

Guest Workers: Japan's Solution to Aging?

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Japan has relied on native-born workers for their superior economic growth performance following World War II. They pretty much “caught up” with United States by the end of 1980s. Since the 1990s, however, two issues have caused Japan to lose economic ground. First, there was a significant slowdown of the Japanese economy, and, second, Japan's competitors and neighbors gained significant ground as a result of globalization and capital deepening.

Meanwhile, Japan is fast approaching crossroads as it seeks to find more workers to mitigate the projected decline in working age population. According to the National Institute of Population and Social Security Research, the population in Japan will fall by more than 40 million by 2060. Over a longer horizon, the decline in the labor force is more striking. The labor force in Japan is projected to fall from about 64 million in 2014 to near 20 million in 2100. In addition, large increases in aging related public expenditures are projected which would require unprecedented fiscal adjustments to achieve sustainability under current policies.

Additional workers would produce additional goods and services and pay more taxes to help achieve fiscal sustainability. With a male labor force participation rate among the highest in the world, additional labor supply in Japan can only come from (i) increases in the fertility rate to produce younger native born workers, (ii) increases in the female participation rates and/or increases in labor in efficiency units, and, (iii) foreign-born workers.

One way to increase the size of the work force is to introduce a foreign worker policy. Indeed, the Japanese government announced early in 2014 that it would consider a guest worker program that would bring 200,000 foreign workers to Japan for a period of 10 years, eventually accumulating a stock of about 2 million guest workers. Can such a guest worker program solve Japan's fiscal problems?

Already, there is a shortage of workers, especially in elder care. According to [http://ec.europa.eu/eurostat/statistics-explained/index.php/Migration and migrant population statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Migration_and_migrant_population_statistics) the number and fraction of foreign-born population in selected advanced economies is given below.¹

¹ Data on Japan come from the Ministry of Justice and in the United States data are from the Census.

Country	in millions	% of total population
United Kingdom	8.0	12.5
Germany	9.8	12.2
France	7.7	11.6
United States	39.0	12.6
Sweden	1.5	15.9
Japan	2.0	1.6

The number of foreign-born individuals in the population varies with total population but the fractions are very similar in rich economies, with Japan being a significant outlier.

How can Japan “manufacture” workers to mitigate the negative effects of the projected demographic trend? Will small adjustments to the current Technical Intern Training Program (TITP), which has about 170,000 foreigners, be sufficient? Or, will a larger and more comprehensive guest worker or immigration program be necessary?

To study these and related macroeconomic questions, economists typically use a model, “a measurement device”. The workhorse model in examining fiscal sustainability and immigration features overlapping generations of individuals that represent the cross section of economic agents in the economy. Indeed, in a paper entitled “Will a Guest Worker Program Solve Japan’s Fiscal Problems?”, my co-authors Prof. Sagiri Kitao of Keio University and Prof. Tomoaki Yamada of Meiji University, and I develop such a model and use it as a measurement device to gauge the impact of a variety of guest worker and immigration programs under different assumptions on wages and interest rates and labor productivities. Against a baseline general equilibrium transition path, which relies on a consumption tax to achieve fiscal sustainability, we compute alternative transitions with guest worker programs that bring in annual flows of foreign-born workers residing in Japan for 10 years with the share of guest workers in total employment in a range between 4% and 16% of total employment. Depending on the size and skill distribution of guest workers, these programs significantly mitigate Japan's fiscal imbalance problem with a relatively manageable and temporary increase in the consumption tax rate.

A Simple Model:

In order to study the impact of guest workers or immigration on the Japanese economy, we build a large overlapping generations model populated with individuals between 20 and 110 years old, who face longevity risk and make optimal consumption and saving decisions over their life cycles. Labor is exogenous and therefore labor income taxes are not distortionary.²

There is a representative firm which operates a constant returns to scale production function, rents capital and hires labor to maximize its profits. The government taxes consumption and income from capital, labor, and government bonds, to finance exogenous government purchases, transfer payments, and its debt.

² This assumption makes the benefits of a guest worker program more conservative since such a program would lead to reductions in the required tax rates with the broadening of the tax base and mitigate the adverse effects on work incentives from higher distorting tax rates.

The model is calibrated to Japanese data. We estimate participation rates from the Labor Force Survey data. Life-cycle earnings of individuals are estimated as age-specific productivities of workers using the Statistical Survey of Actual Status for Salary in Private Sector as this micro data set covers a wide range of employed persons. The conditional survival probabilities are taken from the projections of the National Institute of Population and Social Security Research (IPSS) from 2014 to 2060. The rate of growth of new cohorts of workers is based on the fertility projections from IPSS, which implies an annual average of 1.24% from 2014 to 2080. After 2080, we assume that the growth rate slowly rises and converges to 0% and that the survival probabilities also become stationary.

Earnings over the life cycle typically have a hump shape and these age-dependent productivities are critical inputs into the model. We use estimates of earnings of male workers in the Statistical Survey of Actual Status for Salary in Private Sector. We also use participation rates over the life cycle from the Labor Force Survey.

We assume that the debt to GDP ratio is maintained forever at its 2013 level of 130%. The baseline experiment computes the equilibrium transition from 2014 toward a final steady state in the far distant future and produces an endogenous path for the consumption tax rate that satisfies the government's budget in each period in the face of increases in public expenditures due to aging. Similar to the findings in the literature (see below) we find consumption tax rates above 35% for several decades; there is a very high cost, in terms of unprecedentedly high tax rates, of loading all of the fiscal burden on a single fiscal instrument. In our model, the benefits from guest workers come from increased total production that expands the tax base and revenues and this leads to a "less than otherwise" consumption tax increase. This in turn raises the consumption of native-born individuals.

In Table 1, we present our numerical results that alternatively assume that the productivity of guest workers is 50% or 100% of that of the native workers. A key assumption in our setup is that the guest workers leave after working for 10 years and therefore they do not receive pensions or significant public health transfer payments. In particular, we assume that nonimmigrant guest workers pay a flat 18% personal income tax, spend 50% of their earnings on consumption and pay consumption taxes. The Japanese government pays for health expenditures for guest workers at a level 50% of what native-born workers receive. Finally, we assume that guest workers do not pay any pension premiums and therefore receive no pension benefits.³

To the best of our knowledge, the existing models of immigration assume that foreign-born workers become identical to native-born workers after one period in the model, which is very unrealistic. To make contact with this literature, we also present an extended version of the model in which the foreign-born workers eventually become permanent residents after a work life of 30 years.

³ Our assumption is similar to the tax treatment of F-1, J-1, M-1, H-1B, and H-2A nonimmigrant visa holders in United States that number over 1 million and consist of nonresident students, scholars, teachers, researchers, trainees, and agricultural guest workers who are exempt from Social Security/Medicare taxes.

Table 1: Consumption Tax Rate Needed for Fiscal Sustainability

	Baseline Current Policy	200,000 guests annually for 10 years 50% productivity	200,000 annually, immigration eventually 50% productivity	US style guest workers 50% productivity	200,000 annually, immigration eventually 100% productivity
2015	8.2	7.9	8.0	6.8	7.8
2020	10.2	9.7	9.8	7.6	9.3
2030	14.0	13.3	12.7	11.2	11.5
2040	21.9	20.9	19.4	18.2	17.1
2050	28.9	27.6	25.5	24.4	22.2
2060	34.2	32.5	29.7	29.0	25.6
2070	36.4	34.3	31.0	30.8	26.2
2200	11.7	8.9	4.8	8.7	-0.5

When we initiate a guest worker program in which 200,000 foreign born workers are introduced into the workforce every year to leave after a 10-year tenure on the job, the consumption tax rate rises 2-3% less than that in the baseline case. If Japan adopts a larger-scale U.S.-style guest worker program and builds a stock of foreign-born workers equal to 16.4% of employment and maintains this ratio, then the gains in consumption tax reduction can be as large as 10%. The experiment demonstrates how a guest worker program could contribute to achieve fiscal sustainability in Japan. Finally, if the 200,000 workers, with the same productivity as that of the typical Japanese worker, are allowed to work for longer and become permanent residents (but still without any burden on pensions as assumed previously), then the needed consumption tax rate is much lower than the case of baseline policy and at the VAT taxes in Denmark, Finland, Norway and Sweden.

Another way to look at the potential benefit from guest workers is to compute the additional Gross Domestic Product (GDP) per guest worker. Taking the Japanese GDP in 2014 as 490,786.8 billion yen, using an exchange rate of \$1 = 120¥, and taking the working age population in Japan in 2014 as 63 million, the value of GDP per working age population in Japan in 2014 is about \$65,000. Our model calculates that in 2024, the annual addition to GDP per guest worker is about \$20,000 if foreign-born workers are only 50% as productive as native-born worker, and can be as high as \$66,000 if guest workers are just as productive as their Japanese counterparts and there are no changes to wages and interest rates. In other words, there are large potential gains.

Of course, any immigration or guest worker policy program faces political, societal and technological challenges, some of which may be specific to Japan. An immigration policy, as opposed to a guest worker program, requires planning for and financing of additional old age pensions and public health expenditures. Clearly this would raise the overall fiscal burden and possibly outweigh the contributions to the tax base during working ages over the life cycle. A guest worker program, on the other hand, introduces difficulties in the termination of the finite working age stay in Japan, requiring assurances and controls to keep the 'guest' feature of the program in place. We do not wish to minimize the practical, technological, and societal challenges posed by immigration or guest worker programs. Instead, this paper

focuses on the opportunities that a guest worker policy can provide for Japan. A guest worker or immigration program could significantly help Japan achieve fiscal sustainability.