

# A Sovereign Wealth Fund for a Non-Oil Producing Country: The Case of Japan

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## Abstract

*A sovereign wealth fund (hereafter SWF) would be an effective tool for preserving Japan's national wealth in the medium to long run under a declining, aging population and for coping with external shocks in the short run. Japan is a typical non-oil producing, developed country that relies significantly on international trade. Its energy dependency rate remains around 93%, and its food sufficiency rate is less than 40%. Despite its high dependence on foreign producers, Japan's asset holdings are still distinctly biased toward domestic assets denominated in Yen. Indeed, nation-wide foreign equity holdings are approximately 30% in Japan, while those of the UK and Germany exceed 45%. The same pattern holds in the allocation of bonds. The relative foreign asset allocation of Japan remains lower than European levels in part because of the high volatility in exchange rates and the often observed, persistent appreciation of the Yen against the US dollar. Because of this exchange rate risk, international asset allocation is not optimal. After reviewing the economics of a SWF for non-oil producing countries, we propose that Japan establish a SWF as a means of preserving its wealth for future generations.<sup>§</sup>*

**Keywords:** sovereign wealth fund, Japan, capital movement

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## I Introduction

Consider the following thought experiment. It may appear extremely simplified, but the scenario highlights the basic dynamic and structural features of mature national economies today. Assume a world of two countries. Country A is composed of all retirees, and Country B represents the rest of the world. What will country A produce? It will produce nothing because everyone in country A is retired. What will country A consume? It will consume what its savings will allow its citizens to import from Country B. But, if all the savings in Country A are held in domestic assets, country A will face the risk that the future exchange rate for its currency will decline. This is likely to happen because, given that Country A produces nothing, the demand for the currency of Country A will be very limited. A decline in the value of the currency of country A would, in turn, impede country A's ability to import consumer goods. In other words, if its currency is worth less relative to other currencies, the buying power of its citizens will decline at a point when its citizens are completely dependent upon imports.

How can country A protect itself against this risk? It can save in foreign currencies rather than its domestic currency by investing in assets internationally. Such assets saved abroad are NOT exposed to currency risk. Savings accumulated in the near term can be exchanged at a known exchange rate in a highly liquid market where there are many buyers of Country A's currency.

Japan is not Country A, but they do share certain characteristics including an aging population, an import-dependent economy, and a bias toward domestic savings and investment. This paper proposes establishing a sovereign wealth fund (SWF) to preserve wealth for future generations in Japan by addressing these structural problems.

Japan's official baseline scenario, in which a smaller working age population will bear the costs of a larger aging population, indicates that per capita burdens will increase. A SWF financed with a current, near-zero interest rate should generate profits through asset allocation in global investment opportunities, work as a vehicle to transfer wealth from current to future generations, and reduce currency risk.

A SWF has two additional advantages for Japan. First, given the role of the Yen in the current global economy as a shock absorbing currency, a SWF can work as a vehicle to provide liquidity and to mitigate excessive exchange rate appreciation, especially during a crisis period. Second, inflation rates in Japan are not buoyant yet. The Bank of Japan still needs to continue quantitative easing to achieve a 2% inflation target. A SWF financed by a legitimate and transparent government program can provide additional margin for the Bank to expand its balance sheet, achieve a quantitative target, and control long-term rates.

In short, by selling Yen in the foreign exchange market and investing the newly purchased foreign currencies in long term equity and equity-like investments (like the Yale Endowment), Japan will accomplish two policy objectives:

1) Satisfy Japan's future foreign currency needs at a known price, and a price that is likely to be favorable relative to long-term expectations under the simplified scenario above.

2) Increase the size of Japan's currently insufficient social safety net to meet the future needs of retirees.

By creating a SWF, perhaps called the "Japan Investment Fund" (JIF), Japan will be able to earn an equity risk premium over several decades and increase the pool of savings. The proposal is akin to a two-pronged risk-reduction strategy: on one hand future currency risk is minimized, and, on the other hand, the equity risk premium increases Japanese savings over a multi-decade time frame.

This paper proceeds in four sections. Section II presents a statistical analysis of the risks to the current Japanese economy. Section III explores the characteristics of Japan's foreign investments and the issues inherent in its home bias. Section IV explores the implications of a SWF for the overall economic policy currently pursued by Japan. After reviewing existing funds in Japan and the world, the final section argues the rationale for setting up a SWF in Japan.

## II Japan at Risk

### II.1 Demographic change and potential growth

Firstly, we will address demographic risks as they relate to the Japanese economy. Japan experiences the fastest aging among OECD countries. One-fourth of the total population is now more than 65 years old, a situation caused by long-lasting downturns in the total fertility rate (TFR), and a restrictive immigration policy. The official baseline population projection indicates that total population in 2050 will be about 100 million people, which is just 80% of the population in 2015; furthermore, the working age population in 2050 will be just 70% as large as it was in 2015.

[Fig. 1: Elderly Population Ratio among OECD Countries]

[Fig. 2: Population Projection for Japan until 2050]

In addition to a decline in population, Japan's potential growth rate is diminishing. During two decades of stagnation, brought on by entrenched deflation, the capital stock has not grown enough to boost growth potential<sup>1</sup>. The potential number of workers has declined, as noted above, and labor contribution to growth has been almost zero. Although the female labor participation rate, which still abides by the M-shaped curve, has increased during the current business expansion since 2013, the increase is not large enough to affect the labor shortage significantly.

[Fig. 3: Decomposition of Japan's Potential Growth Rate]

Economic prosperity can be maintained by raising labor productivity, even if factor contributions decline. However, improvement in labor productivity does not fully increase wage income due to the tax

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<sup>1</sup> According to the official economic reports (CAO (2011, 2012)), non-negative constraints of the interest rates levy burdens on the economy, costing from 0.3% to 0.6% per year, during 2009 to 2012. Business investments are mostly affected among demand components.

wedge. In Japan, social security contributions, rather than income taxes, put further burdens on the working-age population. Sluggish growth of disposable income, relative to labor productivity, may discourage the youth cohort from working, and may magnify prevailing pessimistic expectations for the future, in turn further eroding the vitality of society.

[Fig. 4: Tax and Social Security Contribution to National Income in Japan]

## II.2 Trade structure and import dependence

Another challenge faced by Japan stems from its production and trade structure. As a non-oil producing developed country, Japan has a strong comparative advantage in the manufacturing sector in general. The inter-industry trade pattern clearly shows that Japan imports petroleum and foods by exporting transport equipment and other manufactured products. Trade is the basis of production and consumption, so a lower production capacity resulting from aging and depopulation would force Japan to choose between accepting lower living standards to reduce imports, or generating an alternative income stream to continue importing.

[Fig. 5: Japan's Imports and Exports by Commodity]

Among imported items, petroleum is the most significant because Japanese firms and households heavily depend on it. Indeed, the energy dependence rate is above 90%, and has been the most significant constraint on Japanese economic activities. Without innovation that lowers dependence on oil, this risk remains. It is worth noting that Japan also depends on food imports. Japan is the world's largest importer of food, and its annual value reaches 6-7 trillion yen, about 8% of non-durable consumption by Japanese households. Also, because domestic food production cannot be raised easily due to supply-side constraints (land and labor), a high food dependence will be unavoidable and continue in the future.

[Fig. 6: Food and Energy Dependence Rate of Japan]

The current administration takes the situation seriously, as evidenced by its implementation of growth oriented supply-side policies. Although the effect of the supply side policies is unclear, the economy has been expanding since the last quarter of 2012 (except for a temporary dip after a hike in the consumption tax rate in 2014) thanks to eased monetary and fiscal policy. Indeed, many economic indicators in production, demand, financial, and labor markets are all improving. Nevertheless, wage growth is not yet sufficient,<sup>2</sup> and increasing aggregate growth from supply side policies alone can be difficult.

[Fig. 7: Concept of the Current Growth Strategy]

While the endeavor to boost supply capacity through policies is important, it is also wise to consider

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<sup>2</sup> Kato, Motohashi, and Tsutsumi (2017) analyzed that 2.8 trillion yen or 24% of wage increase from FY2013 to FY2016 is attributable to wage and income related policies.

the idea of utilizing accumulated financial assets. Currently, the rate of return on Japan's gross foreign assets is about 3% per year, exceeding a repayment rate of gross foreign liabilities of 1.5%. The rate of return on net assets hovers around 5-6%, which is significantly higher than the return from domestic bonds or the potential growth rate. Rogoff and Tashiro (2015) call this phenomenon "Japan's exorbitant privilege".

[Fig. 8: Japan's Financial Assets and Liabilities]

### III Foreign Investments and Home Bias

#### III.1 Foreign investments

At the end of 2016, the size of the net financial assets owned by Japanese households, private non-profit organizations, and financial institutions amounted to 1,400 trillion yen, 28 trillion yen, and 130 trillion yen respectively. The net debtors are the general government and non-financial private enterprises. The net foreign assets of the economy as a whole reached 350 trillion yen.

The net foreign assets of Japan are the largest in the world. China and Germany have also accumulated a sizable amount of net assets, but these still only amount to around 60% of Japanese net assets. The U.S., as the largest net debtor in the world, borrows about 8 trillion dollars from the rest of the world.

[Fig. 9: International Comparison of Net Foreign Assets]

Among foreign investments, foreign direct investments (FDIs) amount to 159 trillion yen, about 30% of GDP. Portfolio investments are over 450 trillion yen, more than 90% of GDP in Japan. FDIs have grown more than fivefold while portfolio investments grew more than fourfold in the last two decades. Nominal GDP has remained essentially unchanged during last two decades, so the accumulation of foreign assets is simply attributable to continuous excessive savings or a shortage of domestic demand.

[Fig. 10: Japan's Foreign Assets by Type]

#### III.2 Under allocation to international investments due to home bias

The total portfolio investments of Japan are quite large, and 64% is allocated to bonds or fixed income products, while the rest is in equities. However, it is well known that its foreign asset allocation ratio is lower than that of competing countries, suggesting the existence of a strong home bias. Following is an analysis of Japanese investors' home bias.

[Fig. 11: Japan's Foreign Portfolio Investments by Type]

The degree of home bias is represented by the foreign asset acceptance ratio (hereafter FAAR), which moves between 0% and 100%. The FAAR is zero when nothing is allocated to foreign financial products. The FAARs of equity investments show that Japanese investors allocate less than 30%, while

German and U.K. investors allocate approximately 50%. Comparing these two European countries with Japan shows that the latter has a relatively strong home bias in equity investments. The FAAR of the U.S. lies between them.

[Fig. 12: Degree of Equity Investment Home Bias]

The FAARs of bond investments also show that Japanese investors are more reluctant to invest in foreign bonds than are European investors. The FAAR for Japan was approximately 20%, while those of Germany and the U.K. exceeded 40% during the late 2000s. Different from the case in equity investments, the FAAR of the U.S. for bond investments is even lower than that of Japan.

[Fig. 13: Degree of Bond Investment Home Bias]

### III.3 Causes of Home Bias

Past research on Japanese asset allocation has explored several possible causes of the home bias. A summary of empirical examinations suggests that the “asset size<sup>3</sup>” variable has a positive correlation with flows or allocation of assets. Although definitions of “asset size variables” differ in these papers, one can speculate that home bias would be eased by setting up a larger fund, as unit information and transaction costs decline and/or the risk absorption capacity is extended. On the contrary, the “gravity<sup>4</sup>” variable, which is a proxy of information or transaction costs, is negatively correlated to flows or allocation of assets. Indeed, variables related to gravity are consistently negatively correlated to such indicators as common borders, number of bank branches, and international telephone traffic. Previous research also sheds light on the importance of institutional commonality in reducing home bias. Variables, such as “common legal origin”, “to issue public debt in the US”, or “to list on a US stock exchange” illustrate the fact that institutional similarity or transparency reduces home bias among countries. Thus, the causes of home bias are multiple and stem from many distinct sources: informational (potential investors lack sufficient information to evaluate risks and opportunities abroad); institutional (Japanese firms have accounting systems that consider only domestic risks); and behavioral (people have a tendency to reflect on the past rather than the future).

[Fig. 14: Causes of Home Bias]

Exchange rate volatility has proved to be negatively correlated to capital flows or allocation. Fidora, et. al. (2007) tested the hypothesis that real exchange rate volatility induces a bias towards domestic financial assets as well as a stronger home bias for assets with low local currency return volatility<sup>5</sup>.

Comparison of exchange rate volatility among large, developed countries (the currencies), defined as

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<sup>3</sup> Portes, et.al. (2001), Ahearne, et.al. (2004), Portes and Rey (2005), and Ni (2009).

<sup>4</sup> Portes, et.al. (2001), Portes and Rey (2005), and Fidora, et. al. (2007).

<sup>5</sup> They also show that a reduction of monthly real exchange rate volatility from its sample mean to zero reduces bond home bias by up to 60 percentage points, while it reduces equity home bias by only 20 percentage points.

the standard deviation of the series of month-on-month change rate, shows that Japanese Yen has been highly volatile, regardless of sample period, since 1995. Indeed, the degree of volatility in Japan is more than twice that of the U.S. or Germany. The coexistence of a highly volatile currency and a large home bias in Japan is clearly explained by the previously cited research.

[Fig. 15: Exchange Rate Volatility of Principal Countries (Currencies)]

The Japanese Yen is not only volatile in month-on-month change levels. Looking at the relatively long-term movement of Yen, one can find it appreciate significantly after global economic downturns. The combination of exchange rate appreciation with weak global demand means neither income nor price effects can stimulate the economy in real terms. Financially, the rate of return on foreign assets tends to be negative due to exchange rate losses, followed by a latent loss on foreign assets, which exacerbates the problem. A temporary change can be inconsequential, but the past two cases (in the late of 90s and 2000s) show that exchange rate appreciation with the onset of crises can last for several years. Long-lasting exchange rate appreciation exerts continuous downward pressure on domestic price levels, resulting in a deflationary phenomenon. It also forces firms to move out of cost sensitive production sites abroad, eroding production capacity.

[Fig. 16: Movement of Long-term Nominal and Real Effective Exchange Rate of Yen]

#### IV Discussion of a SWF for Japan: How does this proposal relate to Abenomics and the current economic situation in Japan?

In trying to establish an economy with a growth mindset and to escape from a deflationary past, the impact of the exchange rate is important. In an economy where the zero interest boundary (ZIB) limits the effect of interest rates on the economy, monetary policy can operate either through the real balance effect on the domestic consumption or by the portfolio balance effect of base money on the exchange rate. The success of Abenomics since 2013, and perhaps even earlier due to expectations created during Shinzo Abe's campaign, relied upon the effect of the exchange rate, until it was undermined by the strengthening of the Yen since August 2015.

Some may criticize this aspect of Abenomics for being a "beggar-thy-neighbor" policy of exporting recession to other countries. Suppose there are two countries in the world and each country tries to achieve a certain point on the short run Phillips curve. In a two country setting, the partner country will be negatively affected by the expansionary monetary policy of the country that tries to depreciate its currency. As indicated by Hamada and Okada (2009), this beggar-thy-neighbor effect, however, is temporary. So long as exchange rates are flexible, the partner country can always undo the negative effects of the home country by itself easing monetary policy. As long as each country is aiming for a point on the short run curve, the flexible exchange rate will allow the monetary policies of both partners to achieve their price objectives<sup>6</sup>.

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<sup>6</sup> See Hamada (2013) and Dekle and Hamada (2015) for more detailed account of this issue.

There will be no conflicting problems in the Tinbergenian policy calculus. With the fixed exchange rate, in contrast, there is only one monetary policy instrument, the weighted sums of monetary expansions) and possibly two different price objectives. This is the essential difficulty involved in the fixed exchange rate scheme, now well exemplified by the Eurozone economy.

It can be shown that, as long as monetary expansion of the home country affects the domestic economy more than the partner country, the process of implementing counter monetary policies will lead to a stable equilibrium. The world could even achieve a Pareto efficient situation if each nation aims, by utilizing laissez faire policies at its ideal point on the Phillips curve. Successive interactions of monetary easing by two countries will not cause a crisis. These results carry over to multiple countries if the sum of the external effects of a country's monetary policy on the outside world is less than its effect on the home country.

This win/win situation results when the monetary expansion of a country is effectively used to depreciate its exchange rate. In 2015, this channel of monetary policy seemed to be blocked, or at least interrupted, presumably because covered interest parity ceased to prevail<sup>7</sup>. A contributing factor may have been the increased regulation of the U.S. financial market under the Dodd-Frank law, creating additional costs for arbitrageurs across the U.S. and foreign market, making more expensive.

In this light, the appreciation of the Yen (endaka) since August 2015 has certainly made the job of the Bank of Japan more difficult. The strengthening of the Yen, from 125 to 103, from August 2015 to the end of 2016, presented a hurdle to monetary policy.

Another important factor that weakened the effect of Japanese monetary policy on the dollar-yen exchange rate was the increase in holdings of Yen denominated debt by global central banks in their function as managers of their reserves. The IMF publishes the breakdown of reserves, which are reported in the COFER database. It shows that, from Q3 2015 to Q3 2016, over 100 billion dollars worth of Yen was purchased, which increased the weight of Yen in global reserves from 3.7 percent to 4.5 percent.

Specifically, the data show that inflows from China into Japan have been large. This was also reflected in the movement of the Yen/CNY exchange rate relationship, where the Yen appreciated by approximately 25 percent over the last year. This occurred as China shifted its focus from the dollar to using a trade-weighted basket for its currency management.

Long term, the Yen should depreciate since the productivity differential between Japan and its trading partners in Asia is negative. This would be consistent with the Balassa hypothesis and, as illustrated by the thought experiment above, provides an important rationale for the creation of a SWF. Currently, the Japanese economy is subject to a temporary rise of the Yen. In the long run, however, because of the

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<sup>7</sup> Iida, Kimura, and Sudo (2017) analyzed causes of covered interest rate parity deviation and pointed out that the recent key factor to determine deviations was global interest rate differentials. Growing importance of interest rate differentials is driven by a regulatory reform which affects the marginal cost of dollar funding by global banks.



expected and growing differential in productivity, the yen will likely depreciate, threatening the wealth and security of future generations of Japanese. Diversification of savings in foreign markets and in several currencies is the key to sound portfolio management for the nation.

The argument above implies that Japan should manage exchange rate risk by enhancing investment abroad. Given investors' difficulty in overcoming home bias individually, a public collective investment scheme, or SWF, can help compensate for the misallocation of capital that is driven by this distinct home bias.

## V Existing Sovereign Wealth Funds

### V.1 Overview of Sovereign Wealth Funds

Currently, there are various sovereign wealth funds in the world. In total, more than 7,300 billion US dollars are invested in such funds. The top 10 funds manage more than 1,800 billion US dollars, which is one fourth of the total assets under management in SWFs. The largest two funds are based on oil income but half of the top 10 are funded by non-commodity sources. Three Chinese funds are listed and all of them are funded by non-commodity sources. According to Alhashel (2015), the purposes for their establishment include the following: stabilization of government and export revenues, accumulation of savings for future generations in resource-rich countries to offset the future lack of national resources, and/or the management of foreign reserves.

[Fig. 17: Existing Sovereign Wealth Funds in the World]

### V.2 Comparison of Other SWFs in Japan with this proposal

Existing Japanese funds are not ranked in the top 10 list because pension funds are separately classified in the data above. The Government Pension Investment Fund (GPIF) of Japan is the largest single pension investment entity in the world, with assets of about 143,000 billion Yen (about 1,300 billion US dollars). Recent reforms have increased the GPIF's ability to invest abroad, and the current portfolio sets a mid-range value share of foreign bonds and foreign equities at 15% and 25% respectively.

[Fig. 18: Asset Allocation of the GPIF]

Although the GPIF is a collective investment scheme, the Fiscal Investment and Loan Program (FILP) is something of a hybrid. Within the program, the government issues bonds collectively and invests in individual loans and investment plans with public purposes. Some of these loans and investments involve foreign businesses related to Japanese firms and therefore may incidentally involve investments denominated in foreign currencies. Although the program is substantial, with assets amounting to 131 trillion Yen (about 1,200 billion U.S. Dollars), currently a relatively small fraction involves foreign investments. Moreover, the FILP is a part of the budget program and new investments must be approved by the Diet annually.

[Fig. 19: FILP and its Balance Sheet]

While the GPIF and the FILP are public institutions funded by taxes, insurance premiums, and/or bond issuance, there exist other quasi SWFs in Japan. Many of these were established during the last decade and are aimed at achieving respective special public purposes in collaboration with private funds. They are not as large as the SWFs mentioned above or our proposed fund for future generations. In total, private funds amount to 169 billion Yen (about 1.5 billion U.S. Dollars), and public funds amount to 723 billion Yen (about 6.6 billion U.S. Dollars).

[Fig. 20: Public-led Investment Funds in Japan]

In sum, existing SWFs do not mitigate the aforementioned risks, especially the risks from a declining population and aging. The GPIF as a public pension fund helps to some extent; however, pensions are strictly constrained by a predetermined payout structure, which limits ability to mitigate exchange rate risks. Although the FILP is a part of the annual budget program and therefore cannot be a SWF by itself, it could provide a legitimate and transparent funding tool for a SWF.

## VI Conclusion

Today Japanese authorities appear to worry about “endaka,” excessive Yen strength, but the Balassa hypothesis shows that the long-term risk to Japan may well be “en’yasu,” excessive Yen weakness. The combination of an aging population, a resource poor economy, and a private sector with a strong home bias in its savings will likely result in significant challenges for Japan in maintaining its standard of living over the medium to long term, exacerbated by a weakening of the Yen. The creation of a sovereign wealth fund can mitigate the risks created by the confluence of these factors by increasing overall savings and by diversifying the nation’s collective savings in a manner that reduces currency risk.

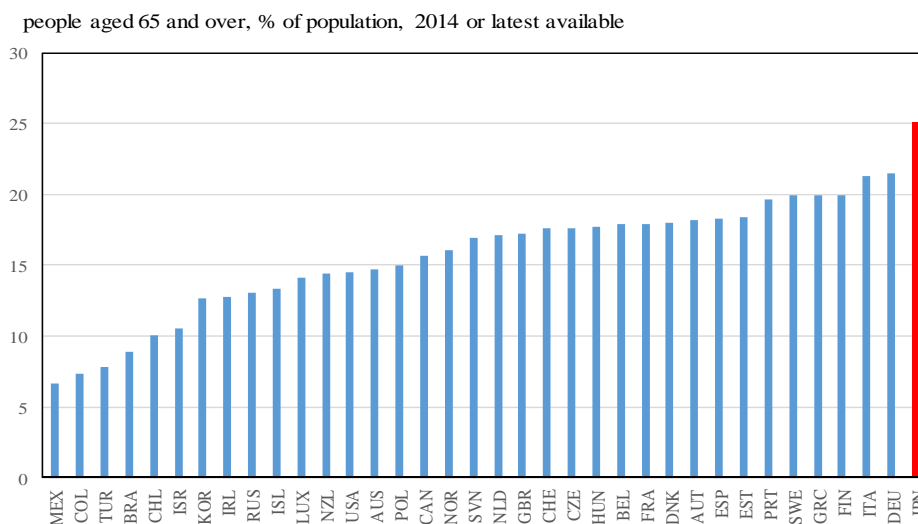
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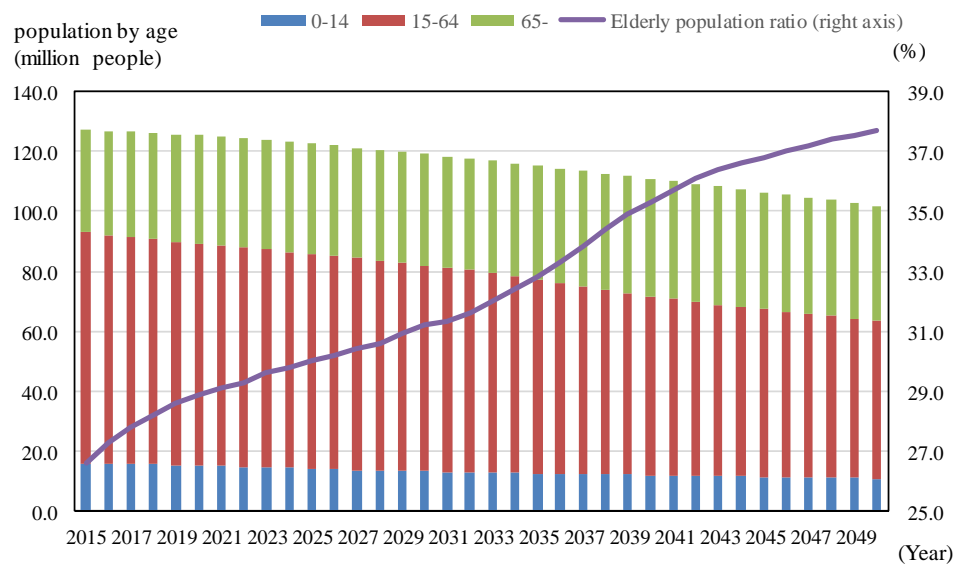
## Figures

**Fig. 1: Elderly Population Ratio among OECD Countries**



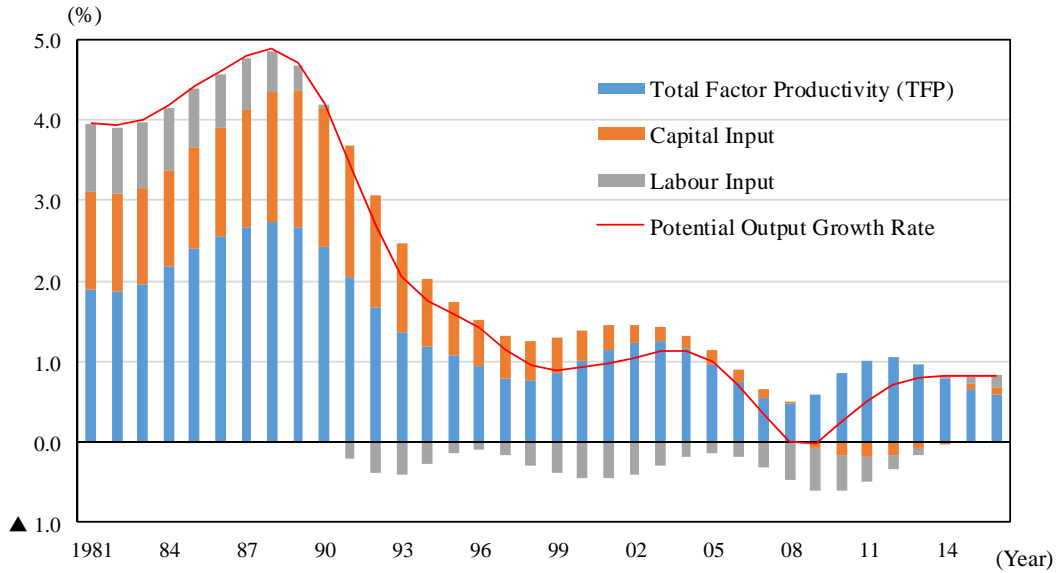
Source: OECD (2017), “Elderly population (indicator),” doi: 10.1787/8d805ea1-en (Accessed on 31 May 2017).

**Fig. 2: Population Projection for Japan until 2050**



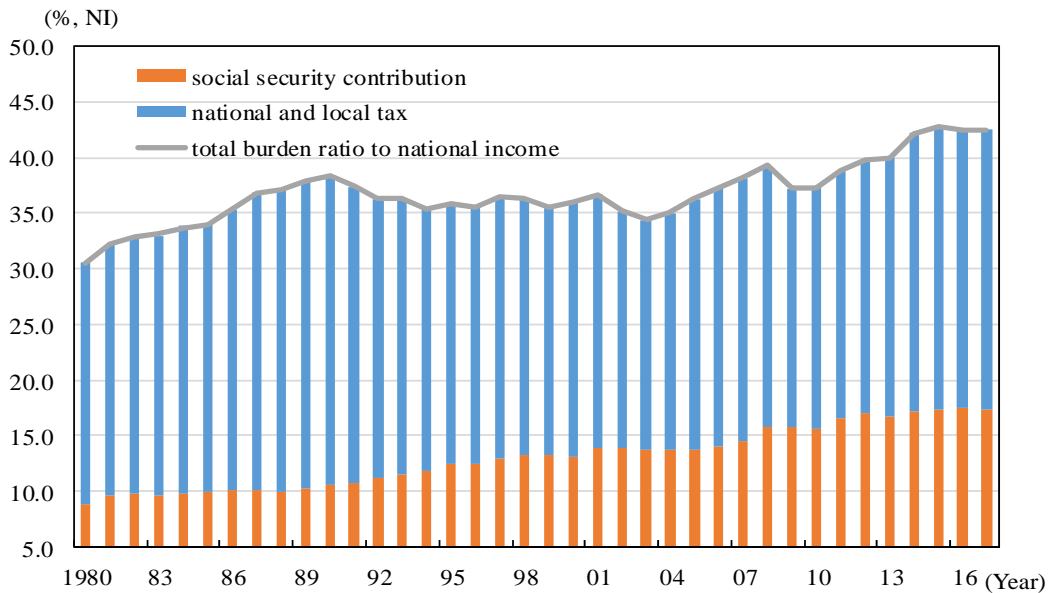
Source: National Institute of Population and Social Security Research (2017), “Population Projections for Japan 2017”.

**Fig. 3: Decomposition of Japan's Potential Growth Rate**



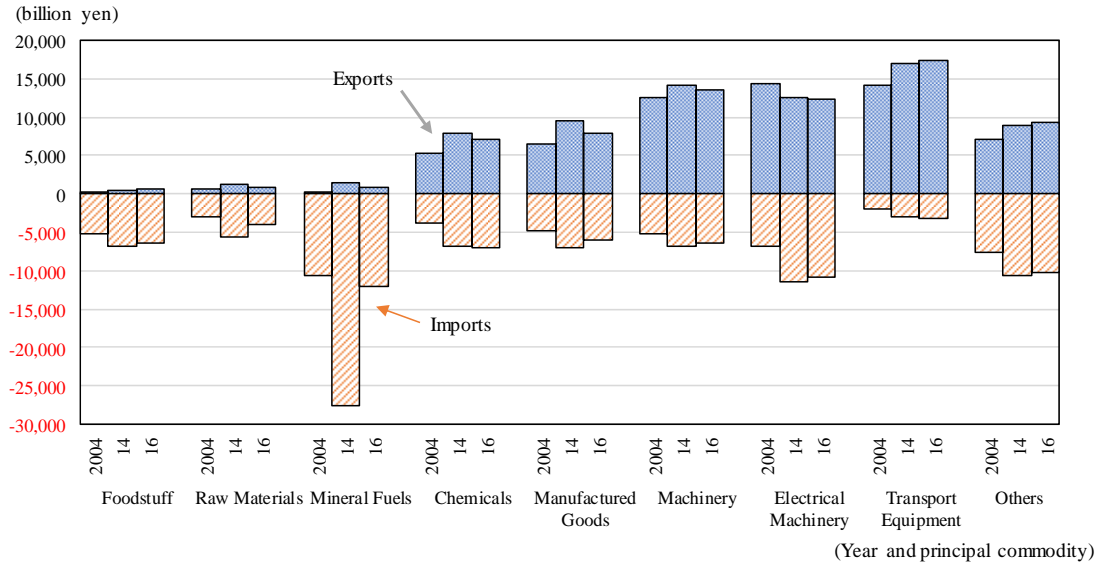
Source: Cabinet Office, the Government of Japan (Accessed on 31 May 2017).

**Fig. 4: Tax and Social Security Contributions to National Income in Japan**



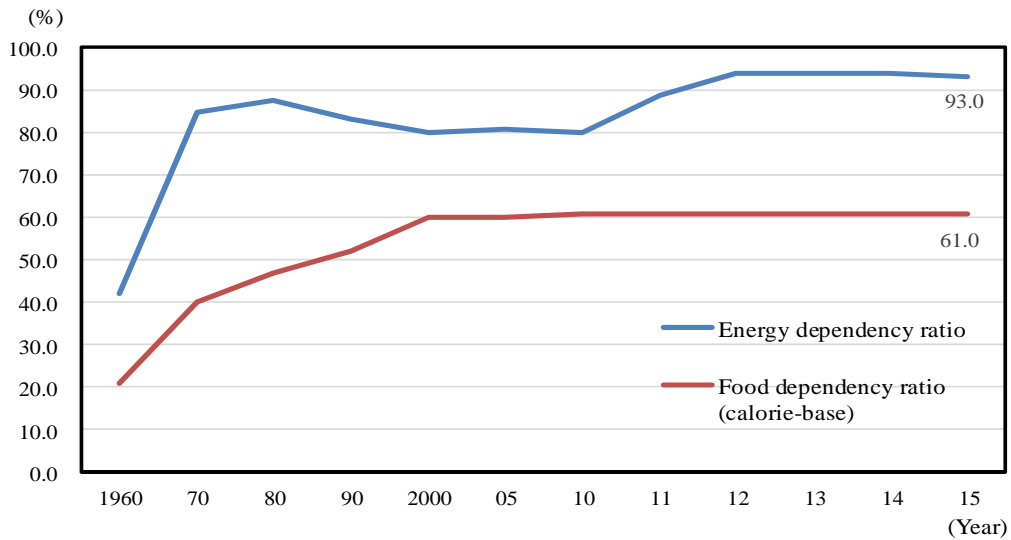
Source: Ministry of Finance, the Government of Japan (Accessed on 31 May 2017).

**Fig. 5: Japan's Imports and Exports by Commodity**



Source: Ministry of Finance, "Trade Statistics" (Accessed on 31 May 2017).

**Fig. 6: Food and Energy Dependency Ratio of Japan**



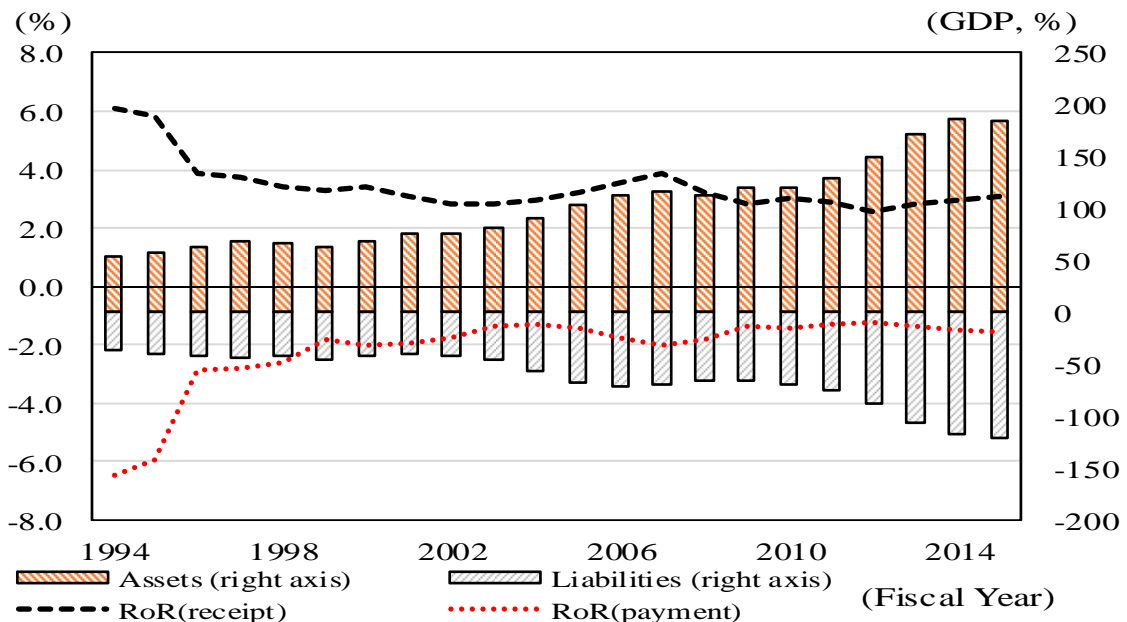
Source: International Energy Agency (IEA) "World Energy Balances 2016 Edition," and Ministry of Agriculture, Forestry, and Fisheries, the Government of Japan.

**Fig. 7: Concepts of the Current Growth Strategy**

- Implement structural reforms (on bedrock regulations (energy, agriculture, medical care etc.) / initiatives through National Strategic Special Zones)
- Move forward toward the elimination of “Six Handicaps to growth” (e.g. appreciation of yen, high corporate tax rate, delay in the conclusion of TPP)
- 3 challenges”, to accelerate corporate actions, in the context of the virtuous cycle of economy in motion
  1. Stimulate potential demand and create/expand new promising markets to raise GDP to 600 trillion yen (“10 Strategic public-private joint projects”)
  2. Enhance drastically productivity to overcome decreasing population and workforce shortage
  3. Enhance capabilities of individuals to facilitate transformation of the industrial structure

Source: Cabinet Secretariat, the Government of Japan.

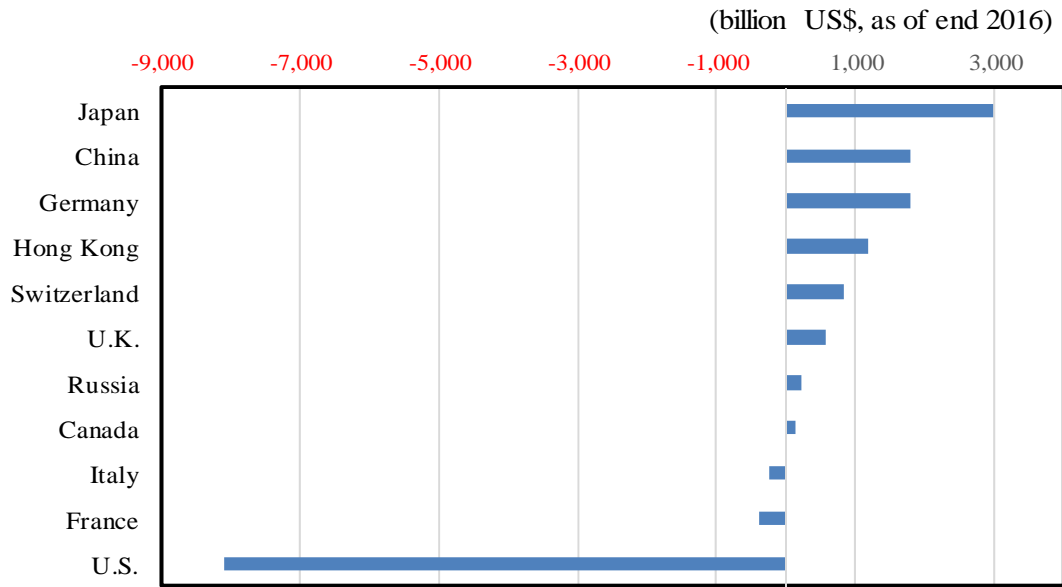
**Fig. 8: Japan’s Financial Assets and Liabilities**



Source: Authors' calculation. Data are cited from the Cabinet Office, "System of National Accounts"

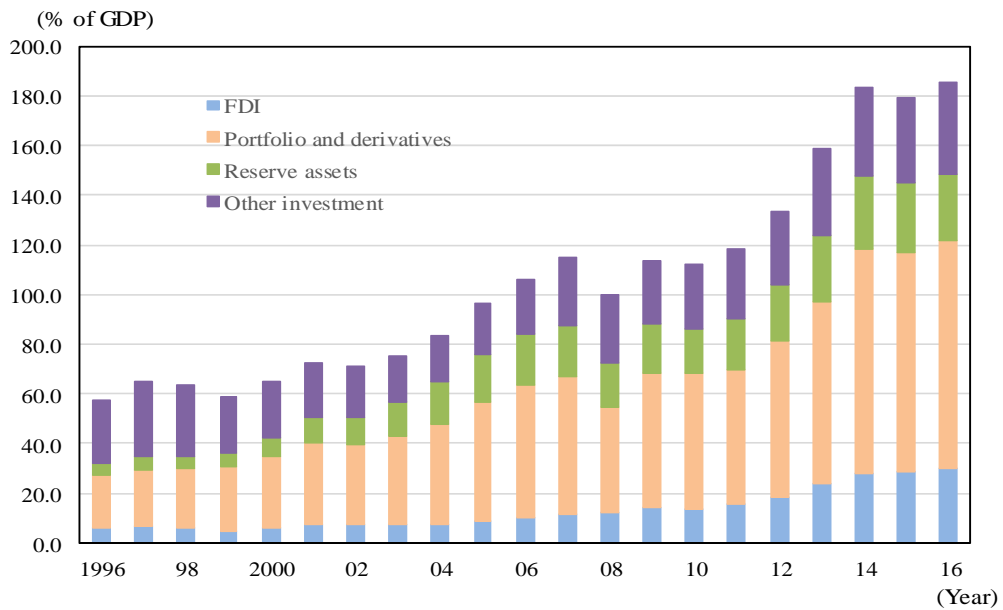


**Fig. 9: International Comparison of Net Foreign Assets**



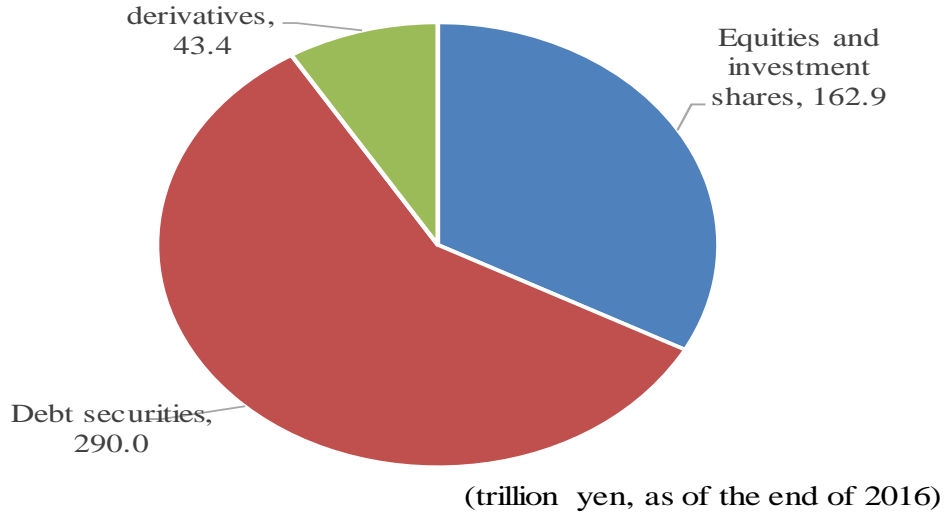
Source: Ministry of Finance, "International Investment Position (IIP)," (Accessed on 31 May 2017).

**Fig. 10: Japan's Foreign Assets by Type**



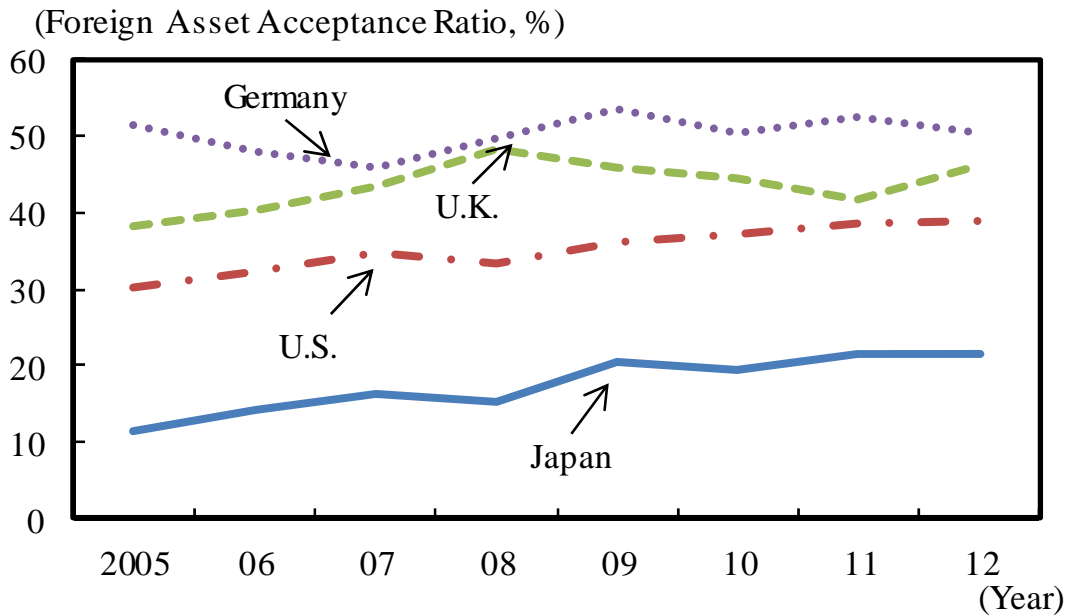
Source: Ministry of Finance, "International Investment Position (IIP)," (Accessed on 31 May 2017).

**Fig. 11: Japan's Portfolio Investment by Type**



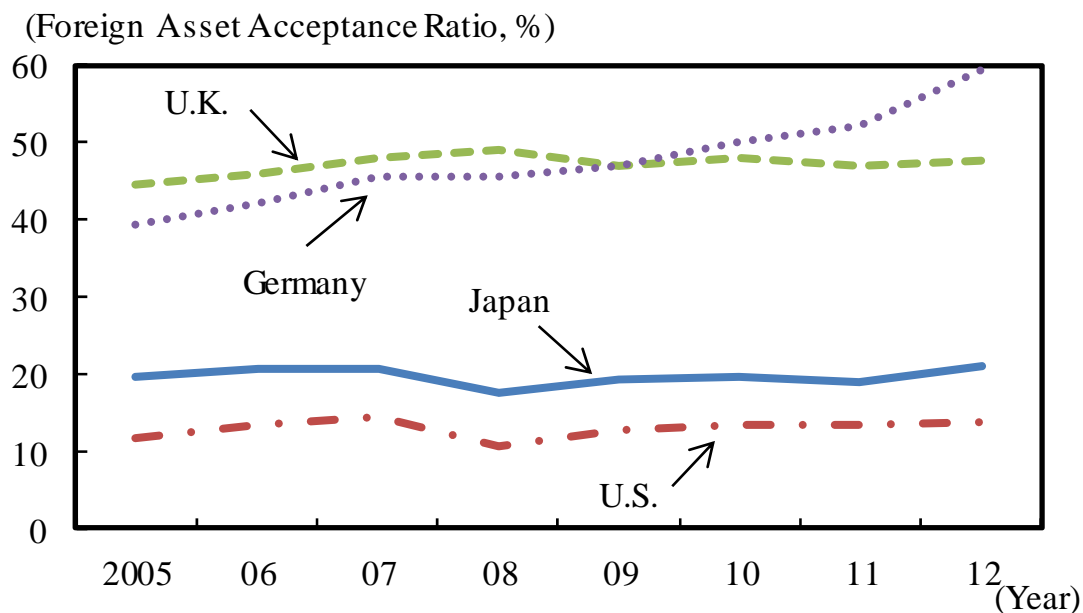
Source: Ministry of Finance, "International Investment Position (IIP)," (Accessed on 31 May 2017).

**Fig. 12: Degree of Equity Investment Home Bias**



Source: Authors' calculation. Data are International Monetary Fund (IMF) "International Investment Position," Bank for International Settlement (BIS) "Debt Securities Statistics," The World Bank, "World Development Indicators."

**Fig. 13: Degree of Bond Investment Home Bias in Japan**



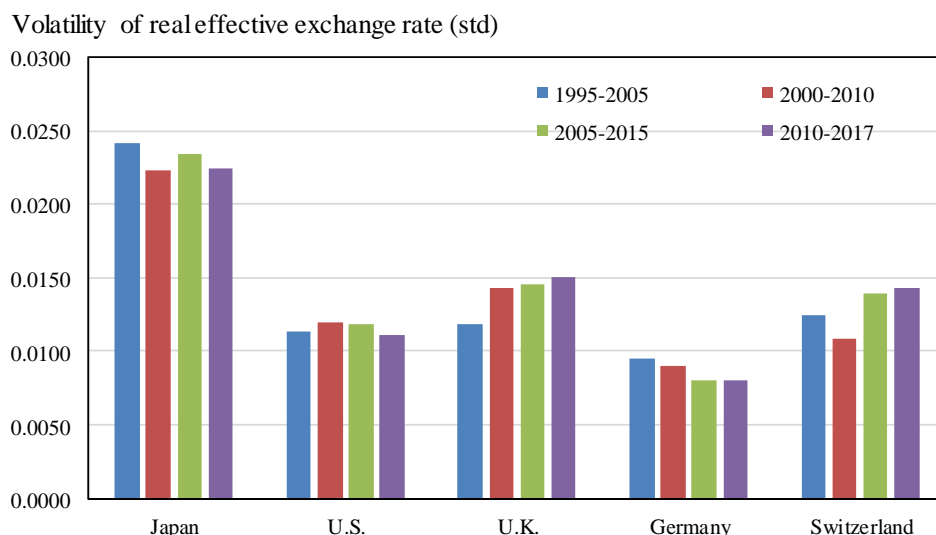
Sources: Authors' calculation. Data are International Monetary Fund (IMF) "International Investment Position," Bank for International Settlement (BIS) "Debt Securities Statistics," The World Bank, "World Development Indicators."

**Fig. 14: Causes of Home Bias**

Explanatory variables	Sign of asset allocation	Papers
Asset size or size of capitalization	+	(1)(2)(3)(5)
Common border	+	(4)
Common legal origin	+	(4)
Concentration of fund allocation (developed or emerged)(foreign, domestic, bond, and others)	-	(5)
Gravity	-	(1)(3)(4)
Number of bank branches	+	(3)
Number of funds	-	(5)
REER volatility	-	(4)
Team management	+	(5)
Telephone traffic	+	(1)(3)
To issue public debt in the US	+	(2)
To list on a US stock exchange	+	(2)
Total numbers of different holdings of a fund	-	(5)

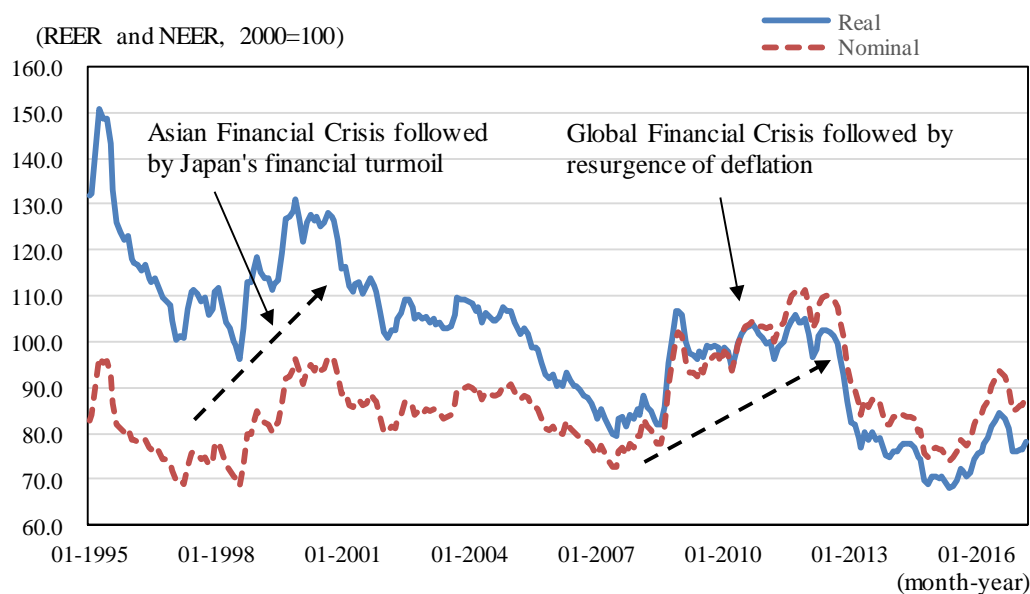
Source: Papers are (1) Portes, et.al. (2001), (2) Ahearne, et.al. (2004), (3) Portes and Rey (2005), (4) Fidora, et.al. (2007), and (5) Ni (2009).

**Fig. 15: Exchange Rate Volatility of Principal Countries (Currencies)**



Source: Authors' calculation. Data are Bank for International Settlement (BIS) database. Volatility (Real Effective Exchange Rate) is defined as a series of standard deviation of a month-on-month change of moving 12 months.

**Fig. 16: Movement of Long-term Nominal and Real Effective Exchange Rate of Yen**



Source: Bank for International Settlement (BIS) database. NEER and REER stand for Nominal Effective Exchange Rate and Real Effective Exchange Rate respectively.

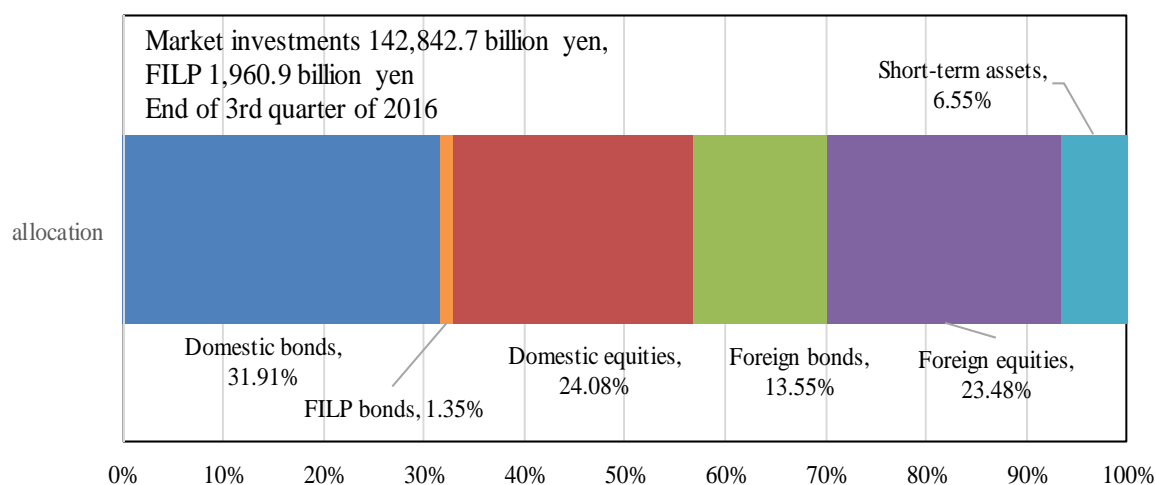
**Fig. 17: Existing Sovereign Wealth Funds in the World**

Ranking	Country	Name of SWFs	Assets (US billion \$)	Establish	Source of funds
1	Norway	Government Pension Fund - Global	922.1	1990	Oil
2	United Arab Emirates-Abu Dhabi	Abu Dhabi Investment Authority	828.0	1976	Oil
3	China	China Investment Corporation	813.8	2007	Non-commodity
4	Kuwait	Kuwait Investment Authority	524.0	1953	Oil
5	Saudi Arabia	SAMA Foreign Holdings	514.0	1952	Oil
6	Hong Kong	Hong Kong Monetary Authority Investment Portfolio	456.6	1993	Non-commodity
7	China	SAFE Investment Company	441.0	1997	Non-commodity
8	Singapore	GIC Private Limited	350.0	1981	Non-commodity
9	Qatar	Qatar Investment Authority	335.0	2005	Oil
10	China	National Social Security Fund	295.0	2000	Non-commodity
	Others		1,831.6		
Total			7,311.1		

Source: Sovereign Wealth Funds Institute (Accessed on 7 June 2017)

**Fig. 18: Asset Allocation of the GPIF (Government Pension Investment Fund)**

Actual allocation



Target Asset Mix

	Domestic bonds	Domestic equities	Foreign bonds	Foreign equities
Allocation	35%	25%	15%	25%
	±10%	±9%	±4%	±8%

Source: The Government Pension Investment Fund, Japan.

**Fig. 19: FILP (Fiscal Investment and Loan Program) and its Balance Sheet**

(Assets)		(Liabilities)	
Types of Assets	Value	Types of Liabilities	Value
Cash/Deposits	5.67	Deposits	34.11
Securities	0.22	Special Account Deposits	26.23
Government Bonds	0.00	Fund Deposits	1.31
Trust Beneficiary Rights and Others	0.22	Mutual Aid Cooperative Deposits	3.44
Loans	125.46	Other Deposits	3.13
to General Account and Special Accounts	23.11	Long-term Bonds	96.33
to Government-related Institutions	18.59	Others	0.91
to Local Governments	48.28		
to Special Corporations	35.49		
<b>Total</b>	<b>131.35</b>	<b>Total</b>	<b>131.35</b>

Source: Ministry of Finance (Accessed on 31 May 2017). Figures are end of April 2017 and unit is trillion yen.

**Fig. 20: Public-led Investment Funds in Japan**

Name	Date of establishment	(100 million yen)		Total
		Capital from government	Capital from private	
Innovation Network Corporation of Japan	Jul-2009	2,860	140	3,000
SME Support, Japan	Jul-2004	157	0	157
Regional Economy Vitalization Corporation of Japan	Mar-2013	160	101	261
Agriculture, Forestry and Fisheries Fund Corporation for Innovation, Value-chain and Expansion Japan	Jan-2013	300	18	318
Private Finance Initiative Promotion Corporation of Japan	Oct-2013	100	100	200
Public-Private Innovation program	Dec-2014	1,000	0	1,000
Cool Japan Fund	Nov-2013	416	107	523
Real Estate Sustainability and Energy-Efficiency Diffusion	Mar-2013	300	0	300
Fund for Japanese Industrial Competitiveness	Mar-2013	1,000	500	1,500
Special investment operation in DBJ	Jun-2015	650	650	1,300
Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development	Oct-2014	150	59	209
Japan Science and Technology Agency	Apr-2014	25	0	25
Fund Corporation for the Overseas Development of Japan's ICT and Postal Services	Nov-2015	19	19	38
Green Fund	Jun-2013	93	0	93
<b>Total</b>		<b>7,230</b>	<b>1,694</b>	<b>8,924</b>

Source: Cabinet Secretariat, the Government of Japan (Accessed on 7 June 2017)