birth rates of women aged 15 to 49) stood at 1.4 children per woman in 2018, which is well below the population replacement level of 2.1.[2] In addition, a large gap remains between the actual fertility rate and the "desired" rate of 1.8—the latter being the rate expected if people had their desired number of children. This gap raises the question as to whether public policies can help increase Japan's fertility rate by removing potential obstacles. A higher fertility rate could have positive impacts on aggregate GDP over the long-run, by increasing the size of the labor force and helping stabilize public debt (as a share of GDP). At the same time, this policy objective needs to be mutually consistent and reinforcing with other public policy objectives. For example, the IMF has stressed the need to promote female labor force participation—see IMF (2018), Colacelli and Fernandez-Corugedo (2018). However, if not accompanied by sufficient support for working couples with small children, higher FLFP could potentially increase the opportunity cost of giving birth and thereby lower the fertility rate. The Japanese government has stepped up its support for households with children, with notable measures being increasing the availability of childcare facilities and making preschool and childcare free. This chapter takes stock of recent developments in Japan's fertility rate, and discusses whether public policy can help increase the fertility rate.

Japan: Population Shrinkage by Prefecture, 2015-2045
(In percent)

- 0-5%
- -5-10%
- -10-15%
- -15-20%
- -20-25%
- -25-30%
- <-30%

© 2019 Mapbox © OpenStreetMap

Source: Statistics Bureau of Japan, Prefecture data.

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[1] Prepared by Takuma Hisanaga (APD).

[2] The total fertility rate in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates. This indicator is measured in children per woman. See OECD (2019).

B. Overview of Japan's Fertility Rate

2.   Japan's fertility rate has improved in recent years but remains low at 1.4 children per woman. After the second baby boom in the early 1970s, Japan's fertility rate declined until it bottomed out at 1.26 in 2005 (see top-left chart of Figure 1). This declining trend of fertility mirrors the trend increase in the percentage of late-married and non-married (see the bottom two charts of Figure 1). The marriage rate (the number of marriages per population of 1,000 persons) in Japan halved from around 10 in the early 1970s to around 5 in 2015. In more recent years, Japan's fertility rate has marginally recovered, but remains low at around 1.4 children per woman—well below the population replacement rate of 2.1, and lower than all other G7 countries except Italy (see the top-right chart of Figure 1).

Figure 1. Japan's Fertility Rate–Stylized Facts

Japan: Fertility Rate and Number of Births

Source: Vital Statistics, Ministry of Health, Labour and Welfare

Japan: Fertility Rates in OECD Countries

Source: OECD

Japan: Male Never Married
(In Percent)

Source: Population Census, Ministry of Internal Affairs and Communications

Japan: Female Never Married
(In Percent)

Source: Population Census, Ministry of Internal Affairs and Communications

3.   A gap exists between the actual and desired number of children per couple. According to a survey by the National Institute of Population and Social Security Research (the NIPSSR), an ideal number of children for a couple is 2.32 on average.[3] However, those couples plan to have on average 2.01 children—the sum of the number of children already born (1.68) and the number of

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[3] See NIPSSR (2015).

additional children the couple plans to have (0.33). On the other hand, while the unmarried rate of females aged 30–34 has risen to about 35 percent, 90 percent of unmarried females aged 18–34 intend to marry in the future. Based on the NIPSSR survey and other data, the government estimates the "desired" fertility rate of 1.8[4] that could be achieve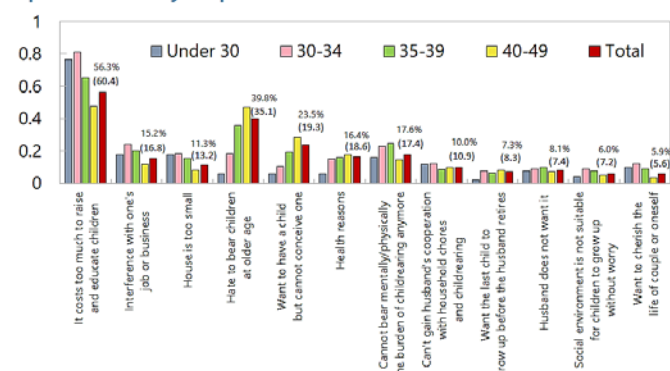d through closing the gap between the actual and desired number of children, and removing obstacles to higher fertility rates.

4.   The direct cost of childbearing seems to be the most important factor which prevents couples from attaining their ideal number of children. The NIPSSR 2015 survey summarizes the reasons why couples do not have their ideal number of children. The top reason cited by 56 percent of couples is the cost of childbearing; this is followed by the reluctance to bear a child at an advanced age (40 percent).

Japan: Reasons Why Couples Do Not Have Their Ideal Number of Children

Source: The 15th Japanese National Fertility Survey (Survey on Married Couples), National Institute of Population and Social Security Research (2015).
Note: Subjects were first-married couples with fewer planned children than their ideal number. The percentage of married couples with fewer planned children than their ideal number is 30.3 percent.

5.   The opportunity cost of childbearing also matters. During the period of Abenomics, Japan's female labor force participation rates (FLFP) have substantially increased from 63 percent in 2012 to 71 percent in 2018 (for those aged 15 to 64), according to OECD Employment and Labour Market Statistics. A higher FLFP could increase household incomes and make the cost of childbearing affordable (i.e., the income effect). On the other hand, higher FLFP could increase the opportunity cost of having children as females typically need to leave their workplaces for a certain period of time (i.e., the substitution effect). In fact, according to the NIPSSR (2015) survey, about 15 percent of couples responded that their jobs/businesses are one of the main reasons for the gap between the actual and desired number of children, which can be seen as a measure of the opportunity cost of having children.

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[4] This rate is based on the planned number of children for a couple, as well as other statistics including the share of single people who hope to marry and the desired number of children of single people.

6.   The opportunity cost of having children is high for full-time workers. According to a
longitudinal survey of Japanese newborns
in 2010, the total share of female workers
sharply dropped after giving birth from 62
percent to 35 percent (see Ministry of
Health, Labour and Welfare (2019)). The
total share of female workers gradually
recovered to the level before childbirth (61
percent) about 5.5 years after giving birth.
However, as illustrated in the text chart on
the right, most of the female workers re-
entered the job market as part-time
workers. The share of full-time workers
dropped from 38 percent to 25 percent
after childbirth and remained low at

Japan: Female's Employment Status after Giving Birth
(In percent)

Source: The 8th Longitudinal Survey of Newborns in the 21st Century, Ministry of
Health, Labour and Welfare

around 26 percent even 7.5 years after giving birth. The MHLW survey suggests that a number of
full-time female workers give up full-time status after childbirth, which has enduring implications for
their lifetime income and employment benefits.

C.   Empirical Analysis: Data and Methodology

**7.   This section provides a simple empirical analysis to study the possible drivers of
Japan's fertility rate.** D'Addio and Mira d'Ercole (2005) discussed the historical development of
fertility rates across OECD countries and showed that, based on a static cross-section analysis,
fertility rates are lower when the direct costs of childbearing are higher. Regarding the impact of
increased FLFP, they calculated that the correlation between female employment rates and total
fertility rates in OECD countries turned from negative to positive in the late 1980s. Using a dynamic
panel data model, they observed that the fertility rate is higher when (i) female employment rates
are higher, and/or (ii) the ratio of female to male wages is lower. In this section, an approach similar
to D'Addio and Mira d'Ercole (2005) is applied to Japan's prefecture-level panel data to study Japan
specific features.[5]

**8.   A panel dataset was constructed that covers data for 47 prefectures for the period
2001 to 2015.** In the panel regression analysis, the dependent variable is the prefecture-level total
fertility rate, and five variables that might affect the total fertility rate are included as explanatory
variables:

- *Education costs*. The share of education expenses in total expenditures for non-single households
  is derived from the Family Income and Expenditure Survey conducted by the Ministry of Internal

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[5] Among the previous studies of the fertility rate in Japan, Abe and Harada (2008) observed that, based on a cross-
section analysis of municipal-level data, a rise in female wages had a negative impact on the fertility rate, and that the
impact of improved availability of childcare facilities on the fertility rate was positive. Kato (2018) also analyzed
municipal-level data to find a positive impact of the female labor participation rate on the total fertility rate.

Affairs and Communications. As this could be viewed as a proxy for the direct cost of child-rearing, the expected sign is negative for the relationship between the total fertility rate and education costs.

- *Female labor force participation rate.* The prefectural labor force participation rates (ratios of labor force over the population) for women between 15 and 64 years old are derived from data of the National Census.[6] Based on the findings by D'Addio and Mira d'Ercole (2005), the expected sign is positive for the relationship between the FLFP rate and the total fertility rate.

- *Wage gap.* Ratios of female to male monthly wages (a higher ratio indicates a smaller wage gap between male and female) are used to measure the gap. The wage is average monthly contractual cash earnings in the MHLW's Basic Survey on Wage Structure. D'Addio and Mira d'Ercole (2005) find that a smaller wage gap (i.e., a higher ratio of female to male wages) implies a larger opportunity cost due to foregone income during maternity leave, leading to lower fertility rates. However, in the case of Japan, female workers often give up their full-time status after childbirth, as discussed in the previous section. Hence, a large wage gap could reflect changes in women's employment status after childbirth in Japan. Provided that the observed large wage gap (i.e., a low ratio of female to male wages) is attributable to a large share of female part-time workers after childbirth, the opportunity cost of giving birth would increase over the long-run, which could lower the fertility rate. Furthermore, a smaller wage gap is expected to yield better income prospects after childbirth, which increases the affordability of childbearing. In light of these factors, the expected sign of the wage gap-total fertility rate relationship could be positive, which would run contrary to the findings of D'Addio and Mira d'Ercole (2005).

- *Availability of childcare facilities*. The capacity (sum of authorized quotas of children) of childcare facilities for each prefecture is obtained from the MHLW's Survey of Social Welfare Institutions. Following Unayama (2009), the capacity is divided by the female population between 20 and 44 years old to make it comparable across prefectures. This variable can be viewed as an indication of commitment to child-friendly policies by prefectural governments. The expected sign of the relationship between total fertility rate and childcare facilities is positive.

- *Unemployment rate.* Prefecture-level unemployment rates are obtained from the Statistics Bureau's model-based estimates, based on data from the Labor Force Survey. This variable is introduced to factor in macroeconomic conditions, and the expected sign of the unemployment rate-total fertility rate relationship is negative.

9.   The Pooled-Mean Group estimator is the preferred model. The simple pooled OLS regression model does not allow for prefecture-specific effects. A commonly-used alternative, the fixed effects estimator, takes account of prefecture-specific effects, but fails to deal with the issue of the endogeneity of explanatory variables with respect to the total fertility rate. In order to deal with the endogeneity issue, the PMG (Pooled Mean Group) estimator proposed by Pesaran et al. (1999) is

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[6] As the National Census is a quinquennial survey, values for gap years are filled by linear interpolation.

used here, following the approach of D'Addio and Mira d'Ercole (2005). The PMG estimator distinguishes long-run and short-run dynamics. Coefficients for long-run effects are assumed to be identical across prefectures, while those for short-run effects are allowed to differ. The other model used in D'Addio and Mira d'Ercole (2005), a GMM (Generalized Method of Moments)-System estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), is a less preferred option here, because the post-estimation Sargan test rejected the null hypothesis that over-identifying restrictions are valid, indicating a potential misspecification (see Table 1). Therefore, the discussion hereafter is based on the PMG estimates, with a focus on the long-run dynamics, while turning to the GMM estimates as a complementary reference.

D. Results

10.   Every explanatory variable has a statistically-significant impact on the prefectural fertility rate in the long-run. Table 1 shows the results:

- *Wage gap.* A rise in the female wage relative to the male wage (a smaller gap between male and female wages) has a positive impact on fertility rates in the long-run. This supports the argument that a smaller wage gap could indicate lower opportunity costs of childbirth over the long-run, and make childbearing more affordable. On the other hand, the sign is negative in the short-run. A possible interpretation of this negative short-run effect is that a smaller wage gap could lower the fertility rate in the short-run due to a larger foregone income during maternity leave.

- *Female labor force participation rate.* A higher female labor force participation rate has a positive impact on the fertility rate in the long-run, in line with the findings of D'Addio and Mira d'Ercole (2005). The long-run result indicates that a one-percentage point increase in the FLFP rate is associated with a 0.04 increase in the fertility rate (see Table 1). Meanwhile, the sign is negative in the short-run, possibly pointing to a negative impact of opportunity costs on the fertility rate, as discussed above.

- *Education costs.* A reduction in education costs has a positive impact on the fertility rate in the long run, though this was not confirmed in the GMM estimates. The short-run coefficient is not statistically significant.

- *Childcare facilities.* An increase in childcare facilities has a positive impact on the fertility rate both in the short run and long run, demonstrating the potential effectiveness of child-friendly policies in raising the total fertility rate.

- *Unemployment rate.* The sign of the long-run coefficient is positive, while it is negative in the short run. The coefficient is statistically insignificant in the GMM estimates. This positive correlation could imply a low opportunity cost of childbearing when unemployment rates are high, though further analysis is warranted on this point.

E.   Policy Implications and Conclusions

11.   The Japanese government's Work Style Reform, which has intensified since 2016, could have a positive impact on the fertility rate.[7] Introduction of public policies to reduce the unwilling exclusion of female workers from the labor market following childbirth could raise the fertility rate over the long-term. It is of particular importance to nurture a working and social environment where female regular workers can retain regular-worker status after childbirth, if they wish to. Potential measures the authorities could undertake to achieve this goal include: (i) further increasing childcare availability; (ii) rewarding firms with high retention rates of female employees after childbirth; and (iii) eliminating disincentives to regular and full-time work embedded in the tax and social security systems (see IMF (2019)). The impact on the fertility rate could be reinforced by measures to alleviate the direct cost of childbearing, such as lowering education and childcare costs.

12.   Public policies supporting fertility should be implemented in a coordinated and sustained manner. Since the impact of each policy on the fertility rate is relatively small, a wide array of policies needs to be put in place in a coordinated, mutually-reinforcing manner in order to make a meaningful impact on the fertility rate. Lastly, the negative short-run effects of female labor force participation and the wage gap on the total fertility rate point to a need for the authorities to be persistent—sustaining public policies to support fertility even if the fertility rate is negatively affected in the short-run.

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[7] See also Box 2 of International Monetary Fund (2019) *Japan: Article IV Consultation—Staff Report*, for a case study of the experience of Nagi-town in Okayama Prefecture.

Table 1. Japan: Estimation Results of Total Fertility Rate by Prefecture, 2001–15

VARIABLES	(1) PMG (long-run coefficients)	(2) PMG (short-run coefficients)	(3) GMM-SYS
Wage gap	1.039***		0.402***
	(0.198)		(0.0815)
FLFP	4.003***		0.787***
	(0.583)		(0.214)
Education costs	-1.170**		-0.0518
	(0.507)		(0.226)
Childcare facilities	3.153***		1.151***
	(0.811)		(0.211)
Unemployment rate	4.442***		-0.116
	(0.655)		(0.266)
Lag of total fertility rate			0.438***
			(0.0340)
Error correction term		-0.385***	
		(0.0353)	
Change in wage gap		-0.355***	
		(0.0835)	
Change in FLFP		-10.29***	
		(2.774)	
Change in education costs		0.135	
		(0.172)	
Change in childcare facilities		1.015*	
		(0.564)	
Change in unemployment rate		-0.888*	
		(0.465)	
Constant		-0.873***	-0.116
		(0.0814)	(0.0999)
Observations	658	658	658
Sargan test (p-value)			0.000

Note: PMG denotes Pooled Mean Group; GMM-SYS denotes Generalized Method of Moments-System.

Prefectural data is for the period 2001-15 for 47 prefectures.

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations.

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TWENTY YEARS OF INDEPENDENCE: LESSONS AND WAY FORWARD FOR THE BANK OF JAPAN[1]

The Bank of Japan has used unconventional monetary policies (UMPs) to fight deflation and stabilize the financial system since its independence in the late 1990s. While the BoJ's reflation efforts have evolved over time, inflation has remained stubbornly low. The purpose of this chapter is to examine monetary policy in Japan over the past twenty years, in order to draw relevant lessons and propose ways to strengthen the Bank of Japan's policy framework. In doing so the analysis focuses on three aspects of monetary policy: (i) objectives and goals, (ii) policy strategies, and (iii) the communication framework.

A. Evolution of the Bank of Japan's Policy Objectives and Goal

1.   In the late 1990s, the central bank law was revised to give the Bank of Japan (BoJ) greater independence and clarify its policy objectives. Following the collapse of Japan's asset price bubble in the early 1990s, two important lessons emerged: (i) stable and low inflation was not sufficient to ensure financial stability and soundness of the national economy, and (ii) the BoJ needed greater independence from the government to secure credibility with the public and financial markets. Consequently, a new central bank law was adopted in 1998, separating the BoJ from the Ministry of Finance and providing the legal underpinning for a broad-based policy approach with explicit policy objectives to (i) achieve price stability and (ii) contribute to the stability of the financial system.[2] [3]

Japan: Asset and Consumer Prices, 1987-1999
(Index=100, 1987)
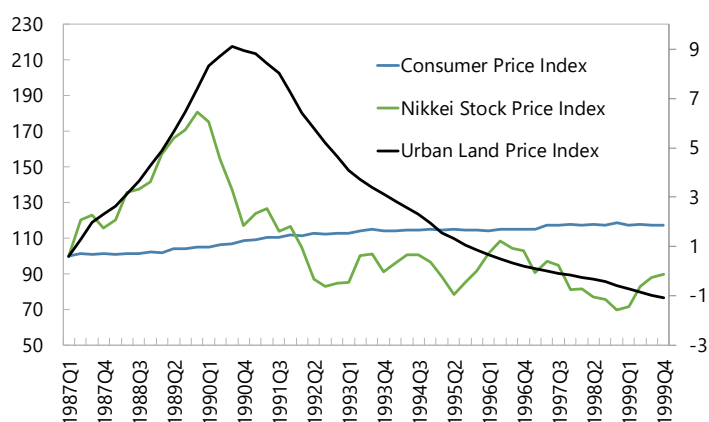
Source: Haver Analytics.

2.   The importance of the BoJ's price stability objective has increased over time along with greater goal transparency. While the revised Bank of Japan Act (1998) specified the BoJ's

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[1] Prepared by Niklas Westelius (FIN).

[2] The new Bank of Japan Act (Act No. 89 of June 1997) was enacted in 1997 by the Diet, and came into effect in April 1998.

[3] The BoJ's objective under the previous Bank of Japan Act (1942) was to help maximize the potential growth of the economy (Ito, 2004). The 1998 Act states that the objective for monetary policy should be "*aimed at achieving price stability, thereby contributing to the sound development of the national economy*" (Article 2) and that the purpose of the bank is to "*[...] ensure smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of stability of the financial system*" (Article 1).

policy objectives, it gave the Bank autonomy to determine their relative importance and to set specific policy goals.

- *Relative weight on policy objectives.* During 2000–06, financial and price stability issues were front and center for the BoJ. Non-performing loans weighed on financial intermediation while deflation became more pronounced. Over time, however, as financial vulnerabilities became less prevalent and the urgency to reflate the economy more pressing, the price stability objective grew in importance. This was particularly true following the government's introduction of Abenomics in 2012 (see text figure) which put forth an ambitious policy agenda to raise growth and exit deflation.

Japan: The BoJ's Price Stability Target and the Public's Awareness of the Price Stability Objective relative to Financial Stability Objective[1]
(Index Dec 2005=100)
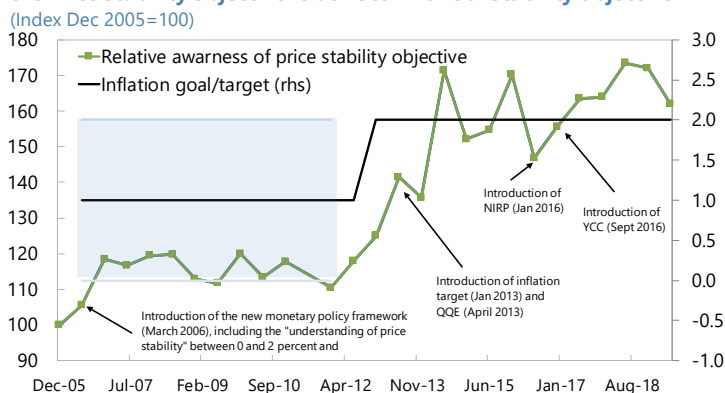
[1] The measure is calculated as the ratio between the share of respondents saying they have knowledge of the price objective to the share of respondents saying they have knowledge of the financial stability objective
Source: Bank of Japan; Opinion Survey on the General Public's Mindset and Behavior.

- *Goal transparency.* Despite early discussions about adopting an explicit inflation target, the exact definition of "price stability" remained vague following BoJ's independence. Fearing that a numerical inflation goal would reduce policy flexibility, the BoJ broadly defined price stability as a situation that was "neither deflationary nor inflationary."[4] However, in 2006—as part of a new monetary policy strategy—the BoJ saw the need for greater clarity regarding its price stability target. Consequently, the BoJ Board decided to disclose that individual Board members' understanding of medium to long-term price stability ranged between 0 and 2 percent with a median of around 1 percent. Six year later, shortly after the U.S. Federal Reserve announced a 2 percent inflation goal, the BoJ adopted a single numerical inflation goal of 1 percent to help clarify its policy stance. Importantly, the new price stability goal was not tied to the views of Board members but to that of the institution. Finally, a year later—with the introduction of Abenomics and in line with other major central banks— the 1 percent *goal* was replaced by a 2 percent inflation *target*.[5] Hence, it took the BoJ almost 15 years before adopting a clear and transparent goal for its price stability objective (Figure 1).

B.   Unconventional Strategies to Reflate the Economy

3.   Shortly after independence, the BoJ adopted UMPs to exit deflation and safeguard financial stability. In the late 1990s and early 2000s the Japanese economy was facing slowing

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[4] See https://www.boj.or.jp/en/announcements/release_2000/k001013a.htm/

[5] The use of "goal" in 2012 reflected the belief that "target" might be construed as meaning rigidly conducting monetary policy with only price developments taken into account. See https://www.boj.or.jp/en/mopo/mpmsche_minu/minu_2013/g130122.pdf

demand, declining consumer prices, and financial instability due to a confluence of factors, including the 1997 consumption tax hike, a domestic banking crisis, and the Asian Financial Crisis (see Figure 1 and 2). With the policy rate close to the zero-lower bound (ZLB), the BoJ embarked on a number of unconventional policy measures.

Figure 1. Japan: Inflation and GDP Growth, 1998–2019

Source: Haver Analytics.

Figure 2. Japan: Monetary Policy Operations, 1998–2019

Source: Haver Analytics.
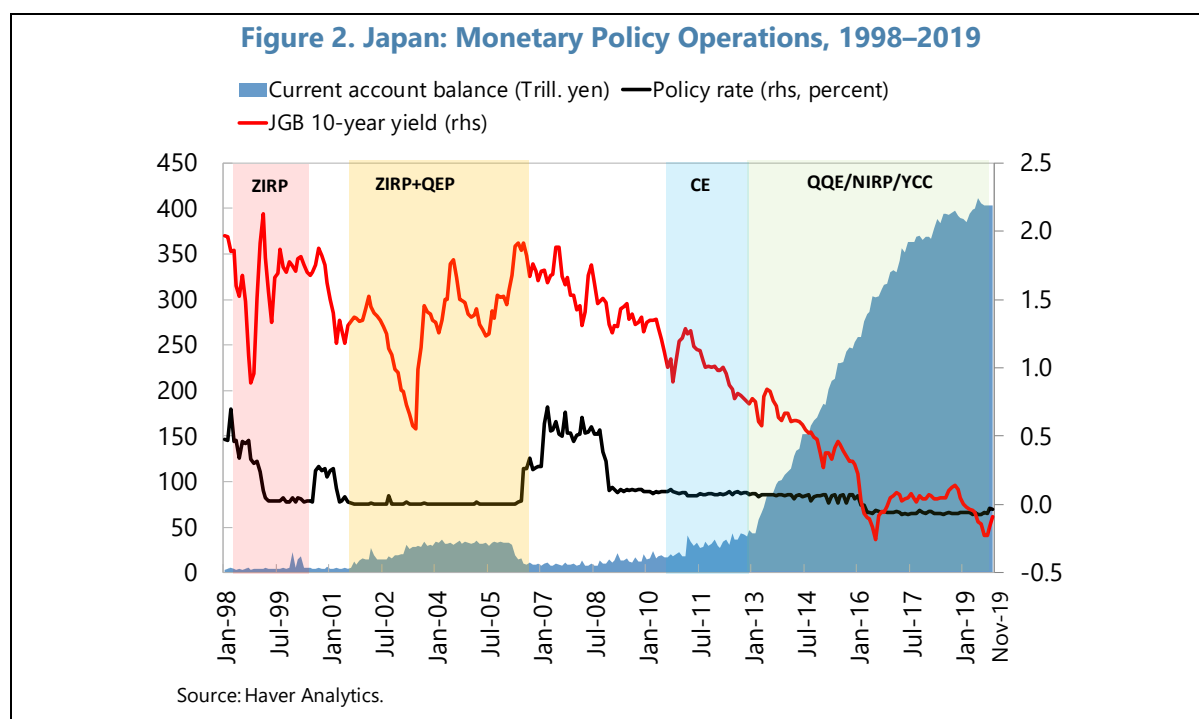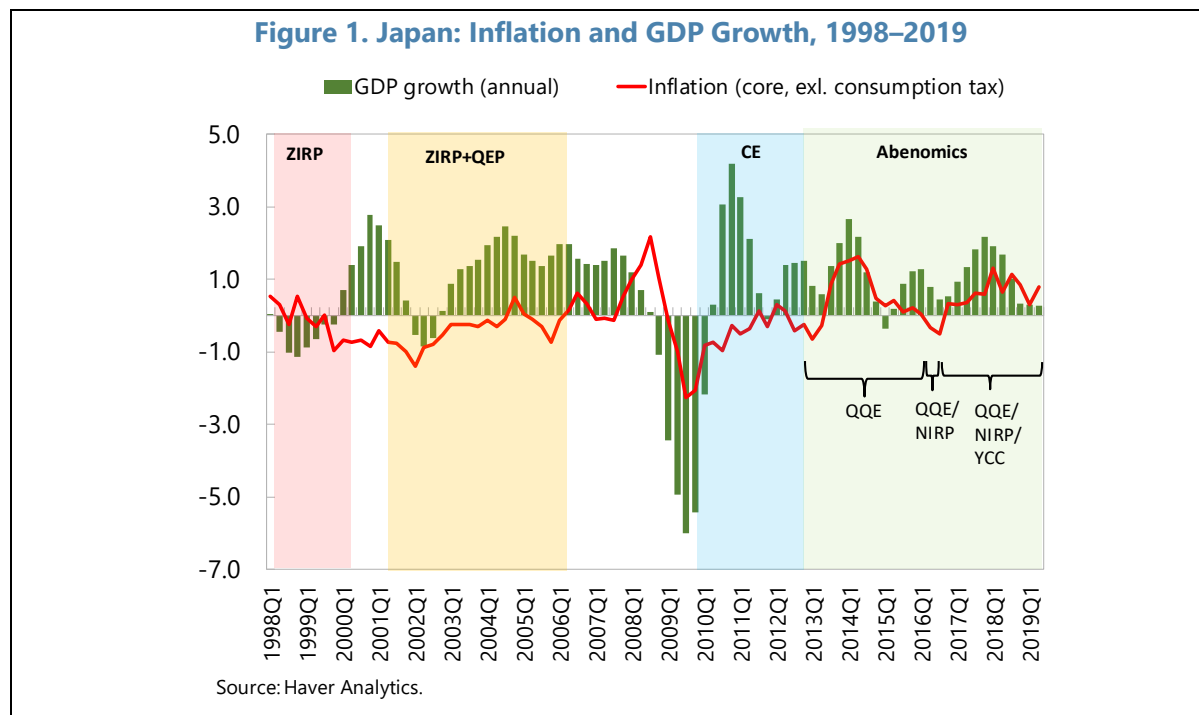
- *Zero Interest Rate Policy (ZIRP).* In February 1999, the BoJ lowered the policy rate "as low as possible" and later added that ZIRP would continue until deflationary concerns subsided. However, by August 2000, the BoJ judged that current economic conditions had improved enough to exit ZIRP and raised the overnight call rate into positive territory. This normalization effort, however, occurred despite a slightly unfavorable outlook (see text figure).

Japan: BoJ: Forecasts when Exiting ZIRP in August 2000
(In percent)
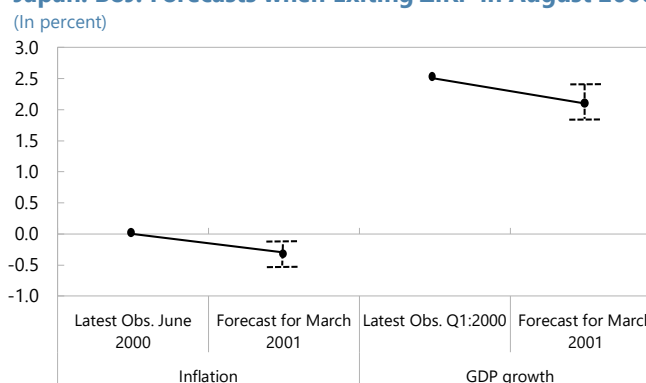
Sources: BoJ
Note: The March 2001 forecasts were published in October 2000. The intervals around the forecasts indicate the range of Board members' forecasts

- *Quantitative Easing Policy (QEP).* The economy weakened substantially in early 2001 and the BoJ decided to re-instate ZIRP and reinforce it with QEP. The new policy strategy entailed a change in policy instrument—from the short-term rate to quantity of reserves—and purchases of long-term JGBs to increase the monetary base. To convince markets that the policy would be maintained, the Board committed to maintain ZIRP until core inflation became stably above zero or recorded an increase year on year.[6]

- *Measures to ensure financial stability.* Financial system stress occurred several times during this period, causing liquidity and risk premia to rise. Apart from the liquidity support through QEP, the BoJ also took specific steps to target pockets of financial vulnerability, including widening the range of acceptable collateral for its fund providing operations and allowing banks to sell stocks directly to the BoJ.[7]

4.   In 2006, the BoJ started to normalize policy as economic conditions improved. In early 2006, economic growth had recovered, inflation was rising, and financial and corporate sectors were in the best shape in over a decade.[8] Moreover, the legacy problem of non-performing loans, which had hampered financial intermediation, was largely resolved. Hence, in March 2006 the BoJ judged that the conditions for exiting QEP had been met and re-introduced the overnight interest rate as the main policy tool. However, similar to the 2000 episode, the BoJ's economic forecast published around the time of the decision did not seem to indicate a strong case for normalization.[9]

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[6] See https://www.boj.or.jp/en/announcements/release_2003/k031010b.htm/

[7] See Ueda (2012) and https://www.boj.or.jp/en/announcements/release_2002/fss0210c.htm/

[8] See https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Japan-Staff-Report-for-the-2006-Article-IV-Consultation-19484

[9] At the time, the BoJ projected the two-year-ahead core inflation at slightly below one percent, with core inflation being positive for three consecutive months and expected to remain positive going forward. Moreover, according to the minutes from the policy meeting on March 9, 2006, many Board members judged that the output gap was only gradually narrowing, and unit labor costs were facing weakening downward pressures.

5.   The BoJ also introduced a new monetary policy framework to improve policy predictability while preserving flexibility. The framework consisted of two components. First, the BoJ Board members decided to disclose their "understanding" of price stability (ranging from 0 to 2 percent). Second, policy decisions were to be guided by a "two perspective" approach. The first perspective entailed an assessment of whether the near-term outlook (1-2 years) followed a path of sustainable growth under price stability. The second perspective was to examine various risks to the outlook over the longer term, including financial stability risks.

6.   The BoJ was relatively slow in returning to UMPs following the Global Financial Crisis (GFC). In the summer of 2008, the GFC significantly depressed economic activity and caused a sharp drop in inflation (Figure 1). The overnight rate was again lowered to the ZLB and number of measures were taken to strengthen financial institutions and market functioning.[10] However, it was not until October 2010 that the BoJ reverted back to quantitative easing by introducing its Comprehensive Monetary Easing (CE) framework. The CE framework re-introduced ZIRP together with an asset purchase program consisting not only of

Size of Balance Sheet: BoJ, ECB and U.S. Federal Reserve (index=100; August 2008)

Source: FRED

JGB purchases, but also risky assets to reduce term and risk premia.[11] However, compared to the U.S. Federal Reserve and the European Central Bank (ECB), the BoJ's response to the GFC was more protracted and smaller in size (see text figure).
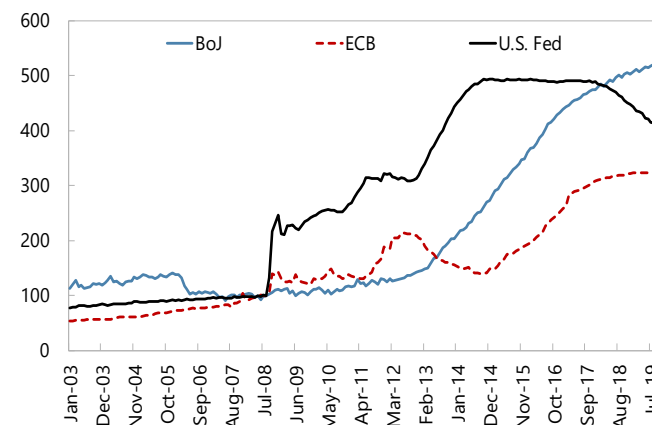
7.   In 2013, the BoJ scaled up its quantitative easing program to quickly boost inflation expectations and achieve the new two percent price stability target. The policy shift occurred in the context of Abenomics—a coordinated policy effort by the BoJ and the government to (i) achieve the new two percent inflation target, (ii) boost potential growth and increase competitiveness, and (ii) ensure long-run debt sustainability.

- *Quantitative and Qualitative Easing (QQE).* In April 2013, just a few months after raising the price stability target to 2 percent, the BoJ introduced QQE—a significant scale-up of CE—consisting of a sharp increase in purchases of JGBs and risky assets. Under QQE, the BoJ explicitly committed to increase its annual purchase JGBs holdings by about ¥50 trillion per year. The new program signaled a determined effort by the BoJ to back up its commitment to the higher inflation target through strong and transparent actions. The new strategy appeared initially successful. Inflation

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[10] See https://www.boj.or.jp/en/mopo/outline/cfc.htm/

[11] The risky asset purchases covered corporate bonds, commercial paper, exchange-traded funds (ETFs), and real estate investment trusts (REITs).

rose, the exchange rate depreciated, and growth picked up. However, economic conditions started to deteriorate in the second half of 2014 as a fall in oil prices and weak demand following the consumption tax rate hike in April 2014 exerted downward pressure on inflation and growth.[12]
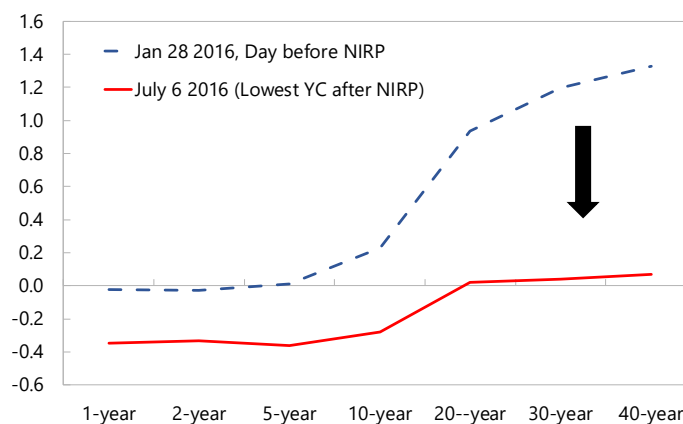
- *Negative Interest Rate Policy (NIRP)*. Despite the scale-up of QQE, domestic growth weakened further in 2015, and inflation continued to fall (Figure 1). Moreover, concerns were emerging that the BoJ would soon run out of JGBs to purchase and that options to further stimulate the economy were limited. To dispel these concerns, the BoJ surprised market participant in early 2016 by lowering the interest rate on excess reserves into negative territory. The intention was to put downward pressure on

Japan: Flattening of the Yield Curve Following NIRP
(In Percent)

Jan 28 2016, Day before NIRP

July 6 2016 (Lowest YC after NIRP)

Source: Haver Analytics.

short-term interest rates and raise inflation expectations by re-confirming the Bank's commitment to achieving the inflation target. However, the impact on yields was larger than anticipated, leading to a significant flattening of the yield curve (see text figure). The large compression of term spreads triggered worries about financial sector side-effects (i.e., increased risk taking and further decline in profitability of financial institutions).

8.   In 2016, the BoJ changed policy strategy again amid concerns about financial side-effects and persistently-low inflation expectations. With actual and expected inflation still below target more than three years after the introduction of QQE, the BoJ launched a comprehensive review of its monetary policy framework. The review was published in September 2016 and concluded that (i) the lowering of real interest rates along the yield curve had been the most effective tool to stimulate economic activity, and (ii) inflation expectations had proven to be more backward-looking than previously thought. Based on these observations the BoJ changed strategy.

- *Digging in for the long-run*. Instead of aiming for a quick reflation, the BoJ switched to a more protracted reflation approach that was more compatible with the adaptive nature of Japanese inflation expectations. Specifically, by generating a persistent positive output gap through sustained accommodative policy, realized inflation would gradually rise and eventually re-anchor inflation expectations at the two percent target. However, this prolonged "high-pressure"

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[12] The BoJ responded to the weakening economy in October 2014 by raising the annual increase of JGB holdings from ¥50 trillion to ¥80 trillion.

strategy would need to be complemented by measures to mitigate financial side-effects and ensure policy sustainability.

- *The Yield Curve Control (YCC) framework*. To support the new reflation strategy, the BoJ implemented a new operational framework. The purpose of YCC was to shape the yield curve by targeting both the short-term interest rate (NIRP) and the long-term interest rate (10-year JGB yield). By buying JGBs along the entire yield curve, the BoJ would be able to prevent the long end of the curve from falling while keeping the short end unchanged. This would make monetary accommodation more sustainable since lending rates are benchmarked to short- to medium-term interest rates, while the profitability of financial institutions such as pension funds and insurers is influenced by long-term term spreads.[13] Moreover, the YCC would allow the BoJ to reduce JGB purchases and hence address concerns that it was running out of JGBs to buy.

9.   While macroeconomic outcomes have somewhat improved under YCC, actual and expected inflation remain below the inflation target and financial side-effects continue to accumulate. Economic growth has average above potential since 2016 and core inflation appears to have stabilized at slightly below one percent. Moreover, the yield curve has steepened compared to the levels seen right before the implementation of YCC, and the BoJ's purchases of JGBs have fallen markedly. However, little progress has been made in terms of permanently lifting inflation expectations. Moreover, low bank profitability and search for yield by financial institutions still pose a significant risk to financial stability over the medium-term.

C.   Communication Strategies and Inflation Expectations

10.   Pre-Abenomics, unconventional monetary policy communication focused on exploring the so-called "duration effect." The duration effect was intended to influence market expectations about the future course of monetary policy, and hence stabilize interest rates at a low level and lift inflation expectations.[14] Initially, under QEP, the BoJ communicated that monetary easing would "*continue until the CPI (excluding perishables) registers stably a zero percent or an increase year on year*."[15] While this commitment reduced uncertainty about the policy rate and laid out relatively clear exit conditions, it was largely backward looking and did not tie policy to a price stability target. This was somewhat reversed with the introduction of the "two-perspective approach" in 2006 which anchored policy guidance in a medium-term numerical "understanding" of price stability. For instance, when introducing CE in 2010, the BoJ stated that it would "*maintain the virtually zero interest rate policy until price stability is in sight on the basis of the "understanding of medium- to long-term price stability.*" While this guidance was better tied to the price stability objective and hence more forward looking, it was more ambiguous regarding exit conditions.

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[13] See speech by Governor Kuroda (2017): https://www.boj.or.jp/en/announcements/press/koen_2017/ko171114a.htm/

[14] See Fujiki and Shiratsuka (2002).

[15] See https://www.boj.or.jp/en/announcements/release_2001/k010319b.htm/

11.   The BoJ's communication strategy changed drastically with the introduction of the two percent inflation target. The new communication strategy focused on quickly re-anchoring inflation expectations at the higher price stability target. First, by promising to achieve the price stability target "*at the earliest possible time, with a time horizon of about two years,*" the BoJ deviated from its previous position that price stability should be pursued over the medium to long-term.[16] Second, the time-dependent guidance indirectly implied an almost unconditional commitment to price stability, effectively deprioritizing other objectives. Third, by committing to the massive increase in JGB purchases, the BoJ showed that it

Japan: Annual Change in the BoJ's JGB Holdings, 2010-19
(Trillion Yen)

Source: Haver Analytics.

was willing to back up its verbal commitment to the inflation target with strong and transparent policy actions.
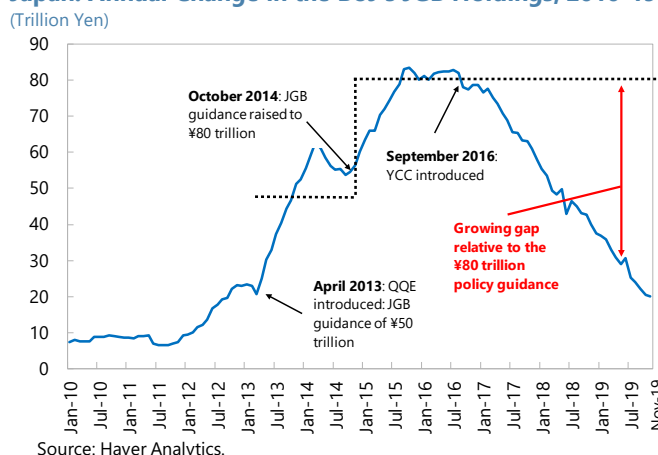
12.   The 2016 shift to a gradual reflation approach under YCC required the BoJ to once again adjust its communication strategy. In line with the new gradual reflation approach under YCC, the time horizon for achieving the inflation target was gradually de-emphasized. Moreover, BoJ Board members began to acknowledge financial side-effects more prominently, while arguing that the new framework was more flexible and sustainable. In addition to YCC, the BoJ also tried to make inflation expectations more forward-looking by committing to expand the monetary base until the inflation target was achieved (e.g., the so-called overshooting commitment). Policy guidance, however, became more complicated. Despite switching operationally from quantity to interest rate targeting under YCC, the BoJ was reluctant to abandon its quantitative guidance on JGB purchases. This has resulted in a growing discrepancy between the quantity guidance and actual JGB purchases (see text figure).

13.   In 2018, speculation of a premature normalization prompted the BoJ to introduce explicit forward guidance on policy rates. In response to upward pressure on the 10-year JGB yield in the summer of 2018, the BoJ (i) increased the variability range around the zero percent yield target and (ii) strengthened its commitment to achieving 2 percent inflation by introducing forward guidance for policy rates. Initially, the forward guidance was time-dependent to ensure that rates would remain low beyond the implementation of the scheduled October 2019 consumption tax rate increase. However, in the fall of 2019, the BoJ shifted to a more state-based guidance by committing to keep short- and long-term interest rates low "*as long as it is necessary to pay close attention to the possibility that the momentum toward achieving the price stability target will be lost.*"

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[16] See https://www.boj.or.jp/en/announcements/release_2012/k120214b.pdf

D. Lessons Learned and Way Forward

14.   Based on the BoJ's twenty years of reflation experience, there are a number of measures that could be taken to strengthen the overall monetary policy framework. In particular, the BoJ could: (i) clarify its commitment to the inflation target while increasing policy flexibility to address competing objectives, (ii) improve the internal decision-making process, and (iii) simplify and strengthen its communication framework.

Policy Objectives and Goals

15.   The lack of stability and clarity of policy objectives have complicated policy implementation and hampered reflation efforts. During the early years, the relatively large weight on the financial stability objective combined with the absence of a clear price stability target may have contributed to insufficient monetary stimulus and a bias towards premature policy normalization (e.g., the 2000 and 2006 episodes). On the other hand, the large relative weight on price stability combined with an over-optimism to achieve the inflation target during the QQE/NIRP/YCC period has likely negatively impacted policy credibility and contributed to keeping inflation expectations persistently low. In particular, the emphasis on achieving the price stability target "as soon as possible" together with unrealistic inflation forecasts have been particularly problematic given limited policy space, a clogged monetary transmission, and rising financial stability costs. Finding the right balance between the price and financial stability objectives and setting realistic conditions for achieving the inflation target is key to improve policy credibility and better anchor long-run inflation expectations.

16.   The BoJ should consider strengthening and clarifying its commitment to the target while increasing policy flexibility to address financial stability concerns. Specifically, the BoJ could announce a comprehensive review of its price stability objective—similar to the reviews conducted in 2000, 2006, and 2013. The review would allow the BoJ to:

- *Re-confirm or re-evaluate the inflation level viewed as consistent with price stability*. Moreover, the BoJ should clarify that the price stability target will be achieved over the medium- to long-term. This would help dispel a lingering perception that the BoJ is trying to achieve the two percent target as soon as possible regardless of the short-term costs.

- *Introduce a range around the inflation target*. This would enable a more gradual reflation process that is more consistent with realistic inflation projections while also providing more flexibility to credibly address financial side-effects.

- *Better communicate its views on the trade-offs between financial stability and price stability objectives*. The BoJ should clarify that it is not excessively focused on inflation, but that other objectives, including financial stability, also matter for monetary policy. This would help avoid speculation of premature normalization and a loss of credibility when financial stability costs rise.

17.   The re-evaluation of the inflation target and introduction of greater policy flexibility would need to be carefully communicated. A target range and a longer time horizon would allow the BoJ to more effectively take into account (i) downward pressure on inflation from structural forces, (ii) limited available policy space, and (iii) financial sector side-effects. However, these adjustments could be interpreted as a reduced commitment to the inflation target and hence depress inflation expectations. It is therefore crucial to communicate these adjustments in a careful and systematic manner. For instance, an announcement of a comprehensive review of the price stability objective would allow the BoJ to clearly lay out the underlying motivation and rationale for the changes. Indeed, the BoJ could replicate the communication strategy of the YCC, which successfully allowed the Bank to reduce JGB purchases without triggering policy normalization concerns. Moreover, the BoJ could point out that introducing a target range and a longer time horizon is largely consistent with the practice of other major central banks. Indeed, as shown in Table 1, several major central banks specify a tolerance range around their inflation target while emphasizing the medium- to long-term nature of the target horizon.

Policy Strategy and Communication

18.   Policy decisions should have been more forward looking and better tied to policy goals. As argued by Governor Kuroda, the BoJ's pre-Abenomics commitment to reflation was at times ambiguous and likely rendered monetary policy insufficient to raise inflation expectations.[17] The absence of an explicit long-term price stability target in the early days may have complicated policy discussions and the ability to manage inflation expectations.[18] In addition, there appears to have been a tendency to place a large weight on current instead of future economic conditions when setting policy. This is particularly problematic given that monetary policy works with a lag. Moreover, discussions during policy deliberations tend to focus on current policy settings rather than the entire future policy path. Indeed, these features of the decision-making process may partly explain the premature nature of the two normalization episodes (2000 and 2006) and the delayed response to the GFC. The "two-perspective approach" implemented in 2006 and the subsequent clarifications of the numerical value of the price stability target clearly improved matters. However, even today, it is unclear how policy decisions are systematically guided by the BoJ Board's economic forecasts and the two percent inflation target.

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[17] See https://www.boj.or.jp/en/announcements/press/koen_2017/ko171114a.htm/

[18] As pointed out by Orphanides (2018), the lack of definition for price stability implied that BoJ Board members could use their discretion to define the inflation goal. The obvious problem with such a situation is that alternative policy goals imply different policy settings.

Table 1. Japan: Monetary and Financial Stability Objectives and Goals of Selected Central Banks

Central Bank	Monetary Policy			Financial Stability Objective	Macroprudential Policy Responsibility
	Objective(s)	Target/range	Horizon		
Reserve Bank of Australia (RBA)	Price stability (taking into account activity and employment levels)	2-3 %	Medium-term average	Promote overall financial stability	*Council of Financial Regulators* (incl. RBA). Power resides with members. Australian Prudential Regulation Authority (APRA) is responsible for MaPP
Bank of Canada (BoC)	Price stability	2% +/-1%	Six to eight quarters depending shock persistence	Fostering a stable and efficient financial system	Powers over macroprudential tools lie with the Department of Finance and OSFI.
Bank of England (BoE)	Price stability	2 % target; Letter to Government if outside 1-3%	None	Protect and enhance the stability of the financial system	BoE's *Financial Policy Committee (FPC)* identifies, monitors and takes action to remove or reduce systemic risks.
Bank of Japan (BoJ)	Price stability	2%	As soon as possible	Contribute to the maintenance of stability of the financial system	The *Financial Sevices Agency* is the designated regulatory and supervisory authority for all financial institutions and responsible for the implementation of macroprudential policy in Japan. The BoJ also assesses systemic risks and conduct on-site examinations and offsite
European Central Bank (ECB)	Price stability	Below 2 %	Medium-term	Contribute to the smooth conduct of policies pursued by competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system	Macroprudential policy is a shared competency between national authorities and the ECB.
Reserve Bank of New Zealand (RBNZ)	Price stability and maximum sustainable employment	2% +/-1%	Medium-term with a focus on keeping future inflation near the 2 percent mid-point	Promote a sound and efficient financial system	*RBNZ* is responsible for macroprudential policy. Ministry of Finance is consulted ahead of policy decisions.
Riksbanken	Price stability	2 % with a variation band of 1-3%	None	Promote stability in the financial system as a whole	*Financial Stability Council* (incl. Riksbanken). Powers reside with members. The Financial Supervisory Authority is responsible for MaPP
U.S. Federal Reserve (U.S. Fed)	Price stability and maximum employment	2%	Long-run goal	Foster the safety and soundness of individual institutions and promote financial stability (shared with other government agencies)	*Financial Stability Oversight Council* (FSOC) - includes all regulatory agencies (incl the FRB). FSCO is consultative and powers reside with members.

Sources: IMF; BoC; BoE; BoJ;ECB; RBNZ; Riskabanken; and US Fed

19.   The communication strategy under Abenomics has at times been overly ambitious, ambiguous, and complicated. The commitment to achieve the inflation target in 2013 was an improvement and stood in sharp contrast to the pre-Abenomics period. However, one potential drawback was that the commitment was likely too extreme, hence resulting in reduced policy credibility. In particular, by communicating an unrealistic target horizon and overselling the available policy space to stimulate the economy, the public gradually come to discount the BoJ's ability to achieve the inflation target. Moreover, communication during QQE/NIRP/YCC did not adequately ensure policy predictability and probably added to policy uncertainty and ambiguity. This is perhaps best illustrated by the surprise implementation of the NIRP, and the BoJ's reluctance to remove redundant policy guidance when changing policy framework (i.e., keeping both quantitative and interest rate guidance under YCC). Overall, there is a need for the BoJ to better explain how its policy strategy can achieve the price stability target based on current and forecast economic conditions. Indeed, anchoring long-run inflation expectations at the 2 percent target critically depends on whether the public believes that the BoJ's policy strategy and associated actions are consistent with achieving the target.

20.   Implementation of Inflation Forecast Targeting (IFT) could strengthen the policy decision process and the BoJ's ability to manage inflation expectations. The IFT framework was originally proposed by Svensson (1997) and has since been adopted by a number of central banks.[19] IFT provides an intuitive and structured approach to policy making which enables a central bank to effectively communicate its strategy and manage expectations.[20] The following adjustments could be made in the case of the BoJ.

- *Strengthen the decision-making process*. In preparation for a monetary policy meeting (MPM), BoJ staff could construct inflation and growth forecasts based on given policy rate-paths and the latest economic information.[21] These forecasts and associated policy paths would then be presented to the Board members at the MPM. They would vote on which policy path best fulfills the BoJ's mandate.[22] Hence, in contrast to today's practice, the Board's decision would not just take into account changes to current policy tools, but also the entire future path of policy decisions.

- *Publish the policy path and the associated economic forecast*. Following the policy decision, the policy path and corresponding economic forecast should be published in the BoJ's *Economic Outlook Report*. In addition, a detailed discussion to motivate the policy path and the forecast is crucial to make them credible. The outlook report should also discuss alternative scenarios to clarify implications of selected shocks. This would help generate a better understanding of the BoJ's approach to managing macroeconomic risks, and thus help improve policy predictability. It

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[19] See Clinton et al (2015).

[20] This discussion closely follows Svensson (2019) and Arbatli et al (2016).

[21] While Svensson (2019) discusses an exogenous policy rate path, Clinton et al (2015) advocates for an endogenously determined policy rate path that is determined by a reaction function.

[22] Note that while the forecast is a key input into the policy decision, the process does not exclude individual Board members from incorporating their own judgment.

would also reinforce that the baseline forecast of the policy path is conditional on economic developments.

- *Simplify the communication strategy*. To improve communication with financial markets and the public, the BoJ needs to simplify its policy guidance. Specifically, the quantity guidance on JGB purchases should be abandoned and the inflation overshooting commitment should be de-linked from the monetary base. Note that if the BoJ was to publish the policy path associated with the forecast, then the forward guidance currently applied to policy rates would be redundant.

21. **Inflation Forecast Targeting has been fully or partially adopted by other major central banks and would not constitute a drastic change from the BoJ's current practices.** Presently, the BoJ publishes economic projections by individual Board members that takes into account the effects of past policy decisions and financial market expectations regarding future policy. Hence, the forecasts do not incorporate the current policy decision nor the Board's view on future policy settings. Adopting the IFT framework would imply a discontinuation of this practice in favor of publishing a staff forecast that is consistent with the Board's view on current and future policy decisions. A commonly-voiced concern is that removing individual Board members' projections would reduce transparency (i.e., the public can no longer observe the diversity in views). This concern could be addressed by allowing dissenting views to be reflected in the *Summary of Opinions*—currently published shortly after a MPM. Importantly, the guiding principles behind IFT are similar to the BoJ's existing guidelines for conduct of monetary policy. Indeed, publishing the baseline staff forecast together with alternative risk scenarios could be viewed as a quantification of the "two-perspective approach" current employed. Finally, IFT has been adopted by a number of central banks in both emerging and advanced countries. Table 2 shows the publication policies by selected central banks regarding the baseline forecast, the associated policy path assumption, and risk assessments. Indeed, most central banks publish both the baseline forecast as well as the assumed underlying policy path.

E. Conclusions

22. **This chapter analyzes the Bank of Japan's twenty-year effort to reflate the Japanese economy**. Three main lessons can be drawn. First, the lack of stability and clarity of the BoJ's price stability objective has complicated policy implementation and hampered reflation efforts. Second, policy decisions have not been sufficiently forward-looking and could have been better tied to policy goals. Third, the BoJ's communication strategy has at times been overly ambitious, ambiguous, and complicated. To address these weaknesses the BoJ could consider: (i) increasing policy flexibility by introducing an inflation range around the target while emphasizing the medium- to long-term nature of achieving the price stability objective; (ii) adopting Inflation Forecast Targeting to improve policy credibility and predictability; and (iii) simplifying its policy guidance by abandoning the quantity guidance on JGB purchases and de-linking the inflation overshooting commitment from the monetary base.

Table 2. Japan: Publication of Forecasts and Risk Assessments by Selected Central Banks

Central Bank	Publication of Forecast	Policy Path Assumption	Publication of Risk Assessment
Reserve Bank of Australia (RBA)	Staff forecast is published quarterly; No policy path assumption is published	Policy path is in line with financial markets	Uncertainty bands around forecast; Risks to the outlook discussed in detail.
Bank of Canada (BoC)	Staff forecast is published quarterly; No policy path assumption is published	Policy path endogenously determined within the model	Risks to outlook discussed in detail; Sometimes quantified risk assessments.
Bank of England (BoE)	Staff forecast is published quarterly; Policy path assumption is published	Two assumptions are used: The policy path is either (i) in line with financial markets or (ii) assumed to be constant.	Uncertainty bands around forecasts; Key judgments and risks; Occasional quantification of alternative risk scenarios.
Bank of Japan (BoJ)	Forecasts of individual Board members are published; No policy path is published	Policy path is in line with financial markets	General assessment of risks to the outlook.
European Central Bank (ECB)	Staff forecast published quarterly. Policy path assumption published	Policy path is in line with financial markets	Uncertainty bands around forecast; Quantification of alternative scenarios (e.g. oil price, and exchange rate path).
Reserve Bank of New Zealand (RBNZ)	Staff forecast published quarterly. Policy path assumption published	Policy path endogenously determined within the model	Key assumptions and uncertainties to the outlook; Alternative scenarios sometimes included.
Riksbanken	Staff forecasts published six times per year; Policy path assumption published	Policy path endogenously determined within the model	Detailed discussion of uncertainties and risks; Sometimes quantitative risk assessments and policy responses discussed.
U.S. Federal Reserve (U.S. Fed)	No monetary policy/inflation report; Projections by Board members published four times per year, including individual policy path projections.	Individual members pick a policy path deemed most likely to foster outcomes for economic activity and inflation that best satisfy the mandate.	The Fed does not publish a monetary policy report; No substantial risk assessment discussed in policy statement.

Sources: IMF; BoC; BoE; BoJ; ECB; RBNZ; Riksbanken; and U.S. Federal Reserve.

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JAPAN'S BOOM IN INBOUND TOURISM[1]

The number of inbound tourists to Japan has tripled since 2012 to more than 30 million visitors. Foreign tourists have become the growth engine of the domestic tourism industry, which now accounts for two percent of nominal GDP and contributes to Japan's current account surplus. Government policies, such as relaxation of visa requirements, were instrumental in these developments. However, two thirds of foreign visitors come from only three Asian countries, and the economic impact within Japan remains concentrated in a few "tourism hotspots". Achieving the government's objectives of attracting 60 million visitors by 2030 and using tourism as an instrument for regional revitalization requires intensified efforts to diversify source markets and promote experience-oriented regional tourism.

A. Introduction

1.   In line with government objectives and policies, inbound tourism has expanded rapidly in Japan. This has injected significant dynamism into the domestic tourism industry, which has become an increasingly important sector, contributing around 2 percent to nominal GDP. Without foreign tourists, the industry would ultimately face a shrinking market as the resident population is aging and shrinking in number. The government actively promotes inbound tourism, sees it as a key instrument for regional revitalization, and aims at 60 million annual tourist arrivals by 2030.[2]

2.   This chapter explores developments in, the impact from, and determinants of foreign tourist inflows into Japan. The general picture of recent tourism developments in Japan and economic impact are presented in Section B. Section C examines the role of government policies. Section D presents model-based results on the determinants of tourist arrivals. Section E concludes.

B. Development and Impact of Inbound Tourism

3.   The number of foreign tourists has tripled since 2012, with an average annual growth rate in tourist arrivals of twenty-five percent during the 2013–18 period (Figure 1). While there had already been an upward trend, interrupted by the Global Financial Crisis and the 2011 Great East Japan Earthquake, foreign tourist numbers took off after 2012 and tripled to more than 30 million by 2018. This growth has been supported by relaxation of visa requirements for countries that require a visa and reinvigorated tourism promotion policies.

4.   Tourists come predominantly from Asia. While the number of tourists from North America, Europe and Australia more than doubled, it increased even more from Asian countries— sixfold in the case of China and almost fourfold in other Asian countries (excluding China). Asia is now providing almost 85 percent of all visitors to Japan, up from a more modest 75 percent in 2012,

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[1] Prepared by Anh Thi Ngoc Nguyen, Takuya Kamoshida and Siegfried Steinlein (all OAP).

[2] See Council for a Tourism Vision to Support the Future of Japan (2016).

with China (27 percent), South Korea (24 percent), and Taiwan (Province of China) (15 percent) being the three largest sources of tourists.[3]

Figure 1. Japan: International Arrivals

Japan: International Visitors by Purpose
(In million)

Legend: Tourists, Business, Others

Japan: International Visitors by Nationality
(In million)

Legend: China, South Korea, Taiwan, Other Asia, North America, Europe, Australia, Other

Source: Haver Analytics.

Source: Japan National Tourism Organization.
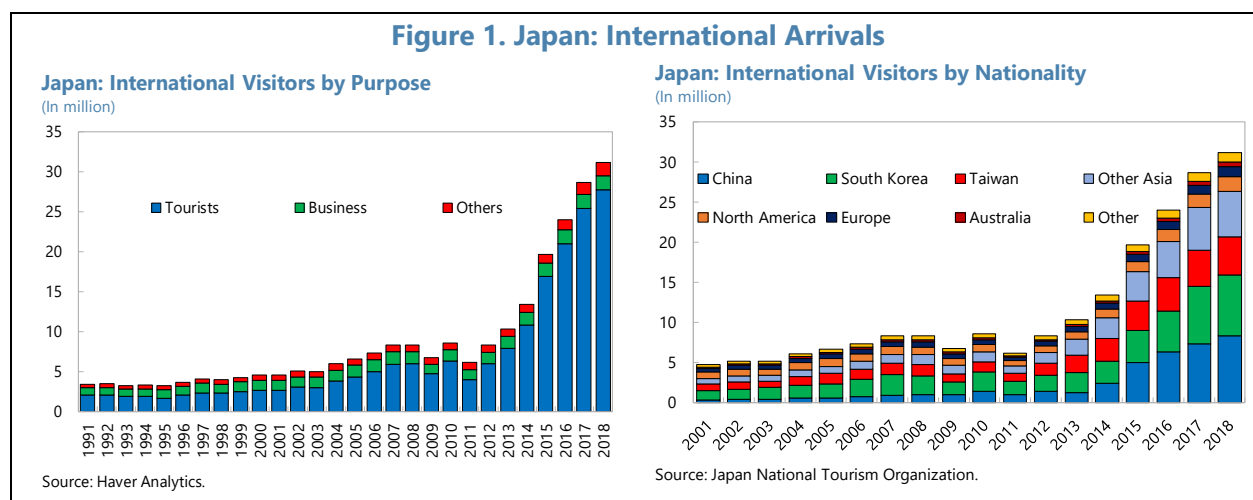
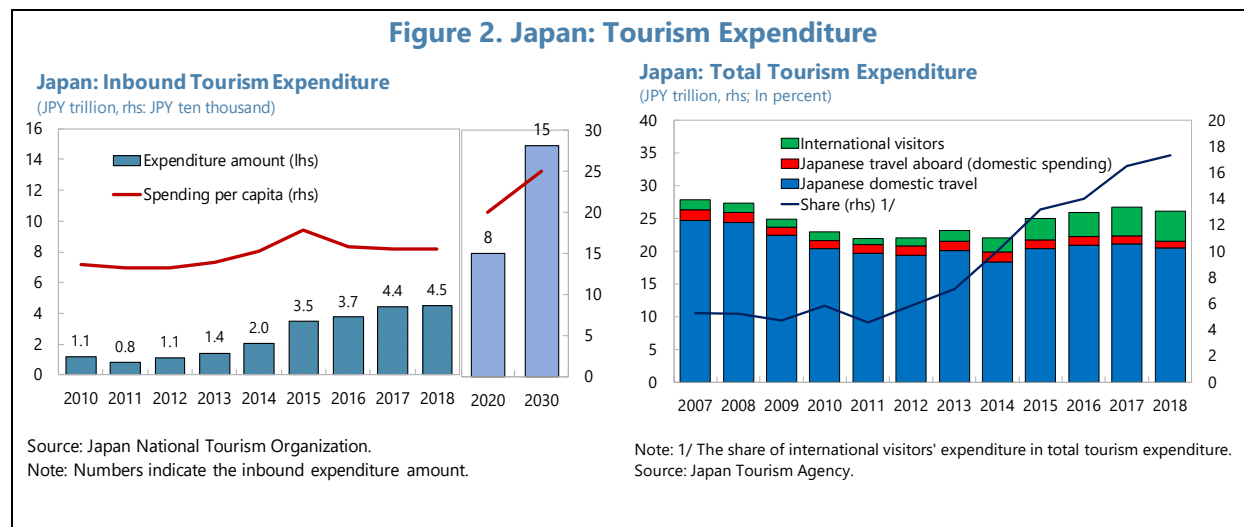**5.   Foreigners have become the growth engine of the Japanese tourism industry.** The amount spent by international visitors quadrupled since 2012 to ¥4½ trillion in 2018, driven by tourist numbers rather than increased per-capita spending, which peaked in 2015 (Figure 2). According to World Tourism Organization data, this upward trend in tourist aggregate expenditure has enabled Japan to jump into the top 10 countries worldwide in terms of inbound tourism expenditure (9 ranks up from 2012).[4] It also increased the share of international visitors in total domestic travel consumption to more than 17 percent.

6.   Tourism spending patterns differ across origin countries. Asian visitors generally spend less in total but relatively more on shopping—more than half of their budget in the case of Chinese tourists (see Annex I). In contrast, longer stays make the budget for accommodation the largest share of expenditure in the case of tourists from non-Asian advanced countries. The Japanese government is enhancing its tourism promotion in these higher-income markets to attract additional long-stay visitors and thus, boost per capita tourist spending.

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[3] Since the share of business and other non-tourist travelers has remained constant, the terms "international visitor" and "tourist" are used interchangeably in this chapter.
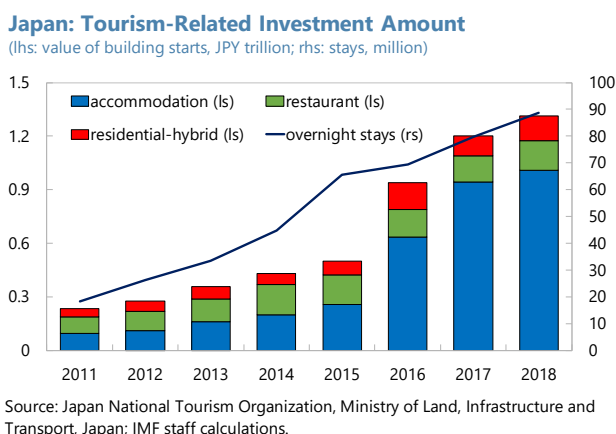
[4] Latest available data are from 2017. See World Tourism Organization (2019) *Compendium of Tourism Statistics* dataset. Ministry of Land, Infrastructure and Transport (2019) *Tourism White Paper* has Japan as the 11th-ranked country.

Figure 2. Japan: Tourism Expenditure

Japan: Inbound Tourism Expenditure
(JPY trillion, rhs: JPY ten thousand)

Source: Japan National Tourism Organization.
Note: Numbers indicate the inbound expenditure amount.

Japan: Total Tourism Expenditure
(JPY trillion, rhs; In percent)

Note: 1/ The share of international visitors' expenditure in total tourism expenditure.
Source: Japan Tourism Agency.

7.   The surge in foreign tourists has enabled tourism to become an increasingly important sector of the economy (Figure 3):

- **The tourism industry contributes some two percent to nominal GDP.** According to the latest available estimates for 2017, tourism GDP stands at ¥11 trillion.[5] Tourism contributed 4.1 percent to total nominal GDP growth in the 2012–17 period.

- **The tourism industry has become an important job creator.** Retail sales and accommodation and food services, two of the main service industries related to tourism, were the 3rd-largest and the 5th-largest job creators in the 2012–17 period.

- **The tourism boom has induced large investments.** Specifically, a boost to accommodation investment in 2016 reflected a steep increase in overnight stays in 2015. In 2018, tourism-related investments amounted to 0.2 percent of GDP. However, accommodation demand has increased more rapidly than supply, resulting in increasing occupancy rates for all types of lodging (up from 55 percent in 2012 to an average of 61 percent in 2018). Lodging capacity constraints are likely to induce further investment, especially with the upcoming 2020 Olympic and Paralympic Games in Tokyo and the World EXPO in Osaka in 2025.

Japan: Tourism-Related Investment Amount
(lhs: value of building starts, JPY trillion; rhs: stays, million)

Source: Japan National Tourism Organization, Ministry of Land, Infrastructure and Transport, Japan; IMF staff calculations.

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[5] The Japan Tourism Agency (JTA) measures "tourism GDP" ("tourism direct GDP") from the production side based on the value added of tourism-related sectors (tourism satellite account, following UNWTO (2010)).

Figure 3. Japan: Tourism Contribution, Growth and Jobs

Japan: Contribution to GDP Growth by Sectors
(2012-2017, In percent)
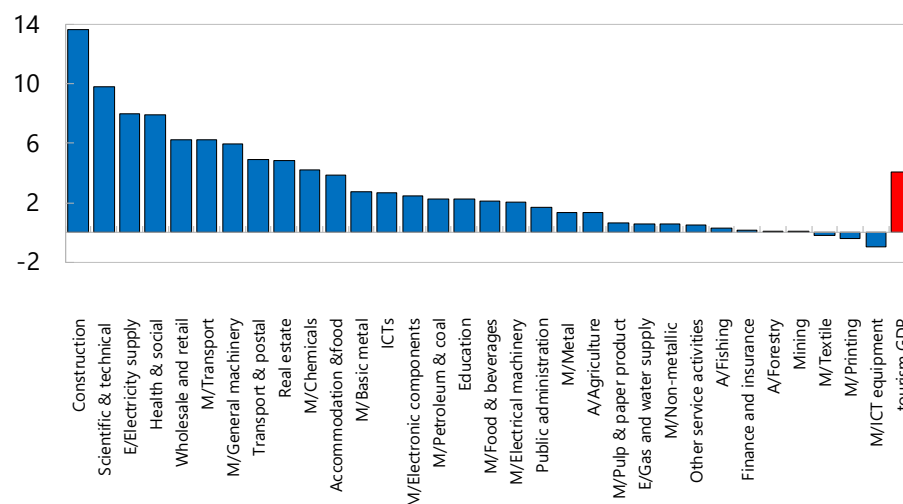
Note: A, E, M indicate Agriculture, Energy and Manufacturing industries, respectively.
Source: Japan System of National Account and Japan Tourism Sattelite Account.

Japan: Contribution Employment Growth by Sectors
(2012-17, In percent)

Note: M indicates Agriculture, Energy and Manufacturing industries, respectively.
Source: Japan System of National Account.

8.   Inbound tourism also contributes to Japan's current account surplus. After turning positive for the first time in 2015, Japan's travel services surplus reached almost one half of one percent of GDP in 2018. This reflects a steep upward trend of travel credits since 2011, and the erosion of travel debits. The latter has been dominated by a fall in the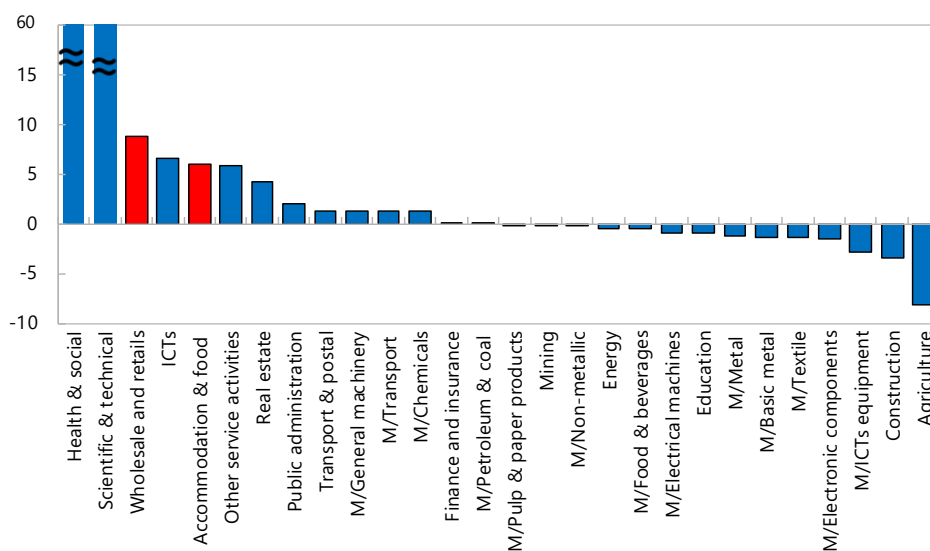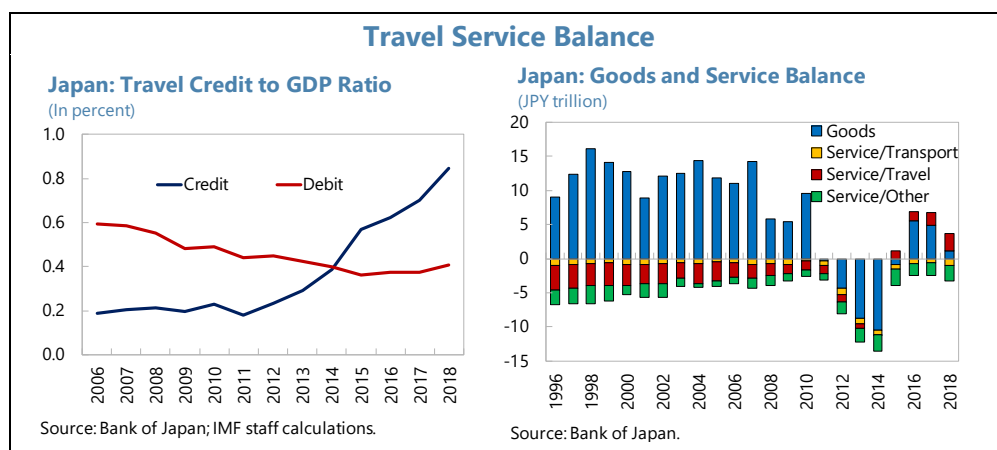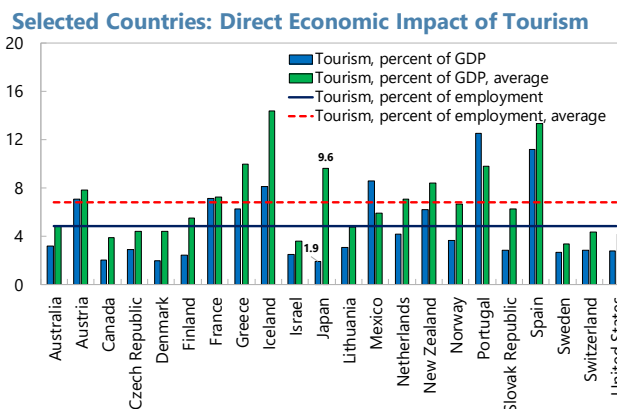 overseas spending of Japanese tourists rather than a decline in their annual headcount, which has fluctuated around 17 million persons.[6] The structural change in the services balance has been significant. Compared to 10 years ago, the travel balance has been transformed from the largest deficit factor into the second-largest surplus factor of the services account, after income from intellectual property (MLIT, 2019).

Travel Service Balance

Japan: Travel Credit to GDP Ratio
(In percent)

Source: Bank of Japan; IMF staff calculations.

Japan: Goods and Service Balance
(JPY trillion)

Source: Bank of Japan.

9.   According to international comparisons, Japan's tourism industry has further potential to expand. The GDP share of Japan's tourism industry in 2016 was only 1.9 percent compared to the OECD average of 4.8 percent. In contrast, the industry's employment share of 9.6 percent is among the highest in the OECD (see text figure).[7] The divergence between GDP share and employment share suggests a likely potential for labor productivity increases that would also help alleviate growth constraints for the industry stemming from labor shortages.

Selected Countries: Direct Economic Impact of Tourism

Source: OECD Tourism Statistics database.

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[6] See Japan National Tourism Organization at https://statistics.jnto.go.jp/en/graph/#graph--outbound--outgoing--transition
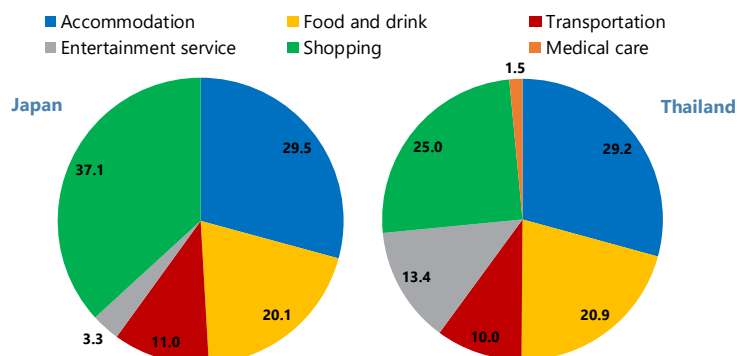
[7] Data drawn from the OECD Tourism Statistics database. Employment is employment in the tourism industry.

10.   Japan also has potential to boost inbound tourist spending. In an international comparison with tourism-competitor Thailand, visitors from America, Europe and Oceania tend to

spend more days with a total of $200-$600 more in per capita expenditure in Thailand than in Japan. In terms of tourist spending composition, significant differences lay in spending on entertainment and shopping: 15 percent of tourists' budget in Thailand is spent on entertainment services, while the corresponding figure is 3 percent in Japan (see text figure). As entertainment spending has a high marginal effect on tourist expenditure (MLIT, 2019),

Japan and Thailand: Tourist Spending Breakdown

- Accommodation
- Food and drink
- Transportation
- Entertainment service
- Shopping
- Medical care

Japan: 29.5, 20.1, 11.0, 3.3, 37.1

Thailand: 29.2, 20.9, 10.0, 13.4, 25.0, 1.5

Source: Japan Tourism Agency, Thailand Ministry of Tourism and Sports; and IMF staff calculations.

promoting entertainment services should continue to be a priority, along with attracting tourists from high-income countries to boost per capita tourist spending.

11.   The tourism boom remains regionally concentrated within Japan. Foreign tourists have increasingly been venturing into outlying regions, but remain highly concentrated in and around Tokyo (Kanto region), in the Osaka/Kyoto area (Kinki region), in Hokkaido, and in Okinawa (Figure 4). Diversification across origin countries differs, too: almost half of the foreign visitors in the Kyushu region are South Korean; and in Kanto and Kinki, 30 percent are Chinese.

12.   The concentration in numbers is mirrored in spending and investment (Figure 5). As per-capita spending is also higher in tourist hotspots, both Kanto and Kinki regions receive more than 70 percent of total foreign tourist expenditure. In a similar vein, although larger in all regions, accommodation investment remains concentrated.

Japan: Overnight Stays of International Visitors by Region (2018)
(Million stays)

China, South Korea, Taiwan, Other Asia, North America, Europe, Australia, others
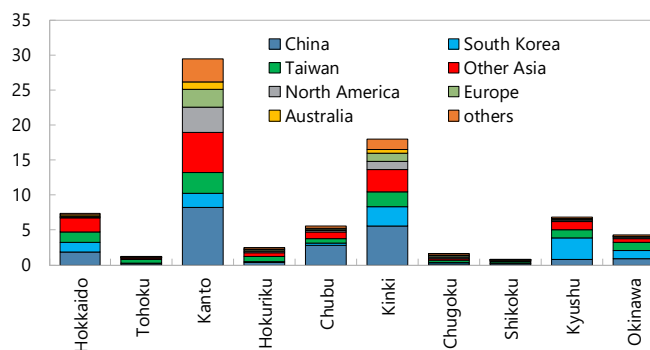
Source: Japan National Tourism Organization; IMF staff calculations.

Figure 4. Japan: Overnight Stays of Inbound Visitors in Prefectures

Japan: Number of overnight stays (2012)

Japan: Number of overnight stays (2018)

< 100,000
100,000 to 500,000
500,000 to 1 M
1 M to 2 M
2 M to 4 M
4 M to 10 M
> 10 M

< 100,000
100,000 to 500,000
500,000 to 1 M
1 M to 2 M
2 M to 4 M
4 M to 10 M
> 10 M

Source: Japan Tourism Agency.
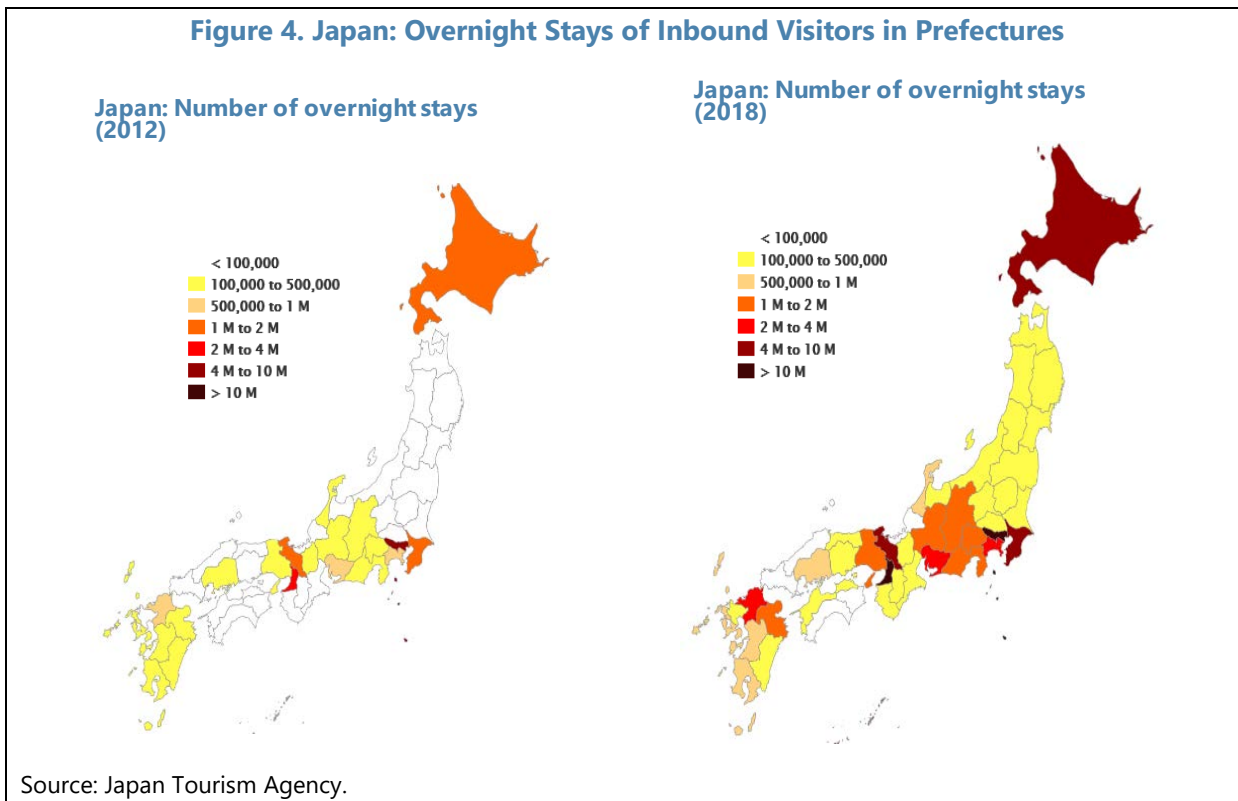
Figure 5. Japan: Tourism Impact at Regional and Prefectural Level

Japan: Distribution of Inbound Tourism Expenditure by Region
(In percent, 2017)

Japan: Accommodation Investment by Prefecture (2018)
(2018, JPY ten thousand)

7%
1%
5%
6%
1%
1%
6%
30%
2%

- Hokkaido
- Kanto
- Kinki
- Chugoku
- Kyushu
- Tohoku
- Hokuriku Shinetsu
- Chubu
- Shikoku
- Okinawa

< 100,000
100,000 to 500,000
500,000 to 800,000
800,000 to 1 M
1 M to 5 M
5 M to 9 M
> 9 M

Source: MLIT (2018).

Note: Regions' sequence is from North to South.

Source: Ministry of Land, Infrastructure and Transport, Japan.

C. Tourism Promotion Policies

13. Tourism promotion, including for regional revitalization, has been stepped up under Abenomics, with ambitious targets. While promotion efforts started in the last decade and considered tourism as an instrument for regional revitalization, tourism policies have been reinvigorated since 2012.[8] A Tourism Strategy Promotion Council was established and regularly meets on the basis of its most recent strategy of 2016. Based on the 2016 Tourism Strategy, a broad array of policy measures aim at enhancing regional attractiveness, industry competitiveness, and travel comfort. Annex II presents its visions and key reforms, including a listing of various reforms to reinvigorate the tourism industry.

Targets for Foreign Visitors

	Actual	Target year	
	2018	**2020**	**2030**
Arrivals (people, mil)	31.2	40	60
Spending (JPY, tril)	4.5	8	15
Overnight stays in regions* (guest nights, mil)	38.5	70	130
Repeat visitors (people, mil)	19.4	24	36

Sources: Japan Tourism Agency, Japan National Tourism Organization.
* Excluding the metropolitan areas: Tokyo, Kanagawa, Chiba, Saitama,

14. Tourism policies have been supported by an increase in budgets of relevant agencies, more tax-free shops, more direct flights, and relaxation of visa requirements (Figure 6).[9] In January 2019, an international tourist departure tax was introduced as a financing vehicle for the tourism budget. With the new income, the budget is set to almost double to ¥66.6 billion in FY 2019. Over 40 countries, mainly in Asia and the Pacific, have been granted relaxation of visa requirements by either multiple-entry visa introduction or visa exemptions during the 2013–18 period.

15. Japan has also attracted major international events. In line with the 2016 strategy, Japan has attracted high-profile events, such as the 2019 Rugby World Cup, the 2020 Olympic and Paralympic Games, and EXPO 2025. These events are likely to have significant income multiplier effects.
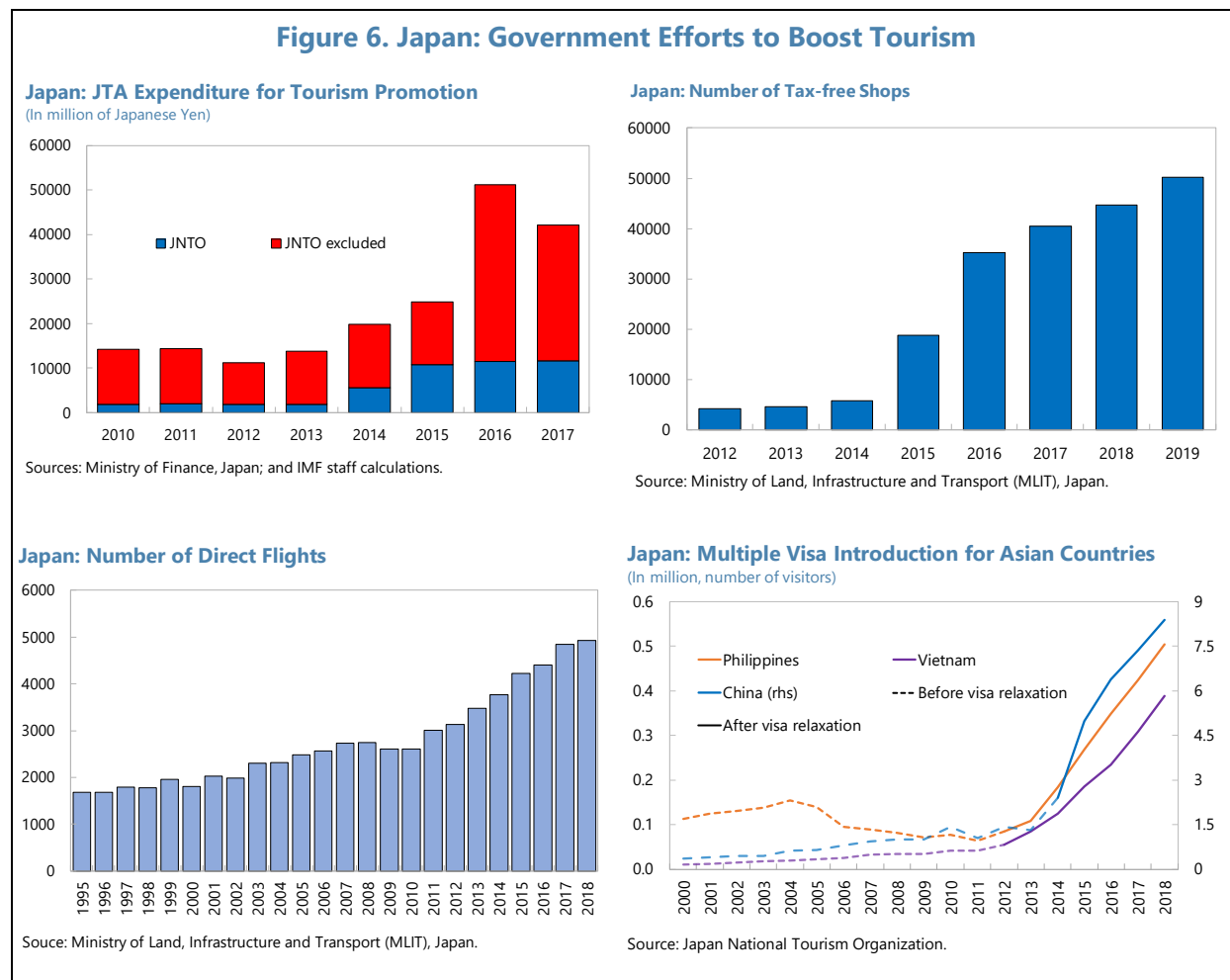
D. Determinants of Inbound Tourism

16. There are several key determinants of tourist arrivals into Japan. Following the work of Pesaran *et al.* (1999), we estimate panel autoregressive distributed lag (ARDL) regressions using quarterly data for Japan inbound tourists. The ARDL method avoids the need for pre-testing the order of integration given that they are valid whether the variables of interest are stationary or integrated (of order one).[10] It is also robust to omitted variables bias and simultaneous

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[8] These early efforts included a "Visit Japan Campaign" (2003), the "Basic Law for the Promotion of a Tourism-Oriented Country" (2006), and the creation of the Japan Tourism Agency (JTA) in 2008.

[9] The agencies at the national level are the Japan Tourism Agency (JTA) and the Japan National Tourism Organization (JNTO), a sub-body of JTA. While JTA is in charge of tourism policies, JNTO is specialized in executing the "Visit Japan Campaign" and other tourism marketing activities.

[10] Pesaran (1997) and Pesaran, Shin, and Smith (1999) show that the traditional ARDL approach can be used for long-run analysis, and that the ARDL methodology is valid regardless of whether the regressors are exogenous, or endogenous, and irrespective of whether the underlying variables are *I*(0) or *I*(1).

determination of growth regressors.[11] As shown in Table 1, origin country GDP, relative prices, visa policies, and natural disasters have a statistically-significant impact on the number of tourist arrivals.

Figure 6. Japan: Government Efforts to Boost Tourism

Japan: JTA Expenditure for Tourism Promotion
(In million of Japanese Yen)

Sources: Ministry of Finance, Japan; and IMF staff calculations.

Japan: Number of Tax-free Shops

Source: Ministry of Land, Infrastructure and Transport (MLIT), Japan.

Japan: Number of Direct Flights

Souce: Ministry of Land, Infrastructure and Transport (MLIT), Japan.

Japan: Multiple Visa Introduction for Asian Countries
(In million, number of visitors)

Source: Japan National Tourism Organization.

17.   Visa relaxation policies for Asian countries has successfully increased tourist numbers (Table 1, Panel A).[12] The introduction of multiple-entry visas helped increase the number of tourists from China by 121 percent and from other emerging Asian countries by 55 percent (long-run effect). Similarly, introducing visa-free travel for some emerging Asian countries boosted the number of tourists by 134 percent.

18.   Income levels in source countries and bilateral real exchange rates play an important role in affecting inbound tourism. These factors appear to be important for all origin countries, with price elasticities being highest for advanced Asia. The high price elasticities point to a large exposure of Japan tourism demand to changes in exchange rates and prices. Accompanied by the safe-haven status of the

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[11] The lag order of the ARDL regressions were selected using the Bayesian Information Criterion with a maximum lag length set to 4.
[12] Tourist arrivals from the included thirty-four origin countries accounted for 99 percent of total arrivals to Japan in 2018.

Japanese yen and a high possibility of sudden yen appreciation (Han and Westelius, 2019), this could hinder the recent increase in inbound tourism.

19. **In the short-run, natural disasters could have a large and prolonged impact on Japan tourism demand** (Table 1, Panel B). The natural disaster dummy shows simultaneous negative impact on tourism demand from most source markets. The number of emerging Asia tourists could decrease by 11–14 percent in the period a disaster occurs. The impact of natural disasters becomes even larger in the following period, with a 43 percent fall in tourist numbers in the case of emerging Asia. The negative impact lasts until the second lag for non-Asian tourists, with tourist numbers 3.5 percent lower than before the disaster (lasting even after 9 months).

Table 1. Determinants of Tourist Arrivals to Japan, 1996-2018

Dependent variable	Δln(tourist arrivals)			
Country/Group	(1) China	(2) Emerging Asia	(3) Advanced Asia	(4) Non-Asia
Panel A: Long-run effects				
Origin country GDP	2.214***	3.936***	2.648***	5.492***
	(0.240)	(0.248)	(0.488)	(0.838)
Bilateral real exchange rate	1.385*	0.679***	2.606***	1.131***
	(0.723)	(0.227)	(0.245)	(0.345)
Prices in alternative destinations	-1.787	-1.536***	0.369	0.488
	(1.216)	(0.318)	(0.352)	(0.338)
Multiple visa dummy	1.210***	0.547***		
	(0.213)	(0.109)		
Visa requirement dummy		-1.340***	0.235	3.923
		(0.115)	(0.143)	(4.509)
Panel B: Short-run effects				
Error-correction term	-0.680***	-0.290**	-0.225***	-0.0799***
	(0.176)	(0.130)	(0.0757)	(0.0133)
Disaster	0.131	-0.143***	-0.110*	-0.107***
	(0.170)	(0.0374)	(0.0624)	(0.0125)
One period after disaster	-0.308*	-0.431***	-0.336***	-0.272***
	(0.172)	(0.0526)	(0.0621)	(0.0222)
Two periods after disaster	0.275	0.0347	0.0479**	-0.0354*
	(0.181)	(0.0439)	(0.0228)	(0.0187)
Maximized log likelihood		175.43	142.13	791.78
Observations	87	482	435	1,874
Number of country	1	6	5	22

Note: ARDL regressions. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: IMF staff estimates.

E. Conclusions and Policies

20. **As part of Abenomics, the government has been successfully promoting inbound tourism.** The number of inbound tourists has tripled since 2012, and the domestic tourism industry now contributes about two percent of nominal GDP (¥11 trillion in absolute terms). Policies, such as relaxation of visa requirements, have played an important role, and all indicators have been moving closer to the government's ambitious 2020 targets. However, the economic impact of tourism within Japan remains concentrated in a few "hotspots", and tourists come predominantly from only three Asian source markets.

21.   Strengthened policies will help enlarge Japan's share in the growing global tourism market and attract more tourists to regional Japan. To achieve its next level of targets in 2030, in its continuous review of policies and action plans, the government could pay special attention to the following priorities:

- **Continued regional diversification within Japan:** A strengthening of the authorities' approach to foster travel convenience and industry competitiveness in Japan's regions would include: broader and more accessible information dissemination about regional attractions; more low-cost flight connections to regional airports; and the creation of regional sightseeing corridors. Enhanced coordination between national and sub-national stakeholders, such as the Japan National Tourist Organization and local Destination Management/Marketing Organizations, is key.[13]

- **Diversification of tourism source markets:** To reduce risks from idiosyncratic shocks in dominant source markets, an intensified diversification strategy could target a broader set of Asian emerging markets, including through additional relaxation of visa requirements and flight connections.

- **More experience-orientated tourism and "Japan branding":** Bringing more tourists into the regions would also foster the transition from shopping-oriented to experience-oriented tourism, which is particularly pertinent to Asian tourists. In turn, experience-oriented regional tourism would further differentiate the tourism brand of Japan, and potentially decrease the price sensitivity of demand. It could also incentivize longer stays, repeat visits, and more tourism spending.

- **Disaster resilience:** Since international tourists have typically an adverse reaction to a post-disaster situation, countermeasures to mitigate the disaster impact on Japanese tourism are necessary not only in disaster-affected areas but also unaffected areas. Implementation of a disaster information policy, including fostering the efficient and accurate provision of information during and after a natural disaster, will help avoid adverse tourist reactions, as well as assist tourists in rescheduling their visits to Japan.

22.   Any forthcoming increase in tourism demand would need to be synchronized with enhanced supply of tourism services, including labor and tourism infrastructure. While fostering labor-saving efficiency gains, more foreign labor (as well as increased female and elderly labor market participation) will need to be considered as the labor force shrinks. In addition, continuing to build tourism infrastructure—such as free Wi-fi, multilingual signage, and cashless payment systems—are among the top priorities to ease tourists' anxiety.[14]

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[13] Destination Management/Marketing Organizations (DMOs) are joint private/public organizations, usually including diversified stakeholders in transportation, culture/historical sites, and accommodation. They are expected to play a role in helping invigorate the regional tourism industry by developing and marketing local tourism attractions in their regions. Japan aims at creating 100 world-class DMOs across the country by 2020.

[14] A Japan Tourism Agency (2019) survey showed that the most uncomfortable issues tourists encounter when traveling in Japan are lack of public Wi-fi, poor non-Japanese language skills, lack of multilingual signage (including for public transportation), and the lack of cutting-edge payment settlement methods.

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Annex I. Tourists' Spending and Composition (2018)

		Length of Stay (days)	Spending Per Capita (in JPY)	Of which (%)				
				Accommodation	Food and Drink	Transportation	Entertainment Service	Shopping
Emerging Asia	China	9.7	224870	21.3	17.8	7.5	3.6	49.9
	Indonesia	12.1	141419	34.0	20.6	14.8	3.9	26.6
	Malaysia	10.2	137612	32.7	22.1	11.9	4.7	28.6
	Thailand	8.8	124421	29.6	22.3	12.1	3.5	32.3
Advanced Asia	South Korea	4.4	78084	32.0	25.6	9.8	5.0	27.6
	Taiwan (Province of China)	6.8	127579	27.7	22.1	10.6	4.0	35.6
	Hong Kong SAR	6.3	154581	29.5	23.9	10.8	3.3	32.5
	Singapore	8.3	172821	36.6	24.0	11.5	3.7	24.1
Advanced	United States	13.5	191539	43.0	26.4	14.3	4.1	12.2
	Canada	12.1	183218	40.9	25.9	15.1	4.4	13.7
	Australia	13.3	242041	41.0	24.3	14.4	6.7	13.5
	France	18.4	215786	39.6	26.4	15.5	3.4	15.0
	Germany	13.9	191736	44.1	24.8	14.8	3.1	13.2
	United Kingdom	13.8	220929	45.6	25.4	15.0	3.8	10.2

Source: Japan Tourism Agency; IMF staff calculations.

Annex II. 2016 Tourism Strategy

3 visions

Maximizing the attractiveness of tourism resources in order to make tourism the base of regional revitalization	**Foster innovation in the tourism industry to boost its international competitiveness and develop it into a core industry**	**Ensure all visitors can enjoy a satisfying, comfortable and stress-free sightseeing experience**

Proposed reforms

・Allow domestic and international visitors entry to "publicly owned heritage sites" ・Shift the balance of heritage policy from "an over-emphasis on preservation only" to allow a greater understanding of the sites by tourists ・Turn the current "national parks" into world-class "national parks" ・Create "landscaping plans" for major tourism areas to improve townscapes	・Review regulations and restrictions in order to make the tourism industry more productive ・Develop new longer-stay markets ・Create and develop world-class Destination Management/Marketing Organizations (DMOs) ・Renew and revitalize hot spring resorts and local towns through better management ・Promotion of MICE (Meetings, Incentives, Conferencing, Exhibitions) ・Strategic relaxation of visa requirements	・Greatly improve hard and soft infrastructure to realize the most pleasant accommodation environment in the world ・Promotion of information dissemination in multiple languages ・Complete "regional revitalization corridors" to allow comfortable travel to every corner of Japan ・Functional enhancement of local airports and the promotion of Low-Cost Carrier (LCC) services ・Reforming the system of "work days" and "days off" towards realizing a more vibrant society ・Comprehensive design promotion activities for the 2020 Tokyo Olympic and Paralympic Games

Source: Council for a Tourism Vision to Support the Future of Japan (2016).

JAPAN'S FOREIGN ASSETS AND LIABILITIES: IMPLICATIONS FOR THE EXTERNAL ACCOUNTS[1]

The composition of Japan's external current account balance has changed over time, with the trade surplus decreasing while the income balance has increased. Japan's higher income balance primarily reflects its growing net foreign asset position and higher corporate saving. A comparison with peer countries also reveals the role of relatively high yields on foreign direct investment (FDI) assets held by Japan—arising from differences in geographical positioning but also, possibly, reflecting profit shifting. The comparison with peers points to the very low FDI liabilities in Japan, suggesting scope for improving corporate governance and reducing barriers to entry in some sectors, and possible measurement issues. Despite the changing composition of Japan's current account balance over time, its response to exchange rate movements operates mostly through the trade channel given relatively higher gross trade flows than income flows, with a small but reinforcing contribution from the income balance.

A.   What Has Driven the Increase in Japan's Income Balance?

1.   The progressive increase in Japan's income balance primarily reflects net revenues from an increasingly positive net foreign asset (NFA) position. Japan's primary income balance is composed almost exclusively of investment income, which has grown in tandem with the growing NFA position, from close to in balance in 1980 to a positive 60 percent of GDP in 2018 (Figure 1, top right panel). Japan's present NFA is the highest in the world, at $3 trillion.

2.   The increase in Japan's income balance since the mid-1990s can be attributed mostly to the corporate sector, and is linked to the increase in corporate saving. The investment income balance is the sum of net property income of all sectors of the domestic economy (corporates, households, public sector).[2] In Japan, corporate net property income and the investment income balance have had a parallel trend increase since the mid-1990s, while household and government net property income have remained broadly flat (Figure 1, middle left panel). In turn, the increase in corporate net property income has been a key driver of the increase in corporate saving (see Japan 2019 Article IV Consultation – Staff Report, Annex XIII). Indeed, the rise in Japan's NFA is itself the product of persistent current account surpluses which have been increasingly driven by growing corporate saving (Figure 1, middle right panel). In line with this, Hashimoto and Kinoshita (2016) underline the role played by corporate balance sheet adjustment and the rise in corporate saving in the increase in Japanese corporates' financial net wealth.

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[2] Strictly speaking, the investment income balance is net property income of the domestic economy, *excluding rents*. However, net income from rents by sector tend to be small and stable over time.
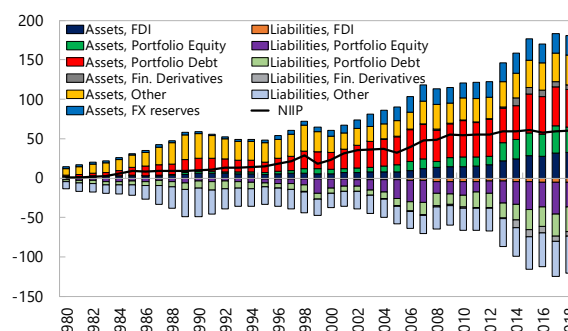
Figure 1. Japan's Increasing Income Balance and its Drivers

Japan: Current Account Decomposition: Trade and Income Balances
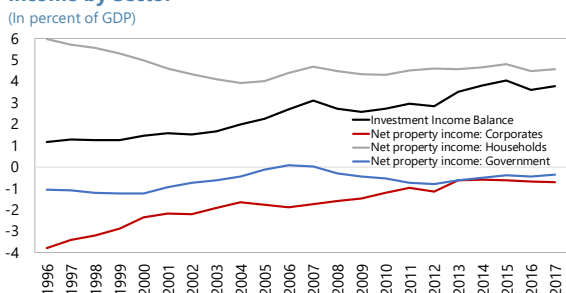(In percent of GDP)
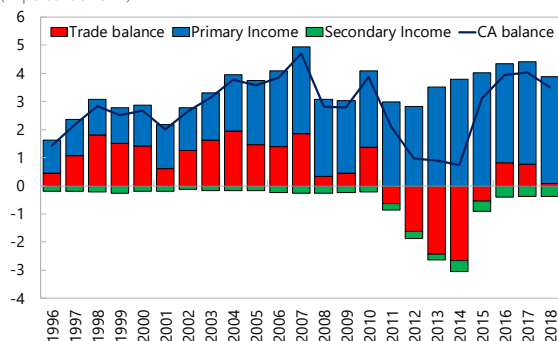
Sources: IMF BOP data; National authorities; and IMF WEO data.

Japan: Decomposition of Net International Investment Position
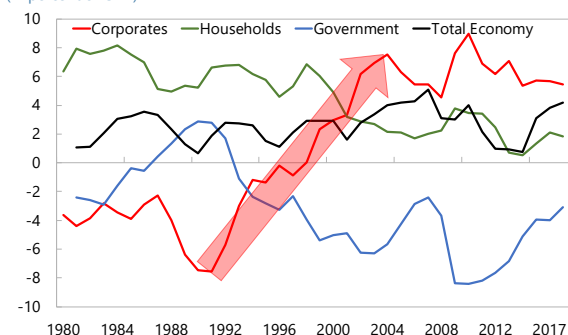(In percent of GDP)

Source: Lane & Milesi-Ferretti database, External Wealth of Nations, 2018.

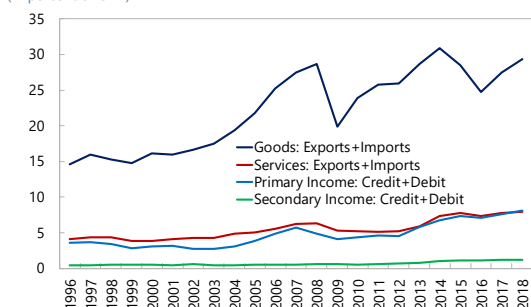**Japan: Investment Income Balance and Net Property Income by Sector**
(In percent of GDP)

Sources: AMECO database; OECD national accounts dataset; IMF BOP data; National authorities; and IMF WEO data.

Japan: Gross Saving minus Investment
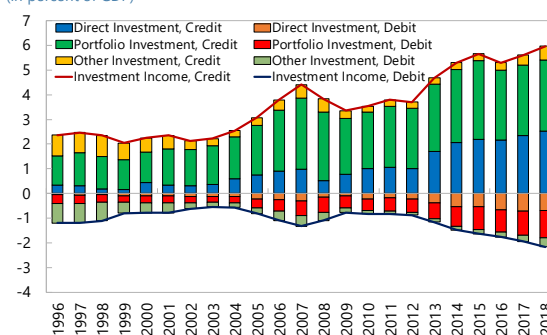(In percent of GDP)

Source: AMECO database.

Japan: Current Account: Trade and Income Gross Flows
(In percent of GDP)

Sources: IMF, BOP data; National authorities; and IMF, WEO data.

Japan: Investment Income Decomposition
(In percent of GDP)

Sources: IMF, BOP data; National authorities; and IMF, WEO data.

3.   In terms of gross flows within the external current account, the respective importance of the trade account and the income account have remained broadly unchanged over time (Figure 1, bottom left panel). Both gross income flows (defined as the sum of credits and debits) and gross trade flows have nearly doubled in 20 years. As a result, the ratio of gross income (primary, secondary) flows to gross trade (goods, services) flows has increased only moderately, from 21

percent in 1996 to 25 percent in 2018.[3] More generally, gross trade flows remain predominant within the current account for all countries, with the relative importance of income flows being somewhat higher in advanced economies. Indeed, while trade integration has progressed in both advanced and emerging economies, financial integration is greater in advanced economies, including due to reduced access to international capital markets in some emerging and developing economies.

4.   Japan's relatively large income balance is primarily the result of an asymmetric income account. With gross income flows growing in tandem with gross trade flows over the past two decades, it is the asymmetric nature of the expansion of income flows, rather than their size, that explains Japan's large and growing income balance. In particular, income credits are significantly larger than debits for most components of Japan's investment income (Figure 1, bottom right panel).

B.   How Does Japan's Income Balance Compare to Peers?

5.   Japan's external income balance is exceptionally large. From an accounting perspective, Japan's larger-than-average current account balance is associated with a trade balance that is close

to median (among G6, advanced economies, or among a 100-country sample), but includes an exceptionally large primary income balance (investment income in particular, see text chart). To shed further light on the reasons behind Japan's large income balance, we decompose the difference between the investment income balance of Japan and G6 countries (Canada, France, Germany, Italy, United Kingdom, United States), highlighting the respective contributions of stocks and yields.

Current Account, Trade, Income Balances: Japan vs. Other Countries (2015-17)
(In percent of GDP)

● Japan   ● Advanced Economies: Median   ● G7 ex-Japan: Unweighted average
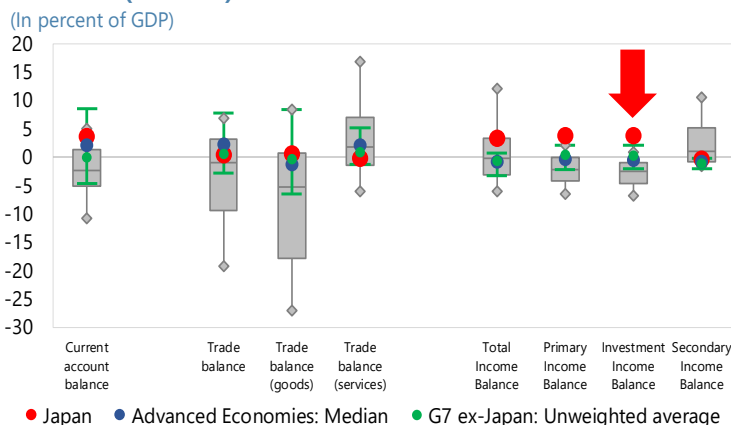
Note: Boxes (diamonds) show 25-75 (10-90) percentiles in the 100-country sample.
Sources: IMF, BOP data; National authorities; and IMF, WEO data.

6.   Japan's investment income balance is significantly larger than that of G6 countries. The 3.5 percentage points of GDP difference in investment income balance $(IB_J - IB_{G6})$ can be described in the equation below, where S denotes stocks and Y denotes implicit yields:

$$IB_J - IB_{G6} = \sum_{k \in \{Assets, Liabilities\}} \left[\underbrace{\left(S_J^k - S_{G6}^k\right).\frac{Y_J^k + Y_{G6}^k}{2}}_{Contribution\ of\ Stocks} + \underbrace{\left(Y_J^k - Y_{G6}^k\right).\frac{S_J^k + S_{G6}^k}{2}}_{Contribution\ of\ Yields} \right]$$

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[3] Accommodative monetary policies have constrained interest flows in recent years; the ratio of income flows to trade flows may increase in the future when monetary policy normalizes.

For each category *k* of foreign asset/liability, the difference in income flows between Japan and G6 can be decomposed into: (i) the contribution of stock positions, measured by the difference in stock positions $(S_J - S_{G6})$ multiplied by the average implicit yield $\frac{Y_J + Y_{G6}}{2}$, and (ii) the contribution of implicit yields, measured by the difference in implicit yields $(Y_J - Y_{G6})$ multiplied by the average stock position $\frac{S_J + S_{G6}}{2}$. Decomposition results for the difference between the investment income of Japan and G6 are presented in Table 1.[4]

Table 1. Japan and G6 Income Balance – Contributions of Stocks and Yields
(2015–17 average)

			Total (net)	ASSETS					LIABILITIES				
				Total	FDI	Portfolio Equity	Portfolio Debt	Other	Total	FDI	Portfolio Equity	Portfolio Debt	Other
Japan	Income flows	*% of GDP*	3.7	5.5	2.2	1.0	1.9	0.3	1.8	0.6	0.7	0.3	0.2
	Stocks	*% of GDP*	62.1	146.2	29.6	30.5	51.3	34.7	109.5	5.0	35.3	26.2	43.0
	Implied Yields	*percent*		3.8%	7.5%	3.4%	3.7%	0.9%	1.6%	12.9%	1.9%	1.0%	0.5%
G7 ex-Japan: unweighted average	Income flows	*% of GDP*	0.2	5.2	2.6	1.0	1.0	0.6	5.0	1.6	1.0	1.8	0.6
	Stocks	*% of GDP*	-4.5	225.1	60.0	48.9	41.0	75.2	231.8	48.5	34.1	73.4	75.9
	Implied Yields	*percent*		2.3%	4.3%	2.0%	2.5%	0.8%	2.1%	3.3%	2.9%	2.4%	0.8%
Contributions to Income Balance difference	Income flows	*% of GDP*	**3.5**	**0.3**	**-0.4**	**0.1**	**0.9**	**-0.3**	**-3.2**	**-0.9**	**-0.3**	**-1.5**	**-0.4**
	Stocks	*% of GDP*	2.2	-2.3	-1.8	-0.5	0.3	-0.4	-4.5	-3.5	0.0	-0.8	-0.2
	Implied Yields	*% of GDP*	1.4	2.7	1.4	0.6	0.6	0.1	1.3	2.6	-0.3	-0.7	-0.2

Source: IMF BOP data; National authorities; IMF WEO data; Lane & Milesi-Ferretti database, External Wealth of Nations, 2018; and Authors' calculations.
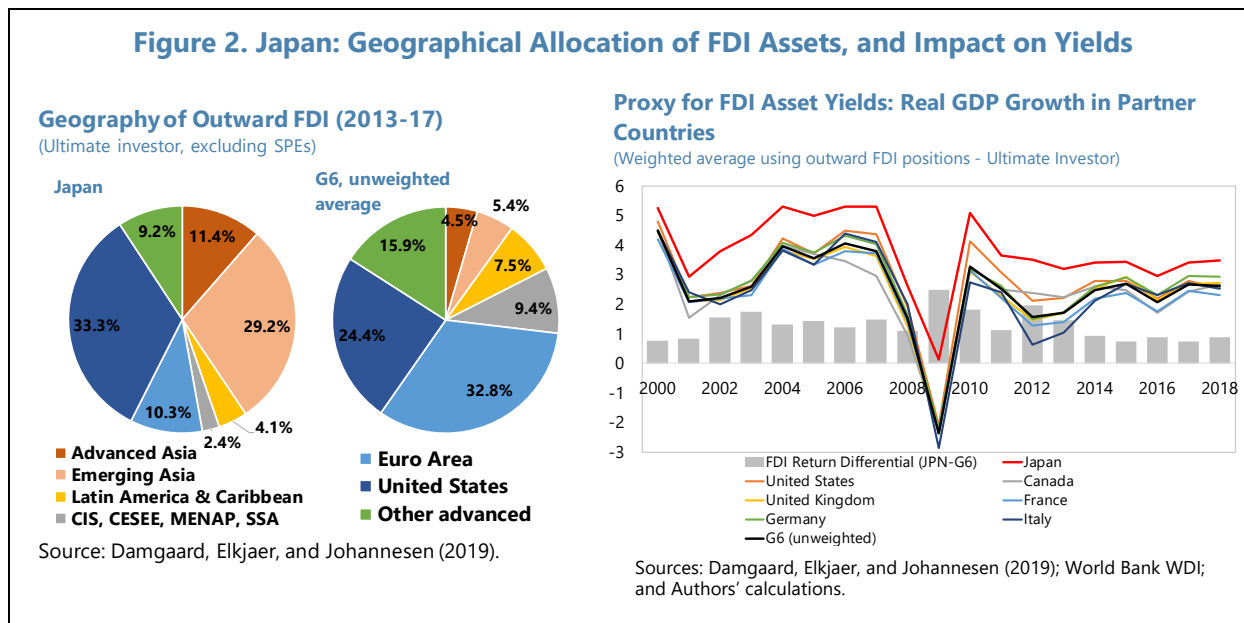
7. On the asset (or credit) side of the income-account-difference decomposition, while Japan holds fewer foreign assets than the G6, yields are higher. Overall, foreign assets explain a small part of the higher investment income balance in Japan relative to G6 countries (only 0.3 percentage points of 3.5 percentage points of GDP difference). This is particularly the case for FDI: Japan has relatively low FDI assets compared to G6 countries, but significantly higher yields. Several factors may help explain the higher returns on Japanese investment abroad:

- **A more favorable geographical allocation of FDI assets**, as Japan has a larger share of FDI in high-growth emerging Asia as well as the United States (Figure 2, left chart). This difference may explain around one percentage point of the higher yields in Japan than in G6 on average since 2000 (Figure 2, right chart).

- **Profit shifting through transfer pricing** may artificially boost investment income credits and suppress export figures. In the case of the United States, Wright and Zucman (2018) attribute the abnormally high returns on foreign investment (with a positive U.S. income balance, despite a negative NFA) in part to profit shifting. Tørsløv, Wier and Zucman (2018) estimate that $28 billion (0.6 percent of GDP) of profits were shifted out of Japan in 2015. Assuming that profit shifting mainly distorted Japan's direct investment income credits (and not the FDI asset position), Japan's "corrected" implied yield on FDI assets would be around 2 percentage points

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[4] Changing the comparator group, e.g. considering advanced creditor countries (Belgium, Denmark, Germany, Israel, Korea) instead of G6 leads to similar results.

lower than at present.[5] Japan's move from a worldwide to a territorial tax system in 2009, while fostering dividend repatriation (Hasegawa and Kiyota, 2017) and reducing foreign cash holdings (Xing, 2018), may also have led to an intensification of transfer mispricing and profit shifting, as suggested by evidence based on the United Kingdom experience (Liu, Schmidt-Eisenlohr and Guo, 2017).

- **Other potential measurement issues.** High yields on foreign assets could also be a sign of potential measurement issues (see more below).

Figure 2. Japan: Geographical Allocation of FDI Assets, and Impact on Yields

Geography of Outward FDI (2013-17)
(Ultimate investor, excluding SPEs)

Source: Damgaard, Elkjaer, and Johannesen (2019).

Proxy for FDI Asset Yields: Real GDP Growth in Partner Countries
(Weighted average using outward FDI positions - Ultimate Investor)

Sources: Damgaard, Elkjaer, and Johannesen (2019); World Bank WDI; and Authors' calculations.

8.   **On the liabilities (or debit) side of the income-account-difference decomposition, Japan's stock of foreign liabilities is much smaller than that of G6 countries, especially for FDI but also for portfolio debt.** This leads to a large contribution to the overall difference of investment income balances (3.2 out of the 3.5 percentage points of GDP difference).

- **FDI liabilities.** The fact that implicit yields paid on FDI liabilities are very high in Japan (close to 13 percent; see Table 1) suggests measurement issues, possibly on the valuation of FDI liabilities.[6] That said, adjusting implicit yields to the G6 level, while leaving FDI income payments unchanged, would only "correct" Japan's stock of FDI liabilities from 5 to 20 percent of GDP, i.e. still a level of FDI liabilities significantly below the G6 average level (at about 50 percent of GDP).

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[5] While profit shifting may partly explain Japan's high implied yields on FDI assets, both in absolute and relative to advanced economies (with profit shifting occurring mainly between large advanced economies and advanced tax havens, and thus being broadly neutral for advanced economies as a group), it does not explain the difference relative to G6 countries. Indeed, G6 economies are also affected by profit shifting, and their "corrected" implied yields on FDI assets would also be around 2 percentage points lower.

[6] To the extent that a firm is included in national statistics, both its stock and flows of FDI should be captured, making it unlikely that macroeconomic aggregates omit FDI stocks without also omitting the corresponding flows. Measurement issues are more likely to lie in the method used to value the stock of FDI.

The low level of inward FDI in Japan has long been recognized in the academic literature, including in relation to measurement issues and corporate governance (Lawrence, 1993; Ito and Fukao, 2005; and Hoshi, 2018).

- **Portfolio debt.** Portfolio debt income paid is small in Japan, due to both (i) low portfolio debt liabilities, and (ii) low implicit yields. On the government side, public foreign borrowing is indeed relatively low, especially when compared with G6 countries, due to the large pool of domestic saving available and domestic investors' willingness to hold Japanese public debt (strong home bias). On the corporate side, low corporate bond liabilities can be linked to the rise of corporate saving and the associated corporate deleveraging after the Japanese real

Portfolio Debt Liabilities
(In percent of GDP)
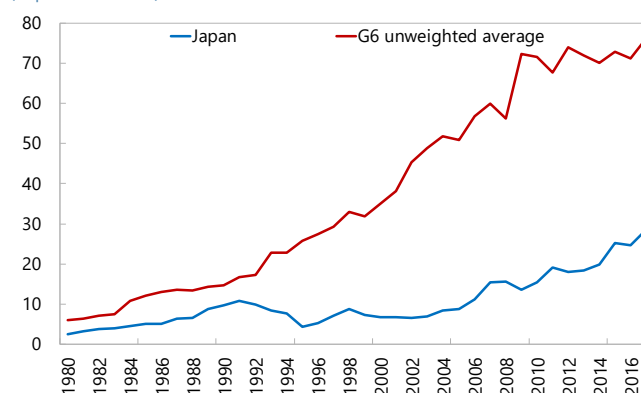
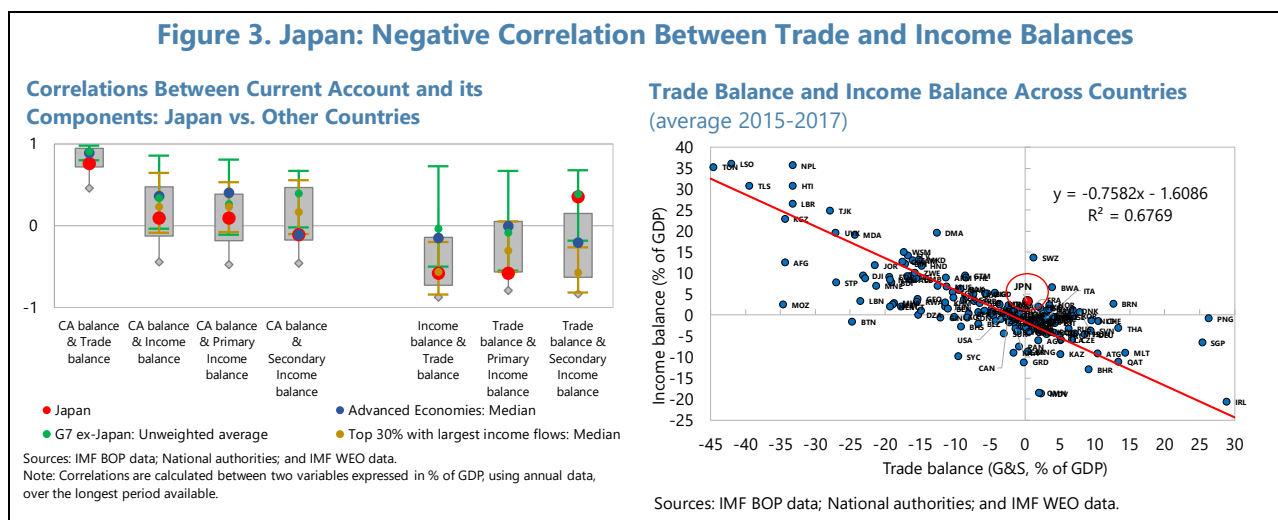Source: Lane & Milesi-Ferretti database, External Wealth of Nations, 2018.

estate bubble burst at the start of the 1990s. Indeed, while portfolio debt liabilities were following similar trends in Japan and in G6 countries in the 1980s, Japan's portfolio debt liabilities started to diverge from the trend in G6 countries after the bubble burst and as a consequence of corporate deleveraging (text chart). Finally, Japan's implied yields on portfolio debt are also lower than in G6 countries, due to the extremely accommodative monetary policy and low credit risk in Japan.

C.   Interconnectedness Between the Trade and Income Balances

9.   **In most countries, including Japan, the current account balance has a high and positive correlation with the trade balance** (Figure 3, left panel, left bars). Indeed, most country-specific correlations between the current account and the trade balance (for the period 1980-2018 or longest available) are close to one (0.76 for Japan). Conversely, country-specific correlations between the current account balance and the income balance (total, primary, or secondary) tend to be much weaker, although there is substantial heterogeneity across countries.

10.   **On the other hand, the income balance is negatively correlated with the trade balance** (Figure 3, left panel, right bars). Country-specific correlations between the trade balance and the income balance (total, primary, or secondary) are generally negative (-0.58 for both the total and primary income balances for Japan), with substantial heterogeneity across countries, especially for the secondary income balance. Several mechanisms may contribute to the observed negative correlation between the income and trade balances, including:

- *General mechanisms:*

  - **Aging.** As countries age, they tend to accumulate net external assets to provide for consumption during old age, leading to an increasing income balance in the earlier phases of aging. In more advanced phases of aging, particularly the post-retirement phase, such countries are expected to start dissaving and increase imports, moving towards trade deficits.

  - **Income effect.** When the income balance increases, agents may consume the additional income, leading to higher imports and lowering the trade balance. This effect likely depends on the marginal propensity to consume of households receiving the income: likely higher for secondary income (as migrant remittances flow to relatively poorer households), and lower for primary income (as firm shareholders tend to be wealthier).[7]

  - **Market pressure.** Countries with high net debtor positions (and negative income balance) may need to run trade surpluses to meet external debt service obligations on their stock of foreign borrowing.

- Other ***mechanisms linked to globalization and the growing role of multinational firms*** may help explain the negative correlation between the income and trade balances as these forces have increasingly blurred the attribution of income between both balances:

  - **Offshoring.** As firms move their production facilities overseas, goods exports are progressively substituted by income receipts.[8]

  - **Profit shifting**, with transfer pricing affecting the trade and income balance in opposite and offsetting ways.

Figure 3. Japan: Negative Correlation Between Trade and Income Balances

Correlations Between Current Account and its Components: Japan vs. Other Countries

Trade Balance and Income Balance Across Countries (average 2015-2017)

$$y = -0.7582x - 1.6086$$
$$R^2 = 0.6769$$

Sources: IMF BOP data; National authorities; and IMF WEO data.
Note: Correlations are calculated between two variables expressed in % of GDP, using annual data, over the longest period available.

Sources: IMF BOP data; National authorities; and IMF WEO data.

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[7] When restricting the sample to the top 30 percent of economies with largest income flows (total, primary, secondary), correlations are more negative, especially for secondary income.

[8] Offshoring may also lead to increased services exports (intellectual property revenue including royalty payments and patent fees from overseas subsidiaries).

11.   **Such an offsetting pattern between the trade balance and the income balance is also observed across countries** (Figure 3, right panel). Countries with a large population living abroad, receiving sizable migrants' remittances, tend to be located in the upper-left quadrant of the chart, illustrating the income effect. Low-tax jurisdictions, in turn, tend to appear in the lower-right quadrant due to distortions in the composition of their current account, reflecting profit shifting and the large role of multinational firms. Conversely, less countries are located in the upper-right and lower-left quadrants, illustrating respectively the income effect and market pressures.

D.   Does the Change in Current Account Composition Towards Income Balance Affect its Responsiveness to the Real Exchange Rate?

12.   **When facing movements in the real exchange rate (REER), there are several mechanisms at play affecting the response of the income balance.** While the trade balance response to REER changes has been widely studied, there is less literature on the income balance response (Alberola et al, 2018).[9] We propose that the income balance response can be decomposed into a mechanical effect (depending on the currency composition of foreign assets and liabilities) and an economic effect, as follows:

- **Mechanical effect.** For most countries, <u>foreign assets</u> tend to be denominated in foreign currency, implying that a REER appreciation would lead to a mechanical decrease in foreign assets and income credits (expressed as percentage of GDP). For example, in 2017 the share of foreign assets denominated in foreign currency was around 70 percent in the United States, 85 percent in Japan, and nearly 100 percent in the median emerging economy (EME), while it has been lower in the median G6 country since 1999 (at around 50 percent) following the creation of the euro (Juvenal et al, 2019). However, the currency denomination of <u>foreign liabilities</u> is more heterogenous across countries, with advanced economies better able to borrow from abroad in domestic currency. For example in 2017, 85 percent of the United States' foreign liabilities were denominated in domestic currency, compared to 82 percent for the median G6 economy and 67 percent for Japan. This pattern implies a limited mechanical effect from a REER appreciation on foreign liabilities and income debits. On the other hand, EME more often borrow in foreign currency due to the "original sin," delivering a mechanical decrease in foreign liabilities and income debits when the REER appreciates (80 percent of EME's foreign liabilities in 1990 were denominated in foreign currency, although that share has declined to 40 percent in 2017).[10]

- **Economic effect.** For small open economies and countries with low outward spillovers, a REER appreciation (of domestic currency against all other currencies) is unlikely to have a significant

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[9] Adler and Garcia-Macia (2018) analyze NFA returns defined as the income balance *plus NFA valuation changes*. With valuation changes often large and volatile, results obtained for NFA returns in Adler and Garcia-Macia's analysis do not directly apply to the income balance on its own (as studied here).

[10] In this simplified presentation, we are not taking into account the potential effect that the REER appreciation may have on GDP (expressed in domestic currency), which would likely be much smaller than the mechanical effects on income credits and debits.

impact on growth and profits in the rest of the world, so it is not expected to affect income credits (except for the mechanical effect mentioned above). However, a REER appreciation may reduce domestic economic activity and profits (especially for exporting firms that become less competitive), and may thus lead to lower income debits (expressed as percentage of GDP) to the extent that firms operating in the domestic economy are, at least partially, owned abroad.

13.   Depending on the net foreign asset position of the country, the income balance response may reinforce or offset the trade balance response to a REER appreciation. Expected effects of a REER appreciation are summarized in Table 2. Overall, both income credits and debits are expected to decrease following a REER appreciation, with the resulting overall effect on the income balance depending on the respective size of the credit and debit channels. In countries with a large net creditor position like Japan, a REER appreciation would likely lead to a decrease in the income balance, as long as the income credit channel dominates (with income credits being larger than income debits). In such countries, the income balance response would therefore reinforce the usual negative trade balance response to a REER appreciation. Conversely, in countries with a large net debtor position, the income debit channel may dominate and a REER appreciation would likely lead to an increase in the income balance, partially counterbalancing the trade balance response.

Table 2. Japan: Theoretical Effects of REER Appreciation on Trade and Income Balances

Trade Balance (TB)	Price effect	Volume effect	TOTAL TB Response[1]	Income Balance (IB)	Mechanical channel ADV	Mechanical channel EME	Economic channel	TOTAL IB Response OVERALL	Large (+) NFA	Large (-) NFA	Current Account (CA) TOTAL OVERALL	Large (+) NFA	Large (-) NFA
Exports value	+	--	-	Income credit	-	-	0[2]	-	--	-			
Imports value	-	++	+	Income debit	0[3]	-	-	-	-	--			
Trade balance			--	Income balance	-	?	+	?	-	+	--[4]	---	-[4]

[1] If the Marshall-Lerner condition is satisfied

[2] For a small open economy and countries with small outward spillovers

[3] If the country is able to borrow from abroad only in domestic currency

[4] If the trade channel dominates the income channel, as expected given relatively larger gross trade flows than income flows

Note 1: "+" represents a smaller increase than "++" while "-" represents a smaller decrease than "--"

Note 2: Grey shading represents the theoretical prediction for Japan

14.   Preliminary empirical results suggest that in Japan, the income balance response to changes in the real exchange rate would amplify the trade balance response, although the effect would be quantitatively modest. Using quarterly and annual IMF BoP data on a panel of 40 countries over 1986–2018, and controlling for the size of foreign assets (resp. liabilities) and related yields, we estimate separately the income credit and income debit elasticities to the real exchange rate. Both are generally found to be negative, as predicted by our proposed channels, although estimates vary under different econometric specifications. Country-specific income balance semi-elasticities are then derived using ratios of income credit and debit to GDP. For all 40 studied countries, income balance semi-elasticities are found to be significantly smaller than corresponding

trade balance semi-elasticities, because gross income flows are smaller than gross trade flows (which importantly affects the relative weights of income and trade balance semi-elasticities). For Japan, as for other large net creditor countries, we find evidence that the income balance response to changes in the real exchange rate would marginally reinforce the trade balance response. Overall, the current account response to changes in REER in Japan is estimated to be marginally larger when we take into account the income balance response, in addition to the usual trade balance response.[11]

E.   Conclusions

15.   The gradual increase in Japan's income balance primarily reflects net revenues from an increasingly positive NFA position. Japan's high income balance is primarily the result of a highly asymmetric income account. The Japanese income balance has been increasing over time, in line with a larger NFA position reflecting past current account surpluses and the increase in corporate saving. When compared with G6 peer countries, Japan's relatively high income balance is due to:

- *higher yields on investment abroad*, especially on FDI (from "better" geographical positioning and possibly profit shifting), which more than offset a somewhat lower stock of foreign assets;

- *much lower FDI liabilities* (due to possible measurement issues, corporate governance, or regulatory and administrative issues) *and lower portfolio debt liabilities* (due to strong home bias and corporate deleveraging); and

- *lower yields on portfolio debt liabilities* (linked to extremely accommodative monetary policy and low credit risk in Japan).

16.   Offsetting patterns between the trade and income balances, within the external current account, highlight their interconnectedness and the blurring impact of globalization and multinational firms on the attribution of income. For one, gross trade flows continue to be significantly larger than gross income flows. In addition, Japan's current account balance is highly and positively correlated with its trade balance, while the positive correlation with its income balance is much weaker. At the same time, the income balance is negatively correlated with the trade balance, possibly reflecting several mechanisms including (i) aging, (ii) an income effect, (iii) market pressures, but also (iv) offshoring and (v) profit shifting through transfer pricing.

17.   For Japan, the income balance response to changes in the real exchange rate is estimated to reinforce the trade balance response, although only marginally. Preliminary estimates indicate that income credits and debits tend to decrease with a REER appreciation, with a dominant income credit channel for large net creditor countries such as Japan. However, the income balance response to the REER is significantly smaller than the trade balance response due to relatively low gross income flows.

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[11] In addition to the overall effect of REER changes on total income credits and debits, Colacelli, Rebillard and Gautam (forthcoming) compute the mechanical effect separately, using data from Juvenal et al (2019), to disentangle and estimate the economic effect.

18.   Continued efforts towards promoting FDI inflows would likely contribute to boosting income debits and reducing the relatively high external income balance in Japan. While the promotion of inward FDI has been one of the policy goals of Abenomics' structural reforms, recent evidence suggests that additional steps are needed to further boost inward FDI to the level of peer countries (Hoshi, 2018). Larger inward FDI would also support Japan's productivity growth. Steps to boost inward FDI could include addressing corporate governance issues (with Japan's corporate governance being an "insider system" with limited power for shareholders, potentially discouraging foreign ownership; see e.g. Hoshi, 2018) and regulatory and administrative issues, including by reducing the cost of doing business. The latter is in line with IMF advice to reform product markets, by reducing barriers to entry in some industries as well as accelerate deregulation of agricultural and professional services sectors, in order to foster growth and investment (IMF, 2018).

19.   Adjustment of Japan's external current account via the exchange rate is estimated to mainly operate through the trade balance, with marginal support from the income balance. The compositional change in Japan's current account balance over recent decades, with the income balance being more prominent, does not in itself fundamentally modify the external adjustment process via the exchange rate, which is estimated to operate mainly through the trade balance. In the case of Japan, the response of the income balance to exchange rate movements may actually amplify the response through the usual trade channel.

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JAPANESE BUSINESS CYCLES, EXTERNAL SHOCKS, AND SPILLOVERS[1]

This chapter develops a quarterly macro-econometric model for Japan, and integrates it within a compact model of the world economy (including the global oil market). A Global Vector Autoregression (GVAR) model is used to evaluate the nature and strength of: economic linkages between globally-systemic countries (including Japan); the size and speed of the international transmission of stress in global financial markets; as well as a global growth slowdown. It also examines outward spillovers from Japan to the rest of the world and how they have changed over time. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. The results show that all regions are more sensitive to developments in China than to output shocks in the Euro Area, the United States, or Japan. Stress in global financial markets can amplify spillovers from growth shocks in systemic economies. While outward spillovers from Japan output shocks have become smaller over time, they remain important for Asia-Pacific economies and the global economy.

A.   Introduction

1.   A Global Vector Autoregression (GVAR) model is used to determine the size and speed of the transmission of different shocks to/from Japan. We use a dynamic multi-country framework for the analysis—see Cashin et al. (2014), Cashin et al. (2016), Cashin et al. (2017b), Mohaddes and Pesaran (2016), and Mohaddes and Raissi (2018a). The framework comprises 33 country/region-specific models. These individual models are solved in a global setting where core macroeconomic variables of each economy are related to corresponding foreign variables (constructed exclusively to match the international trade pattern of the country under consideration). The model has both real and financial variables: real GDP, inflation, primary balance to GDP ratio, public debt to GDP ratio, real exchange rate, short and long-term interest rates, an index of financial market stress, and the price of oil. This framework can account for various transmission channels, including not only trade relationships but also financial and commodity price linkages—see Dees et al. (2007). All data are quarterly in frequency, for the period 1981Q2 to 2018Q2.

2.   The results show that output shocks emanating in globally-systemic economies have important cross-country effects, including for the Japanese economy. Following a one percent decline in China's GDP, economic activity falls by about 0.3 percent for the median Asian economy (and about 0.25 percent for Japan) and 0.2 percent for the median economy in Europe and the Americas. The corresponding number for the fall in GDP of the median Asian economy in response to a similar growth slowdown in the United States is about 0.2 percent after one year. Adverse spillovers from the Euro Area slowdown are modest (assuming limited financial stress in the Euro Area). These results show that countries are becoming more sensitive to developments in China than to shocks in the Euro Area or the United States, in line with the direction of evolving trade patterns and the emergence of China as a key driver of the global economy. In response to a financial stress

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shock, real GDP growth slows worldwide (by 0.2 percentage points on average). Finally, while outward spillovers from Japan output shocks have reduced over time, they do have global implications (albeit to a lesser extent than those of China and the United States), and are stronger in its Asia-Pacific geographical proximity.

B. Modelling the Global Economy

3.   **We employ the GVAR methodology to analyze the international macroeconomic transmission of shocks, with a focus on the Japanese economy.** This framework takes into account both the temporal and cross-sectional dimensions of the data; real and financial drivers of economic activity; interlinkages and spillovers that exist between different regions; and the effects of unobserved or observed common factors (e.g. commodity prices and financial risk). This is crucial as the impact of shocks cannot be reduced to a single country but rather involves multiple regions, and this impact may be amplified or dampened depending on the degree of openness of the countries and their trade structure. Before describing the data and our model specification, we provide a short exposition of the GVAR methodology.

The Global VAR Methodology

4.   **The Global VAR methodology consists of two main steps.** First, each country is modeled individually as a small open economy (except for the United States) by estimating country-specific vector error correction models in which domestic variables are related to both country-specific foreign variables and global variables that are common across all countries (such as oil prices and financial market stress). Second, a global model is constructed combining all the estimated country-specific models and linking them with a matrix of predetermined cross-country linkages. More specifically, we consider $N + 1$ countries in the global economy, indexed by $i = 0, 1, ..., N$. Except for the United States, which we label as 0 and take to be the reference country; all other N countries are modelled as small open economies. This set of country-specific models is used to build the GVAR framework.

GVAR Literature and Spillovers

5.   **The GVAR is a modelling framework of the world economy designed to explicitly model economic and financial interdependencies across markets and countries at national and international levels**. The framework was originally proposed by Pesaran et al. (2004) and further developed by Dees et al. (2007). It links individual country-specific models in a coherent manner to form a global modelling framework by using time series, panel data, and factor analysis techniques. It has been used in bank stress testing; the analysis of China's growing importance for the rest of the world economy (Cashin et al. (2016, 2017b)); the international macroeconomic transmission of weather shocks (Cashin et al. 2017a); the impact of commodity price shocks (see Mohaddes and Pesaran (2016) for the global macroeconomic consequences of country-specific oil-supply shocks and Cashin et al. 2014 for the differential effects of demand- and supply-driven commodity price shocks); other real and financial shocks, as well as in forecasting applications. For an extensive survey of developments in GVAR modelling, see Chudik and Pesaran (2016).

6.   **The issue of spillovers from financial and growth shocks in systemic economies has received extensive attention in the literature.** Important papers include coverage in the IMF's Spillover Reports (IMF 2012, 2014a) and Regional Economic Outlooks for Asia and the Pacific (IMF 2014b, 2015, 2016). Cashin et al. (2017b) and Dizioli and others (2016) find that a slowdown and rebalancing in China can have significant spillovers to ASEAN-5 economies, particularly those with higher trade exposures to China and commodity exporters. They also show that a surge in global financial market volatility could translate into a fall in world economic growth of around 0.3 percentage points after one year. Cashin et al. (2016) and Kose et al. (2017) study spillovers from the U.S. growth slowdown. Dees et al. (2007) explore the international linkages of the Euro Area. This chapter contributes to the literature in several dimensions. First, the price of oil in the model is determined in international markets, thereby being affected by both global demand and supply conditions. An index of stress in global financial markets is added to the model, to account for the financial contagion channel of impact. Second, the chapter investigates the extent to which the global impact of a slowdown in Japan has changed over the past three decades. Third, the estimation sample of the GVAR model is extended from 2013Q1 to 2018Q2.

Model Specification

7.   **The GVAR model includes 33 economies, which together cover more than 90 percent of world GDP** (see Table 1). We obtain quarterly data (for the period 1979Q1–2016Q4) from Mohaddes and Raissi (2018b) on oil prices, domestic macroeconomic variables (treated as endogenous) and country-specific foreign variables (taken to be weakly exogenous) for the 33 economies, and update this data until 2018Q2.

Table 1. Japan: Countries in the GVAR Model

Asia and Pacific	North America	Europe
Australia	Canada	Austria
China	Mexico	Belgium
India	United States	Finland
Indonesia		France
Japan	**South America**	Germany
Korea	Argentina	Italy
Malaysia	Brazil	Netherlands
New Zealand	Chile	Norway
Philippines	Peru	Spain
Singapore		Sweden
Thailand	**Middle East and Africa**	Switzerland
	Saudi Arabia	Turkey
	South Africa	United Kingdom

Source: Mohaddes and Raissi (2018b).

8.   **The modeling framework includes an index of financial stress (FSI_t) in advanced economies**. The FSI_t for advanced countries is constructed by Cardarelli et al. (2009) as an average of the following indicators: the beta of banking sector stocks; TED spread; the slope of the yield curve; corporate bond spreads; stock market returns; time-varying stock return volatility; and time-varying effective exchange rate volatility. Such an index facilitates the identification of large shifts in asset prices (stock and bond market returns); an abrupt increase in risk/uncertainty (stock and foreign exchange volatility); liquidity tightening (TED spreads); and the health of the banking system (the beta of banking sector stocks and the yield curve). We model FSI_t as a common variable, in other words, it is included as a weakly exogenous variable in each of the 33 country/region-specific models, but we allow for feedback effects from any of the macro variables to FSI_t.

9.   **Given the importance of oil shocks for the global economy, the modeling framework also includes nominal oil prices in U.S. dollars in the country-specific models.** We allow for oil prices to be determined in global commodity markets rather in the U.S. model alone (as is more standard in the literature), given that oil prices are also affected by, for instance, any disruptions to oil supply in the Middle East. Therefore, in contrast to the existing GVAR literature, we model the oil price equation separately and then introduce the price of oil as a weakly exogenous variable in all countries, thereby allowing both demand and supply conditions to influence the oil price directly.[2]

C.   Spillover Analysis

10.   **This section analyzes inward spillovers to Japan from**: (i) macroeconomic shocks in other systemic economies (China, the Euro Area, and the United States), (ii) a potential global growth slowdown, and (iii) stress in global financial markets. It also studies outward spillovers from Japan to other Asian countries and globally.

China Slowdown

11.   **China's real GDP growth is slowing— from an average of about 10 percent over the period 1980–2013 to an average of 6½ percent between 2017 and 2019.** These developments, together with market concerns about the future performance of the Chinese economy (also affected by trade tensions with the United States), are resulting in spillovers to other economies (especially to countries in the Asia-Pacific region) through trade links, weaker commodity prices, and financial linkages. The results of the GVAR model show that a one percent negative GDP shock in China translates into lower economic

Responses of Output to a Negative GDP Shock in China
(In percent)
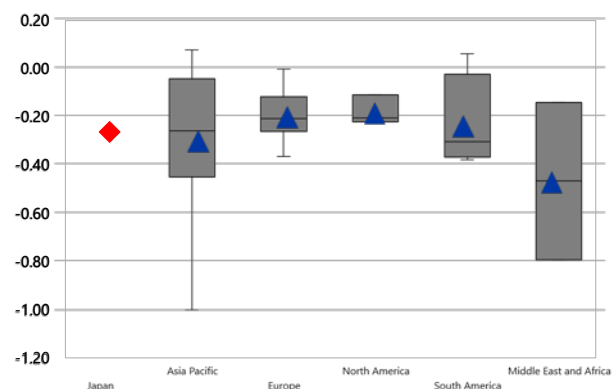
Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in GDP of China. Symbols — and ∆ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

[2] See Cashin et al. (2017a), Mohaddes and Pesaran (2016), for a similar approach.

growth globally (text chart). Countries with large trade exposures to China are most vulnerable to a slowdown in this country. The effects on the GDP of Asia and Pacific countries are generally large (with the median effect being 0.3 percent after one year) owing to strong trade linkages with China. Countries in Europe and North America also suffer a decline in economic output when China's growth slows—by about 0.2 percent each after one year (because some are included in the supply chain of China). Turning to South American, Middle East and African countries, following a negative GDP shock in China, the median output of these countries falls by about 0.2 and 0.4 percent, respectively, largely owing to weaker commodity prices. These findings are somewhat to be expected given the emergence of China as a key driver of the global economy in recent decades. Following a negative China GDP shock, real median output in Japan falls by about 0.25 percent after one year.

United States Slowdown

12.   As a result of the dominance of the United States in the global economy, any slowdown in this country can bring about negative spillovers to other economies. Lower commodity prices are one channel through which a negative U.S. shock affects countries, conveying a negative impact on growth prospects of commodity-exporters (e.g. Middle East and Africa). The median effects of a one percent negative U.S. output shock for output in North American countries are the largest (in absolute values)—median output falling by about 0.65 percent owing to strong trade links between Mexico, Canada, and the United States. Furthermore, the continuing dominance of U.S. debt and equity markets, backed by the strong global role of the U.S. dollar, plays an important role in spillovers to other countries. The results of the GVAR model show that the influence of the U.S. on other economies remains larger than direct

Responses of Output to a Negative GDP Shock in United States
(In percent)
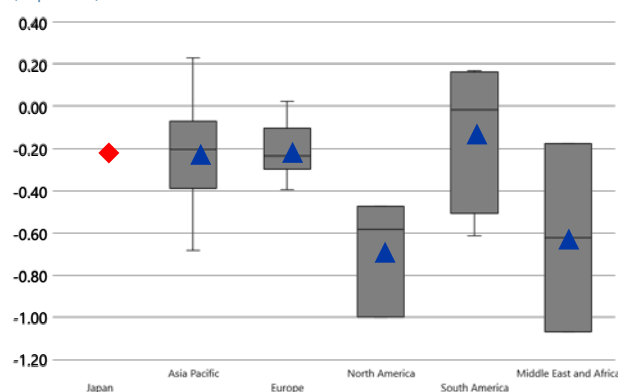
Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in GDP of the United States. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

trade ties would suggest, owing to third-market effects together with increased financial integration that tends to foster the international transmission of business cycles (text chart). For instance, following a negative U.S. GDP shock, real median output in Europe and Asia falls by about 0.2 percent after one year. Similarly, following a negative U.S. GDP shock, real median output in Japan falls by about 0.2 percent after one year.

Euro Area Slowdown

13.   The adverse impact on output of a one percent negative GDP shock in the Euro Area is most significant for other European countries. Median output in European countries falls by 0.65 percent after one year following the shock (text chart). Beyond Europe, growth spillovers vary from

country to country. High dependencies are observed for South American countries, with annual output elasticity of about 0.3 operating via trade and commodity-price channels. For other countries/regions, the impact is modest (assuming limited financial stress in the Euro Area). Following a negative Euro Area GDP shock, real median output in Japan falls by about 0.2 percent after one year.

Global Growth Slowdown

14.   Trade policy uncertainty, geopolitical tensions, and idiosyncratic stress in key emerging market economies weighed on global growth in the second half of 2019. While accommodative global financial conditions have continued, raising growth prospects for 2020, growth forecasts in key emerging market economies remained subdued. Should downside risks to global growth materialize, and be accompanied by rapidly deteriorating financial sentiment, the results from the GVAR model suggest that countries in Asia-Pacific or Middle East and Africa would be disproportionately affected, owing to third-market effects (text chart). Specifically, following a one percent fall in global GDP, the median country in the Asia-Pacific region could experience a reduction in GDP of about 1.5 percent after one year. The median impact is even larger in the Middle East and Africa region given a demand-driven reduction in global commodity prices. Similar to the rest of Asia-Pacific region, following a negative global GDP shock, real median output in Japan falls by about 1.3 percent after one year.

## Stress in Global Financial Markets

Responses of Output to a Negative GDP Shock in Euro Area
(In percent)
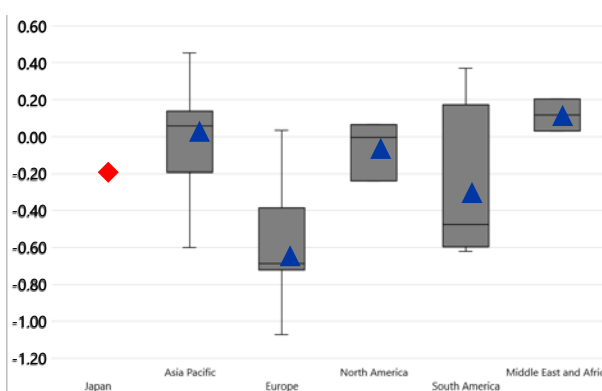
Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in GDP of Euro Area. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

Responses of Output to a Negative Global GDP Shock
(In percent)
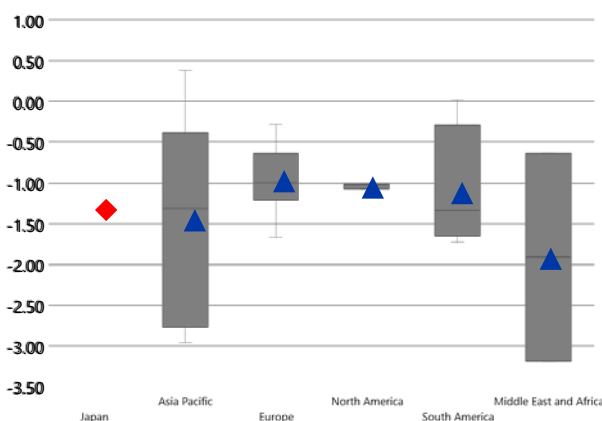
Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in Global GDP. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

15.   Stress in global financial markets could emanate from an increase in risk premiums in reaction to a decline in investor sentiment triggered by a deteriorating outlook, or weak policy frameworks amidst concerns about debt sustainability in some advanced economies. Such shocks could lead to higher interest rates, exchange rate volatility, corrections in stretched

asset valuations (for example, equity and real estate), and sudden international financial flow reversals. These developments would strain leveraged companies, households, and sovereigns; worsen bank balance sheets and profitability; and damage the public finances of advanced and emerging market economies. Cashin et al. (2017b) discuss the implications of financial stress in advanced economies, and point to potentially sizable spillovers from such shocks.

16.   The GVAR model results indicate that in response to potential stress in advanced economies' financial markets, global economic growth decelerates in the short-run. More specifically, a one standard deviation shock to the financial stress index (FSI)[3] translates into slower global economic activity—with world output falling by around 0.2 percent below the pre-shock level on average over the first year (text chart). The growth impact on different countries/regions depends on the magnitude and duration of the FSI shock; countries' economic fundamentals; and the size of safe-haven flows. For instance, model estimates show that the impact is greatest in South America. Growth spillovers to the median Asian country is about 0.1 percent. Following a negative shock to the financial stress index, real median output in Japan falls by about 0.2 percent after one year.

Outward Spillovers from Japan

17.   Outward spillovers from Japan to other Asian economies and the rest of the world are important. The results from the GVAR model indicate that output shocks in Japan matter, particularly for its immediate neighborhood, but also have global implications (albeit to a lesser extent than those of China, the United States, and the Euro Area). A one percent
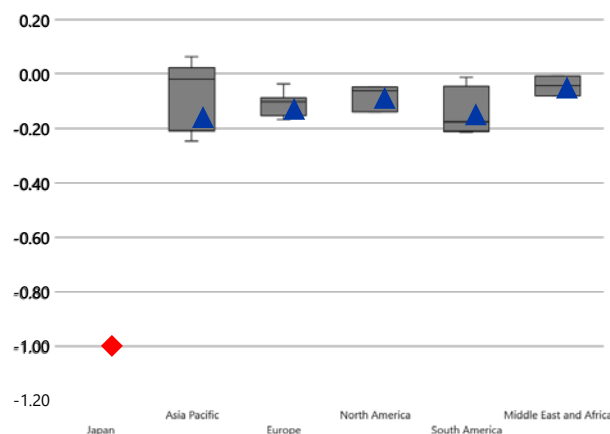
Responses of Output to Potential Stress in Global Financial Markets
(In percent)
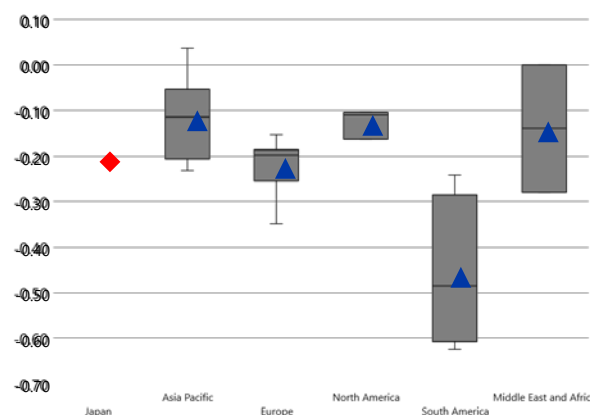
Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a one-standard deviation positive shock to FSI. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

Responses of Output to a Negative GDP Shock in Japan (2014-16 Weights)
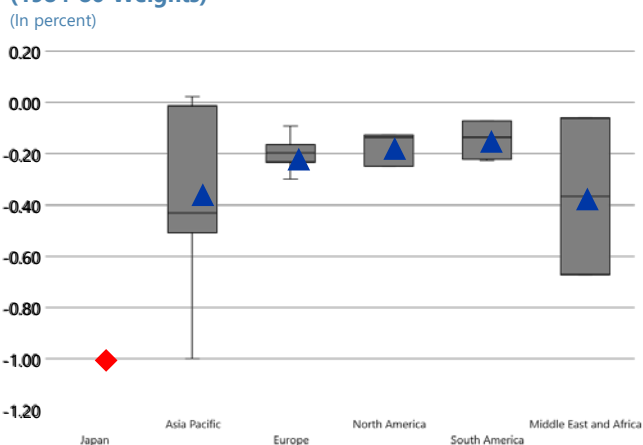(In percent)

Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in GDP of Japan. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

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[3] A one standard deviation positive shock to FSI in advanced economies is two-thirds of the shock that occurred during the European sovereign debt crisis, and one-tenth of the shock that occurred during the Global Financial Crisis.

decline in the GDP of Japan (using 2014-16 trade weights) generates relatively large output losses in other Asian countries, corresponding to around 0.2 percent after one year (text chart). This indicates that the influence of output shocks emanating from Japan remains important for countries in the Asia-Pacific region. However, a Japanese slowdown only has a modest negative effect in other non-Asian regions (with a median effect of about 0.1 percent). To investigate whether the global impact of a negative output shock in Japan has changed over the past three decades, we re-estimated the GVAR model using trade weights averaged over 1984 to 1986 (text chart). Comparing these results with those obtained from our original specification (using 2014–16 trade weights), the results from the GVAR model indicate that the impact of the Japan output

Responses of Output to a Negative GDP Shock in Japan (1984-86 Weights)
(In percent)

Source: Author's estimates.
Note: Figure depicts annual percent change in output of a group of countries associated with a 1 percent decline in GDP of Japan. Symbols — and Δ denote the median and average responses across countries in each group. The boxes show the 25th–75th percentile responses and the whiskers show the minimum and maximum responses.

shock has declined significantly over the past thirty years. Following a negative Japan GDP shock (using 1984-86 trade weights), real median output declines in other Asian countries by about 0.4 percent after one year, with output losses in other regions of around 0.3 percent after one year. This finding suggests that the influence of negative Japan output shocks on the global economy has become smaller in recent decades.

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