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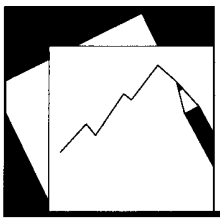

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How Inclusive Is Abenomics?

Chie Aoyagi, Giovanni Ganelli, and Kentaro Murayama

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How Inclusive Is Abenomics?

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Abstract

We assess the ongoing reform efforts in Japan in terms of inclusive growth. We use prefectural level panel data to regress a measure of inclusive growth, which incorporates both average income growth and income inequality, on macroeconomic and policy variables. Our analysis suggests that achieving the Bank of Japan's 2 percent inflation target has a positive effect on average income growth, but an adverse effect on income equality. The package of structural reforms planned under Abenomics is found to be effective in increasing both average income growth and income equality. The main policy implication of our analysis is that full implementation of structural reforms– especially labor market reforms–is necessary to both foster growth and increase equality.

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Keywords: Japan; Inclusive growth; Economic growth

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I. INTRODUCTION

In the last two years, policy makers in Japan have embarked in an ambitious effort to decisively get the economy out of deflation and revive growth. This policy approach, which has been dubbed "Abenomics" after Prime Minister Shinzo Abe, comprises three so called "arrows", namely monetary policy, fiscal policy, and growth enhancing structural reform. The new framework seems to be bearing its fruits so far. Boosted by monetary and fiscal stimulus, the Japanese economy has made an initial escape from deflation. Looking ahead, forceful implementation of "third arrow" reforms, which would allow growth to become private-sector led, is key.

In this paper we seek to evaluate the effects of Abenomics' reforms in terms of inclusiveness, with reference to the recent surge of interest in the literature in issues related to inequality and inclusive growth. While much of the academic and policy debate around Abenomics has focused on whether, and by how much, the reforms will succeed in raising potential growth, our paper is, to the best of our knowledge, the first attempt to study in a systematic way how inclusive Abenomics is.

We believe that this is a relevant exercise, given evidence showing that inequality has been increasing in Japan in the last three decades. Furthermore, more recent developments, such as the depreciation of the yen and the stock market boom, may not have benefitted the whole population equally (Baba and Tanaka 2014). Anecdotal evidence also suggests that, among the Japanese population, concerns over income and wealth inequality have grown, and the previously widely held notion that *"All Japanese are middle class"* has become something belonging to the past. In our view, concerns over inequality and inclusiveness of growth are not driven only by social and moral considerations, but are also directly relevant to macroeconomic outcomes and to the ultimate success of the reforms, for at least two reasons.

The first reason is that if the perception that economic growth is not being shared fairly within the Japanese society becomes prevalent, this could erode support for some much needed reforms, such as deregulation and further international trade integration, which are crucial to boost long-term potential growth, but which might imply some short-term costs for some segments of the population.

The second reason is that in recent times, a growing international consensus has emerged that economic inequality is bad for both growth and social cohesion, and that policies should play an important role to facilitate inclusive growth. For instance, a study coordinated by various UN agencies (UN System Task Team, 2012) found that reduction of unemployment and underemployment is key to improving fiscal policy options, by reducing governments' burdens for social security and contributing to both domestic and external equilibrium. Other examples of this new conventional wisdom can also been found in the work of Berg and Ostry (2011), who document, using a multi-decade and multi-country analysis, how greater equality can help sustain growth. The relationship between inequality and growth also has

implications for poverty reduction. Gramy and Assane (2006), for example, carry out an empirical analysis using data for over sixty developing countries, finding that growth accompanied by improved distribution works better than either growth or distribution alone in reducing poverty. In this context, the International Monetary Fund's managing director Christine Lagarde said that "Excessive inequality is corrosive to growth" (Speech at Davos, Switzerland, January 23, 2013)[1] and the Fund has called, in its Global Policy Agenda (IMF, 2013) for growth to be inclusive.

Evaluating the equity implications of Abenomics is not a straightforward task. Reforms planned under the third arrow include increasing the supply of labor and female labor participation, introducing more flexibility in the labor market and reducing excessive labor market duality. While all these reforms are expected to increase potential growth (Aoyagi and Ganelli, 2013; Steinberg and Nakane, 2012) and some might also reduce inequalities, the overall impact on equity is not clear *ex ante*. This is also true of the overarching objective of Abenomics, that of permanently getting the Japanese economy out of deflation. For instance, while reflation is very likely to foster economic growth, it might not necessarily benefit the poor and vulnerable, such as those who have no or little assets, and whose income (e.g. minimum wage, pension) is low and slow to adjust to inflation.

To study the degree of inclusiveness of the Japanese economy, we use both a descriptive analysis of trends in equity and poverty, and an econometric analysis of how implementation of Abenomics is expected to affect inclusive growth. For our empirical analysis, we use sub-national (prefectural) data for the past three decades. This empirical strategy allows us to exploit the variability in prefectural data and, compared to the alternative of using a cross-country panel, also has the advantage of capturing specific characteristics of the Japanese economy. Our dependent variable is the proxy of inclusive growth developed by Anand et al. (2013), which is essentially average income growth corrected for its equity impact. Using this metric allows us to take into account average real income growth in the inclusive growth debate, whose focus often falls into inequality alone. We find that, throughout 1979-2004, income inequality increased in Japan, but average income displayed positive growth. More recent developments in common perceptions – that inequality is growing – are probably due to the fact that the average income growth was negative or too small to compensate for increasing inequality.

We estimate a model to investigate the impact of key Abenomics policies on changes in average income and in income equality. The explanatory variables, which are proxies of a full implementation of Abenomics, include inflation, labor supply, labor market duality, and female labor participation. We find that expansionary policies which can help move inflation towards the two percent goal (such as monetary expansion under the first arrow) tend to improve average income growth by up to 1.9 percentage points, but have a negative impact on equality. Full implementation of structural reforms (the third arrow) is necessary to both

[1] "A New Global Economy for a New Generation" speech by Christine Lagarde, Managing Director, International Monetary Fund, Davos, Switzerland, January 23, 2013. Available online at https://www.imf.org/external/np/speeches/2013/012313.htm

foster growth and increase equality along the growth path. All policy variables included in our analysis are found to have a positive effect on average income growth (ranging from 0.31 to 0.83 percentage points); and increasing female labor participation is found to have a positive impact on income equality by 0.20-0.35 percentage points. Those estimates are significant in magnitude relative to the recent levels of low (or even negative) growth.

The rest of the paper is organized as follows. Next section discusses various concepts and definitions of inclusive growth. Section III presents a descriptive analysis of recent trends in inequality and poverty in Japan along various dimensions, such as age groups, gender, employment status. Section IV presents our measure of inclusive growth, based on the measure developed by Anand et al. (2013). Section V illustrates the results of our empirical analysis. Section VI presents some scenario analysis based on our regressions, and discussed policy implications. Section VII concludes.

II. INCLUSIVE GROWTH: MULTIPLE DEFINITIONS

Inclusive growth is a multidimensional concept and the notions of inclusiveness and inclusive growth have varying definitions, interpretations and connotations. Since the mid-2000s, the term earned a significant popularity in the operational work of various international institutions, although it had been used sparsely in the scholarly literature before that. Various "inclusive growth" measures have been used to define policy orientation and priorities in resource allocation, and to evaluate and monitor projects. The wide range of definitions used can sometimes be cause of confusion, although it also provides flexibility in the operationalization of the inclusive growth concept. According to the existing literature, a broad classification of inclusive growth measures can be done according to two criteria, which we will now discuss in detail.

First, inclusiveness measures in the literature can be classified by whether the inclusiveness is scaled by monetary or non-monetary measures. The monetary approach is less demanding in terms of data collection and analysis and highly compatible with conventional notions of poverty. However, it may fail to capture some important non-monetary aspects of poverty and inequality, and of the impact of policies to address them. The second approach, on the other hand, gives proper consideration to non-monetary factors, such as opportunities and access to social services across socioeconomic groups. Ali and Son (2007), for instance, propose a measure, which takes into account the varying degree of access to social services and health benefits across income groups. Like multi-dimensional poverty measures, non-monetary measures of inclusive growth are informative but difficult to interpret. A balanced analysis, then, should use both types of measures to achieve a manageable but useful assessment of the growth strategies.

Another conceptual discussion, following Klasen (2010), is whether inclusiveness is measured by a process or an outcome. Inclusive growth in process often refers to labor participation during economic growth. This dimension of inclusiveness is a core issue for

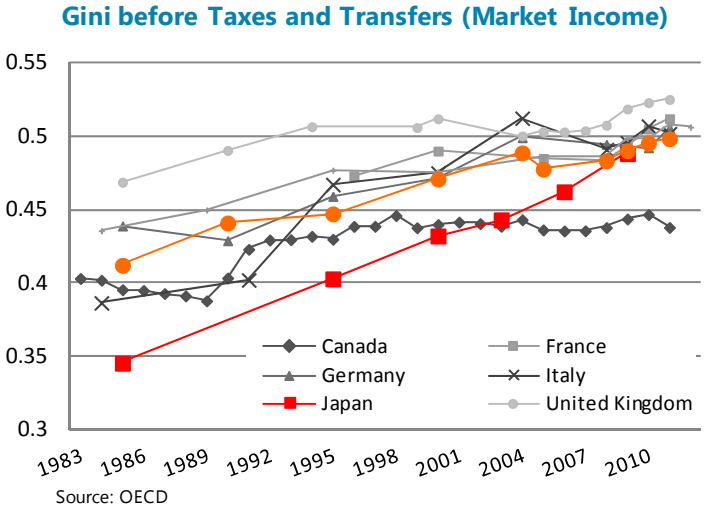
many developing countries and natural resource rich countries, where growth in certain industries such as oil production does not necessarily lead to employment and higher wage for the whole population. Another instance is exclusion of certain segments of the population from economic activities. Inclusiveness in outcome, in contrast, looks at the gains from the growth such as the income (distribution) or access to public services such as education and health care. Clearly those two measures of inclusive growth are related to each other, and the distinction is a matter of analytical framework. In summary, different measures capture different aspects of inclusiveness, and they are most informative when they are used complementarily rather than exclusively. A complementary approach reduces the risk of focusing exclusively on some aspects of inclusiveness while failing to address others.

In light of the above discussion, in the remainder of the paper we try to capture various aspects of inclusiveness in the Japanese economy, although the primary focus is placed on the monetary measure of inclusive growth. First, we examine measures of income inequality to highlight current trends. Second, we look at poverty measures. Then we investigate the extent to which certain demographic groups are disadvantaged compared to others in terms of income. Lastly, we run multivariate regressions to determine and quantify key factors of inclusive growth and derive policy implications. In the econometric part, we use as proxy of inclusive growth the measure developed by Anand et al. (2013), which takes into account both average income growth and its equity impact.

III. Inclusiveness in Japan: Trends and Stylized Facts

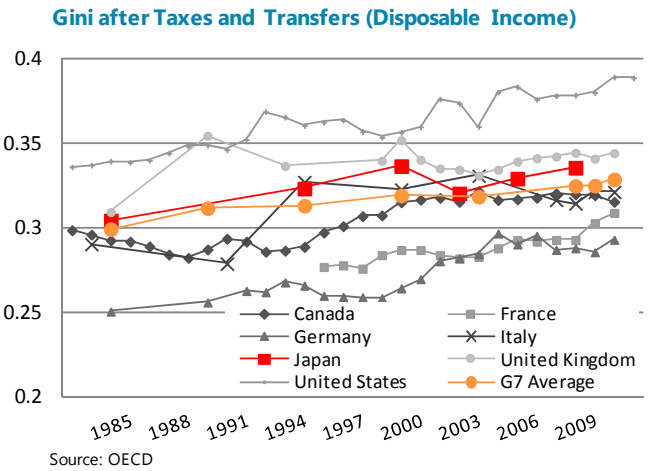
A. Income Inequality

When measured using the Gini coefficient of market income (before fiscal redistribution), inequality in Japan has increased steadily in the last three decades. While an upward trend and some degree of convergence can be observed amongst all G7 countries, Japan's pace of increasing inequality has been exceptionally high, marking a 15 points increase in about 25 years. The latest available figure imply that income inequality in Japan, starting from the lowest G7 level in the mid 1980s, has almost converged to the G7 average of 0.50 (text chart).



Part of the increase in market inequality might be related to the exceptionally rapid pace of aging of the Japanese population. As Jones (2007) suggests, an increasing share of elderly population increases income inequality for various reasons: the elderly population earn less income than the working population; inequality among the elderly population is greater than amongst working population; and an increasing number of elderly people have been forming small households consisting of elderly only, instead of forming households with working-age population.

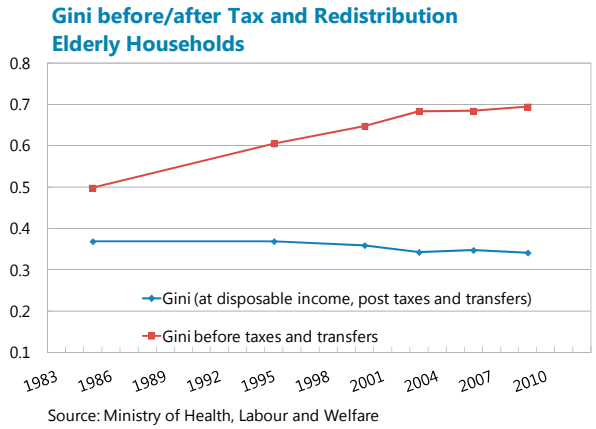
Another measure of income inequality, which takes into account the impact of fiscal redistribution, is the Gini coefficient of disposable income. This measure reflects the actual livelihood status of households, as disposable income represents how much each household, including those who retired, is capable to spend after tax and transfers. In Japan, the disposable income Gini coefficient rose moderately, yet consistently (with the exception of a temporary drop in the early 2000s) over the last three decades.



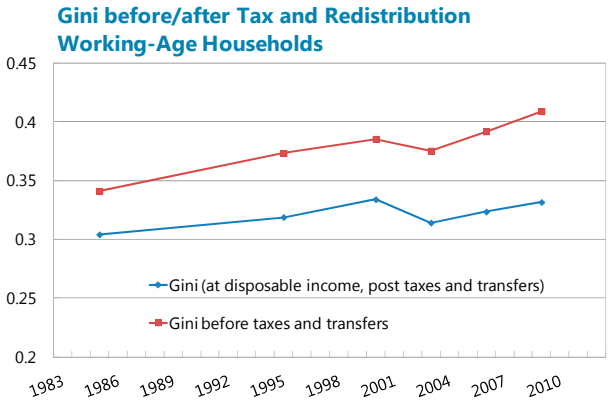
Notably, inequality in Japan has been above the G7 average and even its pace of increase has exceeded that of the G7 average in most years (text chart). The latest figure is about 0.33, slightly above the G7 average.

Looking at both market and disposable income Gini, and further disaggregating these measures between working-age and elderly population, gives important insights into various aspects of inequality. First, fiscal redistribution is effective in reducing inequality for both the elderly and the working-age population, as seen in the gaps between the respective market and disposable income Gini coefficients. At the same time, this reduction of inequality through redistribution is very effective for the elderly, but less so for the working-age population (text charts).

It is evident that fiscal redistribution significantly reduces income inequality for the elderly population. The Gini drops from close 0.7 to close to 0.3 in most recent years as a result of redistribution, with the disposable income Gini even showing a slight downward trend. On the contrary, inequality in disposable income for the working population – that is, mostly the wage inequality – shows a high correlation with market inequality. A simple bilateral regression suggests that, for the working-age population, each point increase in the market income Gini translates into a 0.4 point increase in the disposable income Gini.[2]



Source: Ministry of Health, Labour and Welfare



Source: Ministry of Health, Labour and Welfare

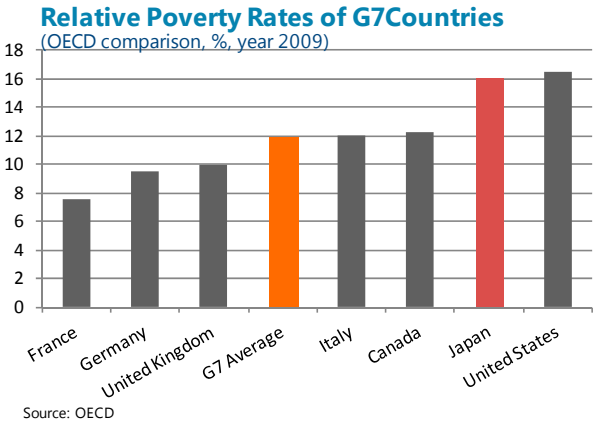
This suggests that for working households variations in market income inequality are highly associated with variations in disposable income inequality, although fiscal redistribution brings down the level of inequality to some extent. In other words, the dynamics of market income inequality for the working-age populations correspond to the dynamics of disposable income inequality changes, which have a direct impact on their living standards.

[2] The goodness-of-fit is about 0.76, and the linear correlation coefficient about 0.87. Both indicate significance of the correlation between the two measures of income inequality.

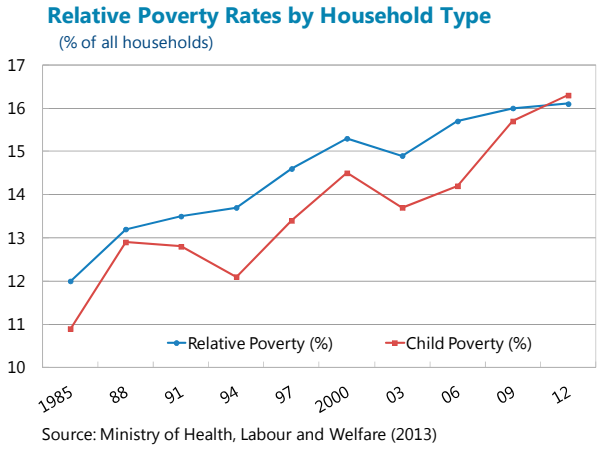
The large gap between the market income and disposable income inequality for the elderly is a sign of fiscal burden. A report by OECD (2011) warns that reliance on the tax and transfer system as a major mechanism of equalization of income is not an efficient or sustainable strategy. In the same vein, a more recent country brief (OECD 2014) points out that "population ageing will put pressure on public finances, which are already over-stretched." Although a discussion of feasible fiscal policy options is beyond the scope of this paper, Japan might need to take into account the fiscal costs of redistribution, given its high and rising public debt, its increasing share of the elderly population, low fertility rate, and rising dependency ratio. In this regard, the Japanese government's emphasis on structural reforms, including labor market reforms, seems appropriate.

B. Poverty

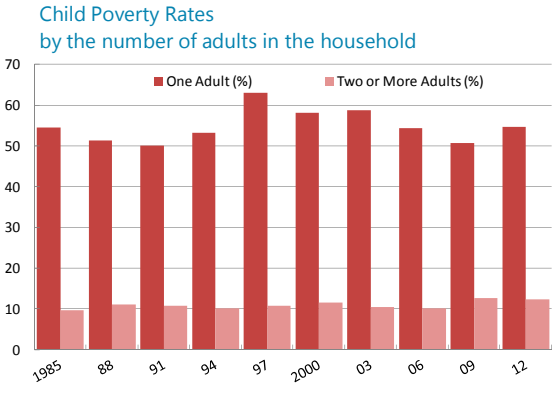
Relative poverty rates – measured by the number of households whose income levels are below half of median income level – have been high and increasing in Japan since the 1980s. In 2009, this indicator marked around 16 percent, which is one of the highest in advanced countries. Compared to other G7 countries, Japan's relative poverty rate is 4 percentage points highest than the average, and the second highest following the US (text chart). Japan's rate is also the sixth highest amongst OECD country, and above the OECD average by 5 percentage points.



A noteworthy trend is the rapid increase in the child poverty rate, defined as the ratio of working households with children who are in relative poverty. Since 2006, the child poverty rate has risen faster than the full-sample poverty rate, and has surpassed the latter in 2012 (text chart). Further disaggregation of poor households with children by the number of adults reveals that the rate is largely driven by the significantly higher relative poverty rate of single-parent households (the majority being single-mother households), which remained above 50 percent for 1985-2012.

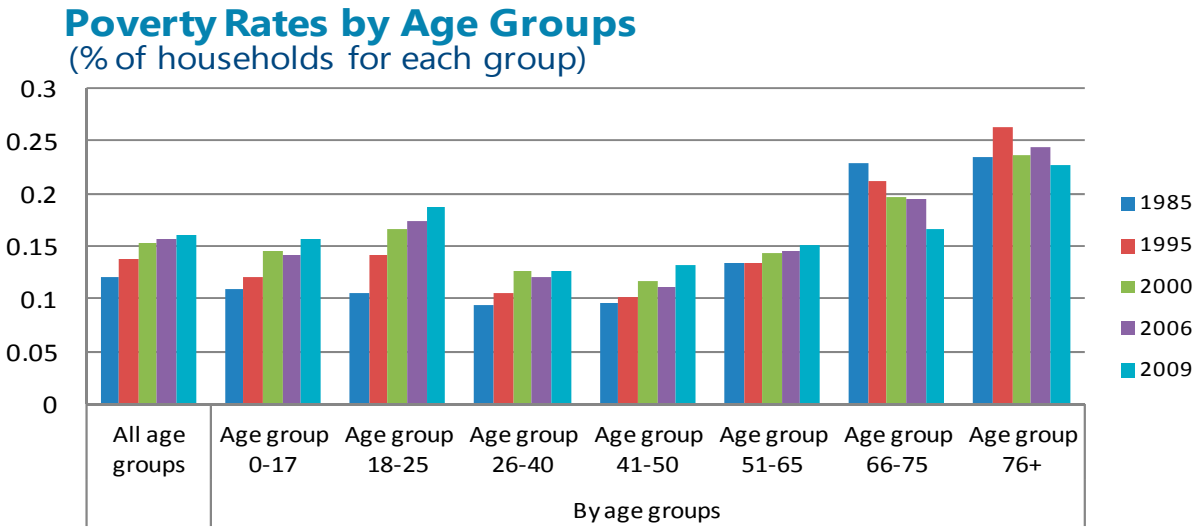


In the long run, a high child poverty rate may exhibit 'lock-in' effects of poverty across generations, since poor households are less likely to afford education, and low educational attainment is likely to affect the future income of the children. In macroeconomic terms, this would imply a decrease in aggregate human capital, and therefore in potential growth, once those children enter the labor market. For instance, Heckman (2000) argues that the lack of early education and training can be costly as the returns are diminishing with age.



Source: Ministry of Health, Labour and Welfare (2013)

Moreover, not only children (who are part of the dependent population), but the young population in general is increasingly poor, according to the historical data on the relative poverty rate by age group. These data show a rapid increase in poverty rates among 0-17 and 18-25 age groups, and less marked increases in poverty for age brackets from 26 to 65, while poverty rates for those ages 66-75 has declined over time (text chart). This observation echoes the findings in generational differences in income inequalities discussed above.



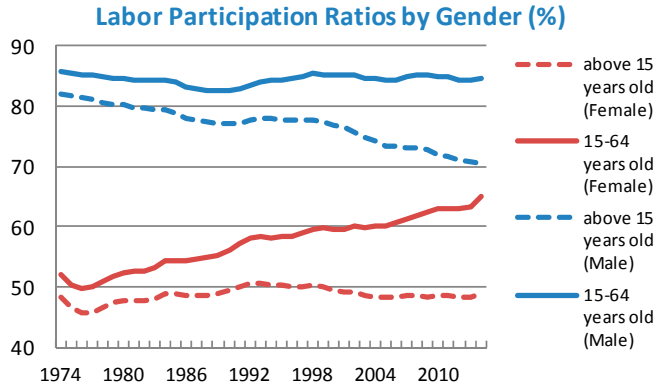
Source: Ministry of Health, Labour and Welfare

C. Other Dimensions of Inequality

The data analyzed so far suggest that income disparities are widening in Japan amongst the working-age population. The drivers of such disparities need to be studied more in detail, but there are at least two prominent dimensions over which income inequality – or, primarily

wage inequality for young, working population – are observed: namely, the gender gap and labor market duality.

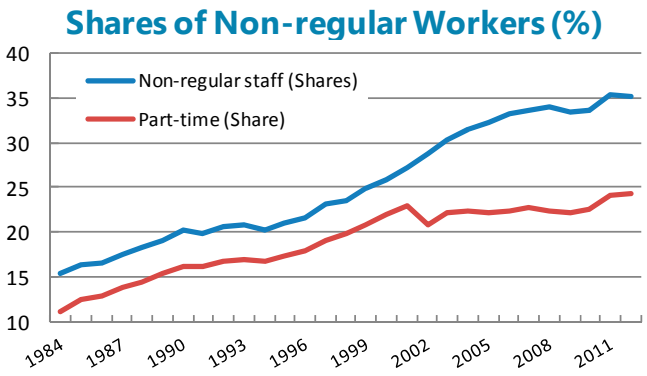
Labor participation rates, defined as the ratio of the labor force to the population of age above 16 years old, are declining in general due to Japan's aging population. Nevertheless, the Female Labor Participation (FLP) rate is lower than the Male Participation Rate (MPR) by about 20 percentage points (text chart).



Source: Minister of Internal Affairs and Communications

Low labor force participation and underemployment of women imply a lack of inclusiveness in the process of growth, which cannot be fully captured by household-based poverty measure. As it has been strongly emphasized by the IMF, low FLP is also costly in terms of reduced potential growth.[3] The problem is compounded by the fact that the Japanese economy has been experiencing negative growth of labor input for years and is facing labor shortages in more recent years.

Another important driver of inequality is labor market duality. According to data by the Ministry of Internal Affairs and Communications (MIAC), the share of non-regular workers consistently increased from less than 20 percent in the 1980s to above 35 percent by 2011(text chart). Aoyagi and Ganelli (2013) stress that such excessive labor market duality is likely to be holding back growth by reducing productivity. The two factors discussed here, low FLP and duality, are interrelated, since, as discussed by Aoyagi and Ganelli (2013), more than half of employed women are non-regular workers, with less job security, lower wages, and reduced career opportunities.



Sources: Ministry of Health, Labour and Welfare

[3] "The Economic Power of Women's Empowerment" speech by Christine Lagarde, Managing Director, International Monetary Fund, Tokyo, Japan, September 12, 2014. Available online at http://www.imf.org/external/np/speeches/2014/091214.htm

In summary, the evidence presented in this section shows that both inequality and relative poverty have increased in Japan in recent decades, and suggests that, with the bulk of fiscal redistribution benefitting the elderly, the economic burden of rising inequality and poverty is concentrated in a disproportionate way on children, women and non-regular workers. This observation is particularly relevant and important when growth of the economy *on average* is promoted without considering inclusiveness. This begs some questions on the growth that implementation of Abenomics reforms is likely to generate. Will such growth be inclusive or will it create more inequality? If the latter is true, will the increased inequality be compensated by average income growth, so that those who are left behind can still enjoy some of the prosperity that comes with the growth of the economy? What would be inequality implications of successfully exiting deflation and of structural reforms in the labor market? The rest of this paper seeks to address such issues in a systematic way by conducting an econometric analysis on the impact of key policy variables on a measure of inclusive growth.

IV. DATA AND EMPIRICAL STRATEGY

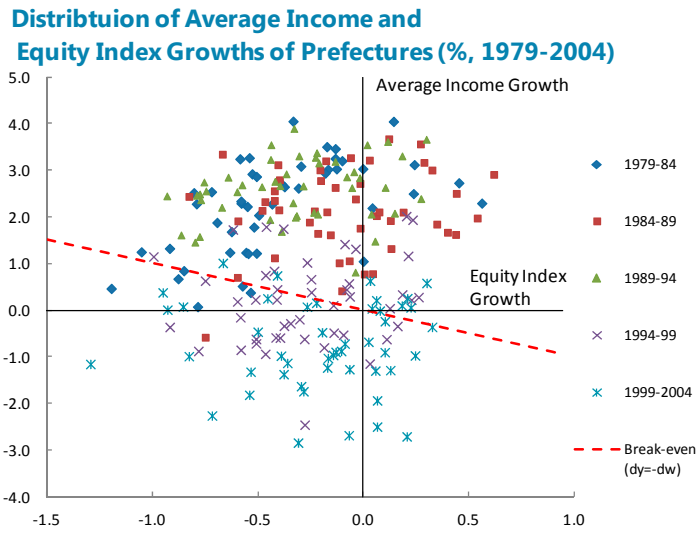
We use prefectural level longitudinal data. Data on income distribution by prefecture are obtained from the National Population Census, which is conducted every 5 years. Income distributions are available for aggregate income, which consists of wages, interest, rent, social security and other payments to households. Data are compiled for the whole population and a subset of working-age households. Incomes observed for each prefecture are deflated by the GDP deflators of the corresponding prefecture, which are provided by the Cabinet office.

Our measure of inclusive growth is the one developed by Anand et al. (2013). Intuitively, it is a weighted average of growth in average income and of the change in an equity index which takes into account income distribution. The equity index is built in a way that it is bounded between zero and one, with one being a perfectly equitable income distribution. This measure of inclusive growth is equivalent to average income growth in the hypothetical case of growth which leaves income distribution unchanged, but deviates upward (downward) from average income growth when growth is achieved by making income distribution more equal (unequal). In other words, our proxy can be interpreted as a measure of growth in average income "corrected" for the equity impact. For a more technical discussion, see the appendix. [4]

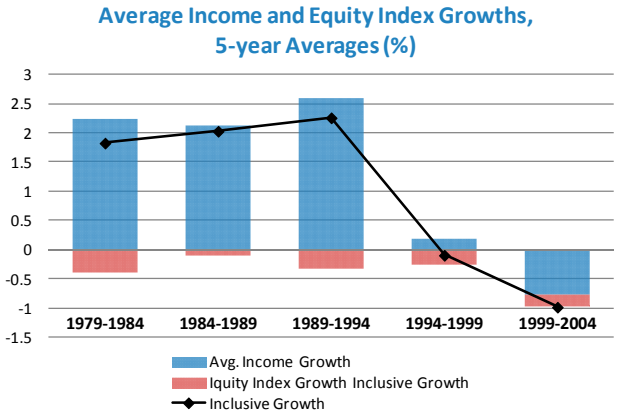
The distribution of the average real income growth and the growth in our equity index growth by prefectures is shown in the text chart. It is clear that observations are clustered by years. With some periods (1979-84; 1984-1989) being characterized by high growth in average income, which tends to be negative in other periods (especially 1999-2004). The variation in the equity index growth shows a less clear pattern.

[4] For the definition, derivation, and a more technical discussion, see Appendix A.

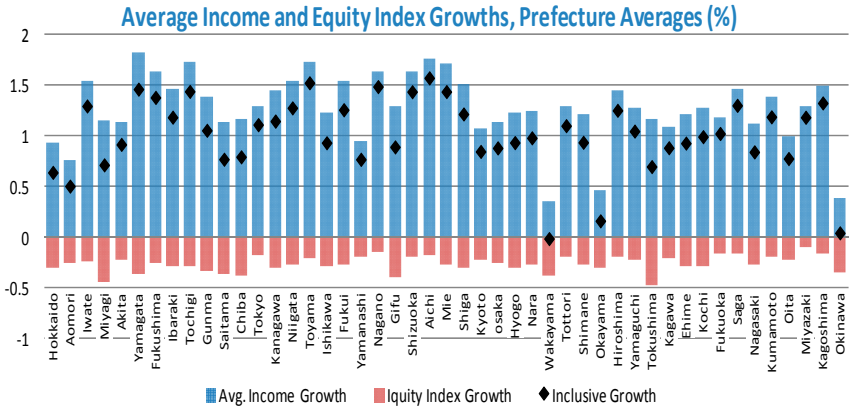
By definition, the break-even points (i.e. the ones in which inclusive growth is zero), lie on the red dotted line, on which growth in average income is equal to growth in the equity index. The majority of episodes shown in the chart point to prefectures experiencing deteriorating equality (i.e. negative equity index growth), but achieving "inclusive growth" by having sufficiently high average income growth (top-left panel, above the red line). Cases in which both average income and equality increases (top-right panel) are relatively rare. The1994-1999 and 1999-2004 periods are characterized by both low average income growth and increasing inequality.



This finding is confirmed by examining yearly averages across all prefectures (text chart). Moreover, the chart reveals that, *on average*, high growth in the late-80s and the early-90s compensated for increasing inequality (i.e. the negative change in equity index), while the negative growth in the late-1990s and the early 2000s failed to keep inclusive growth positive.



Another chart below shows prefectural averages of growth rates over time. The chart confirms a relatively small impact of the equity index compared to average income growth, with a few exceptions. For Wakayama, Okayama, and Okinawa prefectures, average income growth is too low to compensate for the relatively high negative growth of the equity index, leading to near-zero inclusive growth.



Furthermore, there is no obvious "spill-over" effects to neighboring prefectures, despite the fact that our income measures do not exclude households who resides in neighboring prefectures.

In summary, from the decomposition of the inclusive growth measure presented in the figures above, it is evident that the major driver on average of inclusive growth is the growth in average income. One exception is the period between 1994 through 1999, where the income growth was so weak that the negative growth in equality outweighed it. For the 1980s through the early 1990s, the average income growth was at least four times stronger than the deteriorating equity index growth. For the years between 1999 and 2004, the negative growth was worsened by the negative growth in the equity index.

We now move to the econometric estimation. Our empirical specification follows a standard panel model:

$$d\bar{y}^*_{it} = \alpha + \boldsymbol{X}'_{\boldsymbol{it}}\beta + \mu_i + v_{it}$$

where $d\bar{y}^*_{it}$ is the log-difference of our inclusive growth proxy or of its two subcomponents (average income growth and change in the equity index); α the common intercept; $\boldsymbol{X}'_{\boldsymbol{it}}$ is a K-column matrix with explanatory variables; and the error term u_{it} has an individual (i.e. prefecture) specific effect and the remaining disturbance, v_{it}.

Note that we use log difference (i.e. approximate percentage change, or growth) of 5-year panel between the years 1979-2004. Hence, each of time index of length 5 represents a 5 year period. Moreover, log differences are standardized to be an (average) annual rate by taking the geometric mean. For instance, the first observation $d\bar{y}^*_{i,t=1984}$ represents the average growth rate over 1979-1984.

The explanatory variables are presented in the text table. The variables of main interest in our study are the policy variables, which proxy some of the key policy objectives of a "complete" Abenomics package. i.e.: i) achieving positive inflation in a stable manner; ii) increasing flexibility in the labor market and reducing duality; iii) increasing the female labor participation rate; and iv) increasing overall labor input. We also include control variables to account for the size of the prefectural economy (initial GDP per capita) and the degree of "aging" of each prefecture (elderly index, defined as the size of population 65 years old or older divided by the size of working-age population). The frequency of these explanatory variables is in general annual, with the exception of female labor participation rates. Since the frequency of the dependent variable is every 5 year, all the explanatory variables are converted to 5-year panel by taking averages. Due to data limitation at the prefectural level, we use female labor participation rates for the entire work force (15 years and older), while female labor participation rates for working age (15-64 years old) are often used in the literature which uses national level data.

Variable	Measurement
Inflation rate	5-year average, %
Ratio of new job openings for part-time to full-time labor	5-year average, %
Female labor force participation ratio	5-year average, %
Growth of labor input in man-hours	5-year average, %
GDP per capita	Initial value at the 5 year periods
Elderly index	5-year average, index

V. RESULTS

Income distribution data at the prefectural level are available for all households and for working-age households. The first table below shows the results for all households while the second table shows the results from the sub-sample of working-age households. For each table, in the first column (1) the dependent variable is inclusive growth, while in the second (2) and the third (3) columns the dependent variable is average income growth and the equity index growth respectively.

To determine the model specification regarding the type of unobserved individual specific effects, we conducted a Hausman error component specification test for each regression (Hausman, 1978), and the null hypothesis was rejected for every equation; in addition, we also conducted a significance test of individual specific effects for each regression (Honda, 1985) and the null hypothesis was rejected for every equation. Therefore, we control for prefectural fixed effects. Following the convention (Baltagi, 2013), the explanatory power of such fixed effect is not included when computing the goodness-of-fit. Heteroskedasticity robust standard errors (White or "sandwich" estimators) are reported in parentheses.

Table 1. Results for All Households

	Dependent variable:		
	Inclusive Growth	Average Income Growth	Equity Index Growth
	(1)	(2)	(3)
Inflation (%)	1.586***	1.598***	−0.032
	(0.197)	(0.174)	(0.069)
Inflation, squared	-0.353***	-0.331***	-0.020
	(0.041)	(0.037)	(0.015)
Part- to Full-time job openings (%)	-0.028	-0.033*	0.005
	(0.020)	(0.018)	(0.007)
Female labor force participation (%)	0.165*	0.125*	0.040
	(0.084)	(0.074)	(0.029)
Labor input growth (%)	0.524***	0.489***	0.029
	(0.165)	(0.146)	(0.058)
Initial GDP per capita	-1.564**	-0.985	-0.600**
	(0.762)	(0.672)	(0.267)
Elderly index	0.057	0.052	0.004
	(0.037)	(0.033)	(0.013)
Observations	235	235	235
R^2	0.660	0.714	0.112
Adjusted R^2	0.509	0.550	0.086
F Statistic (df = 7; 181)	50.250***	64.430***	3.260***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 2. Results for Working-age Households

	Dependent variable:		
	Inclusive Growth	Average Income Growth	Equity Index Growth
	(1)	(2)	(3)
Inflation (%)	1.514***	1.512***	-0.008
	(0.197)	(0.174)	(0.075)
Inflation, squared	-0.279***	-0.264***	-0.015
	(0.041)	(0.037)	(0.016)
Part- to Full-time job openings (%)	-0.039*	-0.040**	0.001
	(0.020)	(0.018)	(0.008)
Female labor force participation (%)	0.225***	0.155**	0.070**
	(0.084)	(0.074)	(0.032)
Labor input growth (%)	0.384**	0.358**	0.023
	(0.166)	(0.146)	(0.063)
Initial GDP per capita	-0.487	0.036	-0.539*
	(0.764)	(0.673)	(0.291)
Elderly index	0.068*	0.057*	0.011
	(0.037)	(0.033)	(0.014)
Observations	240	240	240
R^2	0.627	0.677	0.065
Adjusted R^2	0.484	0.522	0.050
F Statistic (df = 7; 185)	44.510***	55.440***	1.831*

Note: *p<0.1; **p<0.05; ***p<0.01

Inflation is modeled in a quadratic form, and the coefficients in the first and second columns are indicative of a positive and initially increasing, but then falling effect of inflation on inclusive growth as the inflation rate goes up. Furthermore, the inflation coefficients are significant for the overall inclusive growth measure and for the growth in average income. Our results imply that the maximum effect on the dependent variable is reached at around 2 percent inflation rate, which is consistent with the existing literature about inflation-growth thresholds (for instance, see Khan and Senhadji, 2000). This means that moving towards the 2 percent BoJ inflation goals, one of the main objectives of Abenomics, will promote growth[5], while there will be a diminishing (yet still positive for a certain range) impact on growth if inflation should become permanently higher than 2 percent. The impact of inflation

[5] On the causality between growth and inflation, at the technical level, we check it with a pseudo-Granger test and with IVs in the Appendix D, and we find causality from inflation to growth. At an economic and intuitive level, we are taking the position that exiting from deflation is equivalent, to some extent, to a structural reform, because it changes economic agents' behavior and incentives, and can therefore result in higher growth.

on equity is negative, but small and not significant. The overall effect on inclusive growth of moving towards the 2 percent target is therefore positive. Various measures of the contribution of regressors to explaining the variability of dependent variables also suggest that inflation is the most important regressors in explaining variation of equity (see Appendix E).

One concern is the direction of causality between growth and inflation. To address this potential endogeneity issue, we also carried out a causality test and instrumental variable estimation, using lagged inflation as an instrument. The results, presented in Appendix D, are broadly in line with the ones in our benchmark model, confirming that inflation affects growth.

Labor market duality – measured by the ratio between the numbers of new offers for part-time and regular employment – has a negative and significant impact on inclusive growth, through its negative impact on average income growth. As the scale of labor input is accounted for by the growth in man-hour labor input, the composition of the labor force as proxied by the duality variable captures the utilization of input and the efficiency. The duality measure has a negative marginal effect on the rate of income growth at a similar magnitude for the all sample and working-age sub-sample. A negative effect of labor market duality on average income growth is consistent with the idea, discussed in Aoyagi and Ganelli (2013), that Japan's excessive duality reduces productivity through a "training channel", because non-regular workers receive less training than regular ones, and an "effort channel", because non-regular workers tend to be less motivated and therefore less productive than regular ones. Aoyagi and Ganelli (2013) underscore the importance of reforming Japan's labor market through contract reform to increase productivity by reducing labor market duality. While no concrete measure has been taken in terms of contract reform so far, the idea has been discussed at the technical level in various working group and committees, and the government has expressed its intention to improve working conditions of non-regular workers. In this paper, we therefore assume that a "complete" Abenomics package will, at some point, include measures to reduce labor market duality. Our results show that this will have a positive effect on inclusive growth. Moreover, as expected, such an effect is stronger when we include in the regression only working-age households.

Our results also suggest that a higher female participation rate has a positive effect on inclusive growth by increasing average income growth. Furthermore, this variable has positive and sizable effects both on average income and equity index growth, when using the working-age household sample. Considering that female labor participation is a form of inclusiveness (in process), it is not surprising that the working-age population is affected more strongly. In other words, the results for the estimation with all households are mitigated by the inclusion of the retirement-age female population. Increasing female labor participation is one of the key objectives of Abenomics, on which measures (e.g. increasing availability of child care) have already started to be implemented. Our results suggest that, in

addition to its positive impact on potential growth (as estimated for example by Steinberg and Nakane 2012), this policy is also good for inclusiveness.

Another important objective of Abenomics is that of countering the aging of the population by increasing labor supply not only of women, but of the overall population. While male labor participation is already high in Japan, there is some scope for increasing overall labor supply, for example by increasing participation of foreigners and older workers. Some of the initiatives which have been announced in Special Economic Zones seem to go in this direction. Our results show that increasing labor input would boost inclusive growth by increasing both average income and equity (although only the effect on the former is significant).

Our control variables for the size of the prefectural economy and demographic characteristics show expected signs and reasonable magnitudes of estimated coefficients. Initial GDP per capita — accounting for the level of income of each prefecture — is a negative and significant determinant of inclusive growth (and its components) for the all household sample and the working-age sub-sample, largely due to increasing inequality. The negative signs are consistent with classic theories on growth and inequality: the rate of growth falls as the (average) income level rises (Solow, 1956); and income tends to be unequal at a higher average income level (Kuznets, 1955).

The elderly index — accounting for the aging of the society — has an insignificant effect on inclusive growth when using the all-household sample, and a significant and positive effect when using only the working-age household sample. Since the elderly index is actually a dependency ratio, measured by the ratio of elderly population to the working-age population, we can say that a higher dependency ratio affects the income distribution through the overall productivity of the prefectural economy, rather than through distributional changes. The marginally positive effect of aging on inclusive growth is rather surprising, but can be explained by wealth distribution. In particular, while our income measure is before tax and redistribution (and thus retired households have less or no income flows), it also accounts for interest and rent payments (i.e. returns on assets).

Overall, policy variables affect inclusive growth mostly through growth in average income. Our result suggests that the potential impact of a complete Abenomics package on income equality is relatively small. We also carried out some robustness checks using alternatives weights on the equity index and different assumptions on income distribution.[6] These checks, not reported here but available upon request, confirm the robustness of our results.

[6] Data of income distribution, disaggregated to the prefectural level, are limited to values at first and ninth deciles and the mean. In order to construct our dependent variable, we therefore needed to make some assumptions to estimate an income distribution, given all the available information. In the benchmark estimated income distribution, we assume that: the lowest income is zero; the income distribution between observed

(continued…)

VI. POLICY IMPLICATIONS

In this section, we present some scenario analysis, based on the results of our econometric results, of what would be the impact on inclusive growth of a "complete" Abenomics package. The scenarios present the marginal effect of changes in each policy variable, all other things held constant (text table). We use the base level of inclusive growth at the national level during 2000-04, which is -1.46 percent for the entire household sample and -1.15 percent for the working-age household sample, as references to evaluate the magnitude of marginal effects.

Table 3
Scenario result table, inclusive growth

	All Households			Working-Age Households		
	Incl. Growth	Avg. Growth	Equity Change	Incl. Growth	Avg. Growth	Equity Change
Inflation (0.0 to 2.0%)	1.76	1.87	-0.14	1.91	1.97	-0.07
Part- to Full-time job postings ratio (21 to 5%)	0.45	0.53	-0.08	0.63	0.64	-0.01
Female Labor Participation (47 to 52%)	0.83	0.63	0.20	1.13	0.78	0.35
Labor Input (-0.81 to 0.00)	0.42	0.40	0.02	0.31	0.29	0.02

As shown in the table, we capture the effect of getting the economy out of deflation as a change in CPI inflation from 0.0 percent (its value in 2012 before the start of Abenomics) to the BoJ target of 2.0 percent. When we use the coefficient based on the all sample estimate, the impact is that annual inclusive growth would be 1.76 percentage point higher. This is a large boost to growth, especially considering that it counters more than the base growth level at the national level. An even stronger result emerges for the working-age household case, in which the relative magnitude of 1.91 is more than enough to raise the negative growth above zero. It should be noted that such gains mostly come from the increase in the growth of average income, while the equity index deteriorates (i.e. inequality grows) as inflation rises. Furthermore, the quadratic form of the inflation in its specification implies that, given the coefficients, inflation has an optimal level for the average income growth. Beyond or below this optimal level (around 2 percent; or 3 percent if using the working-age households

deciles is uniform (i.e. it is interpolated by a linear function); and the mean of income is equal to the mean of the nine data points of the deciles. In the robustness checks we looked at the implications of changing these assumptions.

sample), the inflation rate shows a still positive (for a certain range), but diminished effect on average income growth. If the inflation further increases, then the marginal effects will become negative eventually. With the initial value of 0% inflation, about 4.5% is the upper threshold for marginal gains in inclusive growth from higher inflation (See Appendix C for a technical discussion).

In our regressions, we have measured labor market duality as the ratio between the new job postings of part-time and full-time positions. The ratio of non-regular over total workers, which is the more usual "stock" measure of labor market duality at the national level (see for example Aoyagi and Ganelli 2013) and is currently about one third, cannot be used in our analysis because it is not available at the prefectural level. The "flow" measure of duality that we use in this study reached 21 percent in the 2000-04 period (as a 5 year average) while the pre-bubble level was around 5 percent in 1979-84. We consider a scenario where the ratio goes back to the pre-bubble level. With such a shift in labor market duality, inclusive growth would be 0.45 percentage points higher. The impact of the change in terms of composition is similar to one from inflation: the bulk of the boost to inclusive growth comes from increasing growth of the average income, while equality decreases rather slightly. In other words, dual labor market as measured by the "flow" share of part-time employment affects the productivity of the economy, rather than inequality at the aggregate level. Our duality variable is indeed correlated with the net capital investment (correlation coefficient around 0.6), suggesting that the measure is associated with the utilization of inputs. An interpretation of this result is that a lower share of part-time workers, while increasing productivity for the reasons discussed in the previous section (see also Aoyagi and Ganelli 2013), also increases inequality because it prevents some workers who can only work part-time from being employed.

Female labor participation rates (of age above 15 years old) historically hovered around 48 percent, while male labor participation was about 70 percent in 2004. We consider a case where the female labor participation increases by 5 percentage points, which is an ambitious but feasible goal. On the basis of the estimates from the all sample analysis, this would boost to inclusive growth by 0.83 percentage points, about two thirds of the base growth level. Similar to reducing labor market duality, the estimated impact is even larger when estimating with the working-age household sample. Inclusive growth is boosted by 1.13 percentage points, while both average growth and equity index growth are raised by 0.78 and 0.35 percentage points, respectively.

Labor input, measured by the man-hour, has been in decline since 1979, reaching negative growth at the national level since the 1990-1994 period. In our scenario analysis, we consider a rather conservative case in which reforms manage to shift the growth of labor input from negative to zero. In other words, our scenario assumes that the increase in the labor input just compensates for its natural decrease (i.e. population decline). At the stationary labor input level, inclusive growth would be 0.42 percent higher than the latest level in the 2000-2004 period, mostly derived from the average income growth. The relative magnitude of marginal

effect is about one third of the latest level, making it a little less effective than achieving the inflation target or addressing dual labor market duality.

One important policy implication of our empirical analysis and of the scenarios presented here is that the best way for Abenomics reforms to foster inclusive growth, through both growth of average income and improvement in equity, is to fully implement structural reforms, i.e. fully launch the third arrow.

Our scenario shows that if only the first arrow is launched (i.e. if only the BoJ inflation target is achieved), then the growth in income level is confined to a certain level and there is some deterioration in income equality. The scenario analysis also shows that, as long as inflation reaches and stays around 2 percent, our overall measure of inclusive growth improves, because the "growth" effect of inflation is stronger than its "inequality" effect. In the case in which inflation stays around 2 percent and third arrow reforms (higher female labor participation, reducing duality, increasing labor input) are implemented, Abenomics increases average income growth while keeping inequality broadly unchanged (all household sample) or improving it (working-age household sample). Furthermore, our regression results and the technical discussion in Appendix C also suggest that, if monetary policy becomes overburdened because of lack of structural reforms, resulting in runaway inflation above the BOJ's 2 percent target, overall inclusive growth (not only equality) will be reduced. Overall, the results of our empirical analysis and scenario analysis therefore support the argument that the best way for Abenomics to ensure gains in both growth and equity is to successfully launch the third arrow.

VII. CONCLUSIONS

In this paper we argue that fully launching the "third arrow" of Abenomics, a complete package of structural reforms, is necessary to accomplish robust growth and inclusiveness. The Japanese authorities are implementing a series of policies to help Japan to permanently exit deflation, while also increasing potential growth. Our results show that, while achieving the 2 percent inflation target is expected to stimulate average income growth, it will also have a negative impact on income equality.

On the other hand, our results also suggest that structural reforms will contribute to both more robust growth and improved income equality. In particular, reducing labor market duality is expected to increase productivity and foster growth, with a small adverse effect on equality. The latter would be more than compensated by the effects of other reforms, such as increased female labor participation and overall labor supply growth, which are found to be effective in promoting both average income growth and income equality.

Furthermore, our regressions suggests that, if monetary policy becomes overburdened because of lack of structural reforms, resulting in runaway inflation above the BOJ's 2 percent target, overall inclusive growth (not only equality) will be reduced.

Our analysis utilizes the prefectural variation in income distribution and other key variables over time. Therefore, one limitation of our empirical framework is that nation-wide shocks such as changes in consumption tax rates are not modeled explicitly, and alternative methods can benefit from using the inclusive growth measure in order to analyze the implications of nation-wide fiscal policies and provide complementary findings to our analysis.

Based on our analytical findings, our assessment of the inclusiveness of Abenomics is that, if all the arrows are fully launched, this policy framework can be effective in promoting both growth and income equality, therefore fostering inclusive growth.

Appendix A. Data Sources and Definitions

Variable	Frequency	Source
Income Deciles	Every 5 years, 10 thousands yen, 1975 price	National survey of family income and expenditure, Ministry of Internal Affairs and Communications (MIC)
Inflation rate	5-year average, %	CPI reports, MIC
Ratio of new job openings for part-time to full-time labor at job security office	5-year average, %	Public Employment Security Office
Female labor force participation ratio	5-year average, %	e-stat database, MIC
Growth of labor input in man-hours (workers * annual workhours / 1000)	5-year average, %	JIP Database, Research Institute of Economy, Trade and Industry
Real GDP per capita of Prefectures	Initial value at the 5 year periods, 1 thousand yen, 1975 price	Prefectural Statistics, Cabinet Office
Elderly index	5-year average, index	e-stat database, MIC (Derived from the National population census)

Appendix B. Definition of Inclusive Growth

We define inclusive growth through a measure developed by Anand et al. (2013).

Consider a distribution of income xi for a population of the size n, where individuals are indexed by the (ascending) order of income level as $i = 1,2, \dots n$. Then, we can define a sequence income levels, $\boldsymbol{y} = (y_1\ y_2, \dots, y_i, \dots, y_n\ )$, and a social welfare function as follows:

$$W = W(y_1, y_2, \dots, y_i, \dots, y_n)$$

whose value is increasing with its arguments, $\boldsymbol{y}$. Following Ali and Son (2007), we define an opportunity function that is analogous to the social welfare function with some opportunity measure $\boldsymbol{x}$:

$$O = O(x, x_2, \dots, x_i, \dots, x_n)$$

whose values are increasing in its argument. In other words, the opportunity function increases when the opportunity of any person increases.

In order to address inclusiveness (or the equality aspect of growth), we need additional information about the distribution of the opportunity curve. Since the poor are often constrained in available opportunities, a notion of inclusive growth should capture the pro-poor redistribution of such opportunities. Hence, we require an inclusive growth measure to i) be increasing in its argument and ii) satisfy the transfer property (Ali and Son, 2007; Anand et al. 2014). These properties imply that i) the function is increasing in the level of income and thus captures the growth dimension; and ii) any income transfers from those with more income to those who with less income will increase the value of the function.

For this objective, consider a cumulative distribution of the opportunity available for the bottom i-th percentiles. The obtained vector, call it opportunity curve, is expressed as:

$$Q^C = \left(x, \frac{x_1 + x_2}{2}, \frac{x_1 + x_2 + x_3}{3}, \dots, \sum_j^i x_j \Big/ i, \dots, \frac{\sum_j^n x_j}{n} \right)$$

Note that the last term in the opportunity curve is equal to the population mean of the (index of) available opportunities.

Finally, by considering a special case of the opportunity curve, where the opportunity considered is the income level, we can define:

$$S^C = \left(y_1, \frac{y_1 + y_2}{2}, \frac{y_1 + y_2 + y_3}{3}, \dots, \sum_j^i y_j \Big/ i, \dots, \frac{\sum_j^n y_j}{n} \right)$$

Furthermore, we can redefine the index to represent the proportion to the population: $p = 1/n, 2/n, \dots 1$. We call this sequence, $\bar{y}_i$, a Social Mobility Curve (SMC), as it represents the ability for the bottom percentiles in the income distribution to escape into the higher income groups. Again, the last term in the SMC is simply a (population) mean of the income.

Note that, with the rescaling of population index, SMCs are comparable across time and space (i.e. social welfare/opportunity is not scaled by the population size). Hence, we can compute a "growth" of such measures. Empirically, we can define a continuous piecewise linear function, given a percentile of income distribution (e.g. quartiles, deciles, quintiles, and so on).

To summarize the SMC and its changes across time and space, it is convenient to define an index for each distribution. Define a Social Mobility Index as the *normalized* area under the SMC: that is, $\bar{y}^* = \sum_{p=0}^{1} \bar{y}_p$. The relation of the SMI to the SMC is analogous to that of the Gini coefficient to the Generalized Lorenz curve: it is defined both by the mean value and the

distribution of household income.[7] Furthermore, the SMI allows us to decompose economic growth into the change in average income and the change in income distribution, as in the seminal work of Ravallion and Datt (1992) who decomposed income growth into mean and distribution.

The interpretation of the SMI becomes clearer and intuitive when we divide it by average income:

$$\omega = \bar{y}^*/\bar{y}$$

And we get an expression whose value is equal to one when the income distribution is totally equal (i.e. everyone possesses the same income, $\bar{y}$) and zero when it is totally unequal (i.e. one person possesses the entire income). Recall that population size is normalized when computing SMI, and thus this ratio, ω, never exceeds the value of one. We call this measure the Equity Index (EI). Furthermore, by rearranging the terms, we obtain:

$$\bar{y}^* = \omega\bar{y}$$

which can be 'decomposed' by total differentiation:

$$d\bar{y}^* = \bar{y}d\omega + \omega d\bar{y}$$

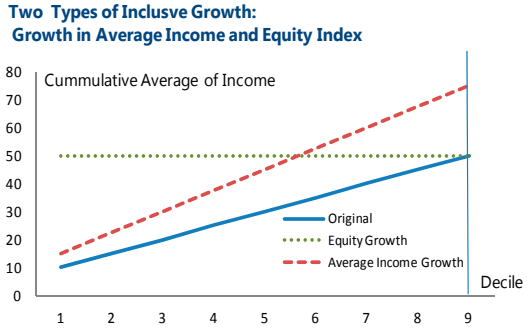
By words, the change in the SMI is a weighted average of the change in the EI and the change in average income, whose weights are the level of the counterpart: when the average income (equity) is high, the contribution of change in equity (income) is higher, and vice versa.

Alternatively, the percentage changes (growth) of SMI can be expressed as:

$$d\bar{y}^*/_{\bar{y}} = d\omega/_{\omega} + d\bar{y}/_{\bar{y}}$$

That is, the growth of SMI is the sum of the growth (percentage change) in the equity index and the growth in the average income.

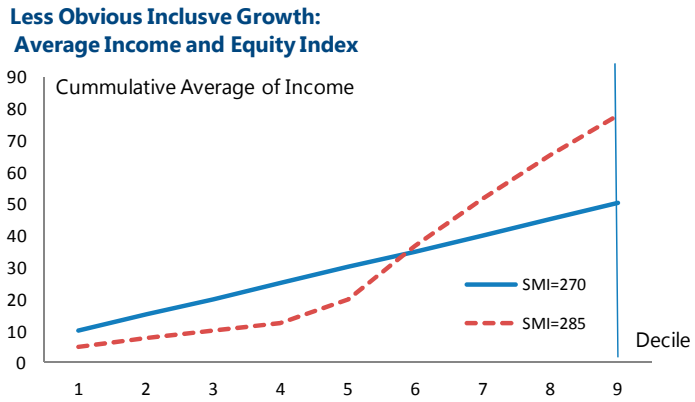
An interesting aspect of SMI, as a measure of inclusive growth is that, even when equity is decreasing (that is, $d\omega < 0$), it can be balanced out with the increase in the



[7] Generalized Lorenz curves are simply Lorenz curves (uniformly) scaled by the average income. See for example, Kleiber (2005).

average income. As examples of SMC and SMI, hypothetical distributions are depicted in the text charts. Relative to the blue line, the red (broken) line represents the increase in the average income while holding the equity index constant[8]. Note that the area under the curve increases even though the equality did not change. Next, the green (dotted) line represents the higher income equality while holding the average income constant. Again, the area under the curve increases.

Furthermore, the case depicted is also a case of inclusive growth, although less intuitive. The average income of the lower end of population has decline, but the average income increased more than proportionally to the increasing inequality (as measured by Equity Index). Since SMI increases, we call still consider this case as one of "inclusive growth", but with deteriorating income equality.



By using he change in SMI as a measure of inclusive growth measure, we can consider all the three cases discussed above as examples of inclusive growth. The difference in the way in which inclusive growth is achieved can be highlighted by the decomposition of the MSI growth.

Appendix C. Quadratic form of inflation, simulation of the estimated effects

Interpretations of estimated coefficients are more complicated when the estimated equation involves polynomials. Unlike for the case of linear terms, the magnitude of marginal effects depends not only on the difference, but also on the levels of the variable to be evaluated. First, we compute the optimal level of inflation (conditionally on other explanatory variables) based on the equation below:

$$\mathbf{Y = a + 1.586x - 0.353x^2}$$

where Y stands for conditional expected value of inclusive growth and x for inflation. Coefficients are based on the all-sample results of the main model (Table 1); and $\boldsymbol{a}$ is an intercept term. Then, by taking the first derivative

$$\mathbf{Y' = 1.586 - 0.706x}$$

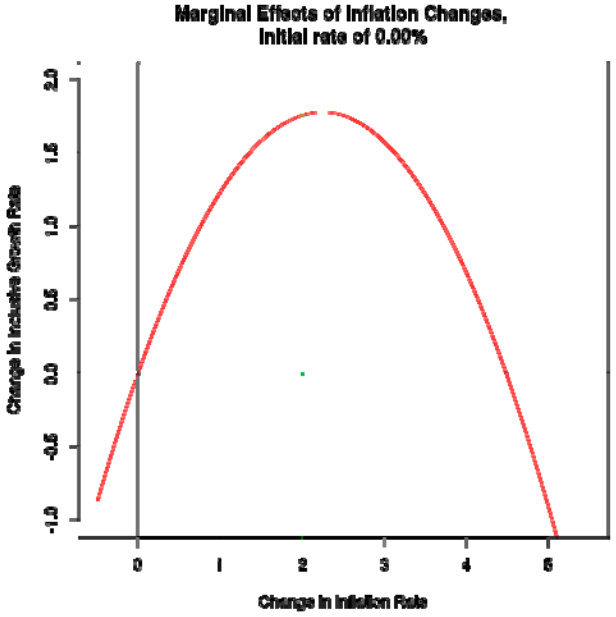
[8] These two curves are not parallel owing to the fact that the lower income population is weighted more than higher income population by the construction of SMC.

and solving for x, we can show that the maximum effect reached at the inflation level of 1.586/0.706 = 2.246 %; and the maximum value would be 1.781%.

The marginal effect of inflation depends on the initial value:

$$Y_1 - Y_0 = (a - a) + 1.586(x_1 - x_0) - 0.353({x_1}^2 - {x_0}^2)$$
$$= 1.586(x_1 - x_0) - 0.353({x_1}^2 - {x_0}^2)$$

In the text chart, we plot the marginal effect of changes in inflation rates (red line), while assuming an initial inflation rate of 0.00% as in our policy scenario. The chart shows an initially increasing, but then diminishing marginal effect. Moreover, the marginal effect becomes negative (i..e further inflation reduces inclusive growth) at around 4.5%. Note that, because the specified curve is symmetric, the marginal effect would decay off at the same distance from the optimal level. In this case, it is $2.246 + (2.246 - 0) = 4.492\%$.



The policy scenario we considered is the initial value of 0.00% and the targe rate of 2.00% (text chart, green line). With an increase of 2.00% points, the marginal effect on the inclusive growth is 1.76%, slighlty less than the value at the optimal level.

Appendix D. Causality Direction between Inflation and Growth

To test endogeneity, we run simple bilateral regressions between growth and inflation:

$$y_{it}=a_1 y_{it-1}+a_2 y_{it-2}+b_1 m_{it-1}+b_2 m_{it-2}+\mu_i+v_{it}$$

where y is the dependent variable and m is the (supposedly endogenous) explanatory variables. Note that this is not equivalent to a conventional Grange causilitu test because: the lag is not chosen by statistical significance, but limited by the data availability (l=2); regressions are run separately; and the specification contains the fixed effect for each prefecture.

The result is shown in the table below.

	Dependent variable:	
	Growth	Inflation
	(1)	(2)
lag(dys, 1)	-0.461***	0.080**
	(0.110)	(0.039)
lag(dys, 2)	-0.078	0.094**
	(0.104)	(0.037)
lag(Inflation, 1)	2.052***	0.962***
	(0.251)	(0.090)
lag(Inflation, 2)	1.431***	0.816***
	(0.093)	(0.033)
Observations	144	144
R^2	0.748	0.918
Adjusted R^2	0.478	0.587
F Statistic (df = 4; 92)	68.230***	258.300***
Note:	*p<0.1; **p<0.05; ***p<0.01	

Both variables are good leading indicator of the other both at the lag of 1 and 2, but the coefficients on the impact of inflation on growth tend to be larger than those of the impact on griwth on inflation.

We have also estimated the same model as in the becnhamrk case, btu with with lagged (l=1) inflation (5 year averages) as an instrument variable (Balestra & Varadharajan-Krishnakumar, 1987). The results are shown below, and are broadly consistens with those discussed in the main text.

Table 1
Results for All Income, IV

	Dependent variable:		
	dys	dy	dw
	(1)	(2)	(3)
Inflation (%)	4.707***	4.592***	0.051
	(1.154)	(1.071)	(0.259)
Inflation, squared	-0.876***	-0.832***	-0.034
	(0.195)	(0.181)	(0.044)
Part- to Full-time job openings (%)	0.031	0.023	0.007
	(0.038)	(0.035)	(0.009)
Female labor force participation (%)	0.270*	0.225*	0.042
	(0.137)	(0.127)	(0.031)
Labor input growth (%)	0.156	0.136	0.019
	(0.291)	(0.270)	(0.065)
Initial GDP per capita	-5.476***	-4.737***	-0.707*
	(1.812)	(1.683)	(0.407)
Elderly index	0.450***	0.429***	0.014
	(0.153)	(0.142)	(0.034)
Observations	235	235	235
R^2	0.486	0.539	0.105
Adjusted R^2	0.374	0.415	0.081
F Statistic (df = 7; 181)	5.173***	7.330***	3.021***

Note: *p<0.1; **p<0.05; ***p<0.01

Results for Working-age Income, IV

	Dependent variable:		
	dys.work	dy.work	dw.work
	(1)	(2)	(3)
Inflation (%)	4.926***	4.371***	0.534
	(1.226)	(1.047)	(0.324)
Inflation, squared	-0.852***	-0.743***	-0.106*
	(0.207)	(0.177)	(0.055)
Part- to Full-time job openings (%)	0.025	0.014	0.011
	(0.040)	(0.034)	(0.011)
Female labor force participation (%)	0.338**	0.250**	0.088**
	(0.146)	(0.124)	(0.038)
Labor input growth (%)	-0.020	0.018	-0.039
	(0.309)	(0.264)	(0.082)
Initial GDP per capita	-4.770**	-3.545**	-1.230**
	(1.926)	(1.645)	(0.509)
Elderly index	0.497***	0.417***	0.079*
	(0.162)	(0.139)	(0.043)
Observations	235	235	235
R^2	0.444	0.514	0.007
Adjusted R^2	0.342	0.396	0.005
F Statistic (df = 7; 181)	-0.283	5.466***	-4.416
Note:	*p<0.1; **p<0.05; ***p<0.01		

Appendix E. Contributions of regressors to variation in equity.

In the text table below me represent various measures of how much of the variation in the equity index is explained by the various regressors. The top three variables for each measure are denoted by ***.

Standardized Regression Coefficients show the expected change of the dependent variable in standard deviations with respect to one standard deviation change in the explanatory variable. (e.g. one standard deviation change in FLP is associated with a 0.373 standard deviation change in equity index growth).

Semi-Partial Correlation Coefficients measure the *unique* contribution of each explanatory variable in explaining the variations of the dependent variable. The proportion of the variation that is jointly explained by multiple variables is not accounted for in this measure (i.e. if all the explanatory variables are independent of each other, the set of semi-partial correlation coefficients sum up to the R^2 of the model.)

Extra Sum of Squares is simply the amount of sum of squared residuals reduced by removing one variable from the full model. (e.g. by removing inflation the sum of squared residuals is increased by 0.707, by removing inflations squared it is increase by 0.321). Note that they do not sum up to the total sum of squared residuals.

Contributions of regressors to variation in equity.

	Standardized Regression Coefficients	Semi-Partial Correlation Coefficients	Extra Sum of Squares
Inflation	-0.089	0.005***	0.707***
Inflation, squared	-0.056	0.006***	0.321***
Job Openings	0.132***	0.001	0.089
FLP	0.373***	0.007***	0.254
Labor Growth	0.069	0.0005	0.032
GDP PC	-0.58***	0.004	0.757***
Elderly Index	0.079	0.0001	0.017
	-	0.0236	-

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