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Demographic Transition, Impact of ICT, and Globalization:

A Long View of the Post-Crisis World

Speech at the Central Bank of the Republic of Turkey

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Introduction: Turkey and Japan -- Friendship and Cooperation on the Rim of Asia

It is my great pleasure to visit the Central Bank of the Republic of Turkey, and I am especially delighted to have the opportunity to speak before you on global economic issues that I think are relevant both to Turkey and Japan.

Turkey and Japan are nations on the opposite sides of the rim of Asia, separated by a distance of some 9,000 kilometers. However, the distance has not hindered friendship and cooperation between the two nations in the past and the present. We must not forget that the two nations faced the same challenges as they tried to modernize themselves in the second half of the 19th century. It was in this context that the Turkish Emperor Abdul Hamid II sent the frigate Ertuğrul to Japan with more than 600 men on board in 1889. The voyage, as we know, ended in a tragedy caused by a typhoon. Nonetheless, the rescue efforts of Japanese locals and the subsequent exchanges of goodwill laid the firm foundations of the friendship and cooperation between the two nations.

Today, the world, including Japan and Turkey, is facing many challenges, some of which were caused by the recent financial crisis. On this occasion, I would like to share with you some thoughts on issues that I have been thinking about for the last few years. These issues are not directly related to current macroeconomic developments *per se*, but relate to medium- to long-term influences on the post-crisis global economic environment.

My presentation will consist of three parts. First, I will examine three emerging trends that seem to define the post-crisis economy. These three trends are: mismatches in the labor market, lower trend growth, and the end of wage disinflation. I will then turn to the possible root causes of these symptoms. I will identify four: demographic trends, balance-sheet adjustment, the influence of information and communication technology, and globalization/polarization. Finally, I will conclude by discussing the policy implications of these trends for the future.

1. Economy After the Crisis: Labor Market Mismatch, Low Trend Growth and Inflation -- the United States and Japan

So, let me jump into the first part. What are the most important trends in the global

economy?

Different people will surely have different views, but I believe the three most important emerging trends in the post-crisis economy are: seemingly increasing mismatches in the labor market, persistently lower trend growth, and the stalling momentum of services wage disinflation. I will explain each in turn.

1.1. Increased Mismatch in the Labor Market

An indicator of the increasing mismatch in the labor market -- the first trend -- is an outward shift of the Beveridge Curve, which is a well-known way to illustrate the state of the labor market. The Curve represents the relationship between the unemployment rate and the job vacancy rate, or the ratio of the number of job vacancies to the sum of employment and job vacancies. In its typical format, with vacancies on the vertical (y) axis and unemployment on the horizontal (x) axis, the curve slopes downward, as a higher rate of unemployment normally occurs with a lower rate of vacancies. Data points are expected to move up and down the curve along with the business cycle.

The graph of the U.S. labor market on this slide shows that data points moved down on the curve as the recession took hold in the early 2000s, climbed back up during the subsequent expansion until they reached their high point in December 2006, then fell again after the Great Financial Crisis struck, all the way down to June 2009. If we extend the data to June 2012, the data points climb back up again along with the recovery. Nevertheless, after about three dozen data points, it seems sufficiently clear that we are not moving back up the old curve, but along a new curve.

As I have said, the outward shift in the curve, which means higher unemployment for a given level of vacancies, is usually interpreted as an indication of increasing mismatches in the market. The implication is that, *ceteris paribus*, we would see a higher unemployment rate for a particular stage in the business cycle. This development reminds me of what we experienced in Japan ten years earlier, which you can see on the next slide. Data points after the bursting of the bubble, shown in black, are clearly on a different curve.

1.2. Lower Trend Growth

As to the second trend, evidence for lower trend growth can be derived from Okun's Law, which describes the empirical relationship between unemployment and the decline in a country's output. In the next graph, annualized quarterly changes in the unemployment rate and annualized quarterly changes in growth for the United States are plotted on the x and y axes respectively. If we draw a regression line for the data points before Q4 2000, the coefficient is -1.8573 , which is broadly in line with the rule of thumb advocated by Okun: a 1 percentage point increase in the unemployment rate corresponds to a 2 percent decline in output.¹ The point where this line intersects the y axis, in other words the intercept of the regression line, could be regarded as an estimate of the trend growth, given that such a rate of growth would leave the unemployment rate unchanged.

Looking at the data after 2001, we can see that the relationship between unemployment and growth has changed. The regression line is much flatter and has shifted lower after Q4 2000. The change is more pronounced after the so-called Paribas shock of August 2007. This implies that the trend growth is significantly lower than it used to be, at least for the time being.

1.3. Stalling Wage Disinflation

Turning to the third trend, the next graph shows the changing relations between unemployment and wage inflation in the United States. Wage inflation for a given unemployment rate steadily declined in the service industries from the early 1980s into the mid-2000s. In other words, there was a pronounced downward drift in the short-term Phillips Curve. In the early 1980s, on the yellow line, wages increased by about 8 percent even when unemployment stood at around 8 percent. Shortly before the Great Financial Crisis, wage inflation did not even reach 4 percent as unemployment dipped below 5 percent. In other words, we saw substantial wage disinflation relative to the 1980s or 1990s.

Having said this, the downward shift seems to have been more or less arrested in recent years. The data points since Q1 2005, around the black line, seem to be resting

¹ Here I refer to the "difference" version of Okun's Law.

comfortably on this regression line. Statistically, the coefficient of determination (R squared) is 0.89. Given that services account for more than 60 percent of household consumption expenditure, it is not surprising to find inflation creeping up with the upturn in the business cycle, even if unemployment remains stubbornly high. The recent movements in the trimmed mean of U.S. PCE inflation on the next graph show this point. Here the trimmed mean PCE inflation is usually regarded as representing the steady trend component of PCE inflation.

Turning to Japan, we can draw graphs that are quite similar to the U.S. ones that we have just seen. In the next slide, while Okun's relationship is not very visible in Japan, regression lines for periods corresponding to the U.S. example suggest that trend growth has indeed declined in Japan as well. The short-term Phillips Curve after the bursting of the property bubble in the late 1980s is also stable, as you can see in the next slide, and, as a result, trend inflation as represented by year-on-year changes in the trimmed mean of CPI has been edging up until recently, although the level of inflation is much lower in Japan.

1.4. Temporary or Permanent?

Are these trends temporary or permanent?

Many in the United States certainly believe that they are temporary. One example is the table on the next slide, which shows a projection made recently by the Congressional Budget Office. Potential GDP growth may be lower in the period 2012-2013, but it is expected to return to pre-crisis levels in 2014-2022.

Such a view rests on an assessment that the three trends result not from structural changes but from the unusually large shock that was the Great Financial Crisis. More specifically, these observers believe that the Beveridge Curve itself has not shifted: the data points are just following a historical counterclockwise pattern during the upward leg of the business cycle. They also believe that unusually large layoffs and subsequent rehiring in the face of the shock could explain the deviation from Okun's rule of thumb. Accordingly, they tend to recommend measures to jump-start aggregate demand, which would enable the economy to return to its pre-Crisis trajectory in a relatively short time.

The problem with such a view is that reality is beginning to work against it. In particular, the speed of the recovery has remained very slow, and is not expected to accelerate anytime soon. The economy is not rebounding as rapidly as in previous business cycles. It is becoming more difficult to refute the parallels with the Japanese experience since the beginning of the 1990s, which I have just shown.

There are also differences with past cycles in the pattern of recovery. For example, the auto sector enjoyed a relatively swift recovery, whereas the housing market shows little signs of life even at the current extremely depressed levels. In addition, some historical research, such as that presented by Reinhart and Rogoff, suggests that recovery from financial crises tends to be slow and prolonged.² The fact that not only the United States but also other advanced economies are suffering from similar symptoms, and that emerging economies, which initially weathered the storm fairly well back in 2008, are now visibly slowing down makes us wonder if there are common threads that tie economies to a prolonged period of sluggish growth.

I will explore these common factors in the next part of my presentation, but before moving on, I would like to stress that I am not a fatalist. While structural factors play an important role in the economy, and they may have a lasting influence, not all economic developments could or should be attributed to them, and the economy can benefit from sensible aggregate demand policies, including monetary policy. These policies can certainly prevent excessive swings in aggregate demand, in both the upward and downward legs of the business cycle. Policies can still be effective, but they must be formulated, adopted, and implemented with the understanding that structural changes do occur, and when they do, this will change the context and effectiveness of policies. It may be unfair therefore not to mention the potentially profound changes related to energy costs resulting from the so-called shale gas revolution in the United States, to which I will try to return in the final part of my presentation.

² Reinhart, C., and K. Rogoff (2009), *This Time Is Different: Eight Centuries of Financial Folly*, Princeton University Press.

So, let me now move on to part two.

2. What Lies Behind Mismatch and Low Trend Growth: Ageing, Balance-Sheet Adjustment and the Impact of ICT on Workplace, Value Chain, and Globalization

In this part, I will try to explore the root causes of the trends that I have just observed. As I laid them out at the beginning, these trends are: demographic trends, balance-sheet adjustment, the influence of information and communication technologies, and finally, globalization.

2.1. Demographic Transition and Reduced Mobility and Flexibility

The first force that I would like to identify is the effect of the transition from what we might call demographic bonus to demographic onus. The two graphs on the next slide demonstrate this for Japan and the United States. The black lines show the inverse dependency ratio. This is the ratio of the working-age population between 15 and 64 of age to the rest of population, who are dependent on the working-age population.

The inverse dependency ratio shows how many independent working-age persons have to provide for one dependent person (in the form of pensions and expenditure on children). The two humps in the graphs reflect the post-World War II baby boom: the first hump appeared as the boomers reached working age, and the second as the children of boomers reached working age while the boomers themselves had not yet retired. The pink and green lines show real estate prices and the amount of bank loans outstanding respectively, both adjusted for inflation and on a scale where the peak level equals 100. The striking feature of these graphs is that in both Japan and the United States, the peaks in real estate prices and loans have more or less coincided with the peaks in the inverse dependency ratio. The actual peaks are about 15 years apart between Japan and the United States, but the pattern is surprisingly synchronous. Similar experiences are observed in other countries as well.

There are several empirical studies, employing multi-country panel analyses, which conclude that demographic changes have a significant effect on economic variables, such as

property prices and long-term interest rates.³ This comes as no surprise since, in the population dividend phase, young baby boomers want to buy more land and save more real money for their retirement. Since the supply of land is physically limited, the real price of land will go up. Similarly, if nominal money supply is held constant, the "price" of real money holdings, which is the inverse of the price level, should also go up, implying deflation. Being mandated to maintain price stability, the central bank is then likely to increase nominal money to keep prices stable. The result is an increase in property prices while general price levels remain stable.⁴ At the same time, I should also stress that demography alone does not explain the formation and bursting of asset bubbles. For example, excessive optimism, or the "this-time-is-different" syndrome is also an important contributing factor.

Meanwhile, demography makes a lot of difference when a bubble bursts. Generally speaking, the effects are expected to be much more pronounced under the demographic onus of an ageing population rather than the demographic bonus of a young and growing population. Let me offer two examples: reduced flexibility or mobility in the economy, and more acute balance-sheet adjustments.

Older people tend to be less mobile or flexible than younger people. This is because older people, with fewer productive years ahead, are more reluctant to incur various adjustment costs, for example relocating to a different geographical area or obtaining new skill sets to work in a different sector of the economy. This tendency appears not only in workers but also in entrepreneurs. As a result, when the population ages and the proportion of older people increases, the mobility or flexibility of the whole economy is likely to decline.

³ For property prices see, for example, Takáts, Előd (2012), "Aging and house prices", *Journal of Housing Economics*, vol 21, no 2, June, pp.131–141, and Nishimura, Kiyohiko G. (2011), "Population ageing, macroeconomic crisis, and policy challenges", Panel discussion at the 75th Anniversary Conference of Keynes' General Theory, University of Cambridge, 19–21 June 2011. For long-term interest rates see for example, Ichiue, H., and Y. Shimizu (2012), "Determinants of Long-term Yields: A Panel Data Analysis of Major Countries and Decomposition of Yields of Japan and the US", WP 12-E-7, Bank of Japan.

⁴ See Nishimura, K. G. and E. Takáts (2012), "Ageing, Property Prices and Money Demand", BIS Working Papers No 385, Bank for International Settlements, which has both theory and empirical analysis of a panel of 22 advanced economies.

Reduced mobility or flexibility leads to prolonged mismatches in the economy: job seekers may need more time to find a new job and entrepreneurs may be slow in exploiting new business opportunities.⁵ Such a trend would depress productivity growth. I should add that the effects of balance-sheet adjustment, which are aggravated by demographic onus, will also magnify the loss of mobility or flexibility.

Such a trend was observable in Japan after its bubble burst in the 1990s. Even the United States, which is one of the most mobile and flexible economies, has been suffering since its housing market collapsed in 2006. There is a wealth of evidence of reduced mobility or flexibility. For example, the slide (on page 21) shows that the mobility rate among house owners declined substantially, by more than 30 percent on average, between 2005 and 2009. The fact that the mobility rate among renters did not change suggests that the change was influenced by the decline in house prices during that period. The next graph shows the rate of births of new business establishments. It can be said that the higher this rate is, the more flexible the economy. Here again, there is a marked decline after 2005, which coincides with the peak in the inverse dependency ratio.

Another example on the next slide shows immigration into and emigration out of the United States. Immigrants are the most mobile members of the population and are generally regarded as contributing substantially to the flexibility of the U.S. economy. The concurrent decline in arrivals (inflows to the U.S.) and increase in departures (outflows from the U.S.) once more suggests less flexibility in the United States. To underscore this relationship between demographics and mobility or flexibility, I would like to show you the next slide on Japan. After the bubble burst, there was a sharp brake on the creation of enterprises whereas destruction increased only modestly.

2.2. Severe Balance-Sheet Adjustment

Let me now turn to the second force, the severity of balance-sheet adjustments.

⁵ A sizable number of people change jobs without experiencing a spell of unemployment. Thus, in discussing mismatch or inefficiency in labor markets, simply focusing on the unemployed is misleading.

The next slide (on page 25) shows the changes in inflation-adjusted house prices. The graph on the left compares Japan, the United Kingdom and the United States. It shows monthly changes in real house prices relative to the peak price. The shape of the graphs is strikingly similar. It took more than ten years for the Japanese real house price to hit the bottom at almost one third of the peak price, when her population was ageing. While recent data for the United States is often regarded as showing signs of stabilization in the housing market, it is far from certain that downward trending is finally over, if one takes into account the possible effects of an ageing population that the Japanese experience suggests.

Even without any further fall, a 40 percent decline in U.S. real house prices is a deep adjustment. This has led to a significant divergence among industries in the pace of recovery. Some industries are recovering much quicker than others. The proportion of households that have negative equity has jumped since 2010 and continues to increase, which leaves the U.S. housing market still in the doldrums. In contrast, the debt service ratio is now markedly lower, reflecting the decline in interest payments as central banks eased monetary policy. Consequently, U.S. auto sales have now recovered to a level closer to what can be considered normal.

Another problem related to severe balance-sheet adjustments is the breakdown of the market economy's natural selection mechanism. The role of financial institutions to channel funds to productive enterprises can be obstructed when those institutions have significant amounts of impaired assets. Suffering from severe balance-sheet problems, institutions may find themselves with no other choice but to keep borrowers on life support, which prevents them from extending new loans to more promising businesses. Such patterns were observed in Japan during the financial crisis of the late 1990s. The market selection mechanism broke down, and the survival of the fittest no longer applied to the world of business. So-called zombie firms were supported by zombie banks.

Strong evidence of this phenomenon is found in a study I conducted with Nakajima and Kiyota, the main conclusion of which I have included in the next slide. By conducting a

large-scale panel analysis at the firm level, this research was able to show that during the period of the financial crisis of 1997, the total factor productivity of surviving firms was actually lower than that of exiting firms.⁶

2.3. Impact of Information and Communication Technology

The third force that is shaping the global economy is the impact of information and communication technology (ICT). I argue that ICT has in fact been a polarizing force both in the labor and product markets. Furthermore, the effects are not confined to specific industries, but are more or less ubiquitous and far reaching.

Labor Markets

The reason ICT impacts the labor market is that it can be applied to a variety of moderately skilled tasks, and consequently displaces workers from those tasks. For example, banks used to be inundated with paper. Payments were made in checks, slips of paper were made to record transactions, which were in turn tracked on paper ledgers, and ticker tapes provided up to the minute market information. Banks employed hundreds or even thousands of clerks to literally push the paper around their offices, just to keep track of their operations. Clerks were skilled in the sense that they had to know what was the important information on those pieces of paper, and in which books such information was to be written down. ICT changed all this. Now, virtually all bank transactions are processed electronically with minimal intervention from human workers. As a result, the bank clerk has become extinct, or at least an endangered species. Such changes occurred not only in banking but in all industries. Any task that could be programmed was moved onto electronic platforms, displacing workers in the process.

This could be the force behind the graph on U.S. employment according to worker skills, which shows the greatest job losses after the Great Financial Crisis were those for medium-skilled workers.

⁶ Nishimura, K. G., T. Nakajima, K. Kiyota (2005), "Does Natural Selection Mechanism Still Work in Severe Recessions? -- Examination of the Japanese Economy in the 1990s --", *Journal of Economic Behavior and Organization*, 58:1 (2005), pp.53-78.

The next two slides (on pages 32 and 33) are schematic illustrations of this development.

Let us suppose that there were three broad types of worker defined by their skill sets and a labor market for each type before the prevalence of ICT. We could label them: top management or highly-skilled professional workers, middle management and moderately-skilled workers, and manual laborers or low-skilled workers. Looking at the supply curve for the three categories of workers, we would expect a steeper curve for more skilled workers, since it is likely that there would be a smaller number of these skilled workers. On the other hand, the demand curve would be determined by the marginal productivity of workers, which in turn is equivalent to what employers are willing to pay workers as wages. In this regard, employers should be willing to pay higher wages for more skilled workers, because their marginal productivity is higher. The resulting equilibria for the three types of workers could then be illustrated as in this slide (page 32).

The effects of the widespread application of ICT are shown on the next slide. The resulting increase in productivity is reflected in the upward shift of the labor demand curve. Meanwhile, the market for middle management and moderately-skilled workers is now gone because tasks performed by those employees are easily replaced by ICT. Since the displaced workers are not likely to have the skill sets required for the top group of workers, they will probably have to compete for jobs with the manual labor or low-skilled workers. This will have the effect of shifting down the labor supply curve for manual laborers or low-skilled workers. The resulting equilibria would offer higher wages for top management or highly-skilled professional workers, reflecting the shift in the demand curve, and only moderately higher wages for manual laborers or low-skilled workers, reflecting the shifts in both the demand and supply curves. In addition, the influx of over-skilled workers into the market for manual laborers or low-skilled workers implies increasing mismatches.

What would happen if this mechanism were not allowed to play itself out for historical, cultural or political reasons? Employers may be compelled to (or even be willing to) preserve the *status quo*. In order to maintain the middle market for labor, employers cannot take advantage of ICT, which becomes a drag on productivity growth. This may

explain the slowing of Japanese productivity growth since the 1990s. Historically, up until the 1980s, Japanese firms benefited from the accumulation of firm-specific skills or knowledge in their workforce, particularly among middle management or medium-skilled workers. Nevertheless, the reluctance of firms to replace those workers with ICT since the 1990s, because of the high cost of shedding workers, began to weigh on productivity. I have shown the consequences of this empirically in a panel study of sixteen industries from 1981 to 1998.⁷

Product Markets

Turning to the product market, ICT is influencing business organization and business models.

As mass-production developed and economies of scale advanced from the latter half of the 19th century, the cost of getting the right inputs at the right time became more of a concern to firms than the cost of the inputs themselves. Thus, the skills required to organize and optimize the production process and product development became the source of profits. An early solution to this problem was the vertically integrated firm based on the "ore-to-assembly" operation exemplified by the Ford Motor Company's sprawling River Rouge complex in Detroit. A later solution in the latter half of the 20th century was Toyota's *Kanban* operation, which improved the interaction between the car assembly plant and its various suppliers. In both cases, the knowledge and skills of coordinating a complex production system and product development were the major source of profits, and thus assemblers became profit centers. Though not as pronounced as in the automobile industry, the same was true in other areas, including consumer electronics.

Considering that such skills boil down to communication and information processing, we can understand why the impact of ICT has been so enormous, especially since around the turn of this century. As ICT dramatically reduced the cost of interfacing between functions, it soon became more efficient to procure products and services from specialized outside suppliers, who could offer better products much cheaper by virtue of specialization

⁷ Minetaki, K., and K. G. Nishimura (2010), *Information Technology Innovation and the Japanese Economy*, Stanford University Press, 2010, Chapter 6, Section 4, pp.133-144.

and economies of scale. If everyone is buying the same inputs from the same supplier, and the cost for sourcing is leveled due to ICT, there will be less opportunity to differentiate any finished product assembled from those inputs. Consequently, the assembly business became a business of attrition. This is clearly manifested in the next slide (page 35). The operating profit margin is depressed in the downstream: particularly for LCD TV set makers. The same is true for solar cells, where assemblers (system vendors) are suffering from dwindling profit margins.

ICT also forced changes in business models in many sectors. For example, if you wanted to distribute music in the mid-20th century, you had to cut a master disk from a recording, plate it to make a die, stamp a piece of vinyl with the die to make a record, put the record in a paper jacket and send the final package off to stores around the country. Each record sale had to cover the costs involved in this process. This model did not change much even after the compact disc was introduced in the early 1980s. Now, however, music is distributed digitally: a recording, once converted to an appropriate format, can be copied an infinite number of times at virtually no cost. ICT is making this transition to electronic delivery more practical in many industries. Economics tells us the price of a product will be driven down to the marginal cost of production. Thus, it is not surprising to see the price of electronically delivered products falling ever closer to zero, which is the cost of reproducing such products. These changes introduced by ICT have not only sealed the fate of traditional distribution channels, but have also forced businesses to re-consider how they charge for their products. The rise of platform businesses is perhaps one answer.

These developments in the product market interact with the labor market. When huge integrated manufacturing firms are replaced by decentralized networks of smaller firms, some of which are abroad, workers who were responsible for internal coordination are released and replaced by ICT. At the same time, these smaller firms become more efficient than before thanks to ICT, and tend to employ fewer workers to complete a certain task. As a result employment creation in manufacturing is likely to stagnate. Furthermore, jobs are also lost when existing distribution channels, which were a significant source of employment, are replaced by electronic distribution. In contrast, now-flourishing platform businesses, by virtue of being easily scalable, will not be hiring

too many workers even if they grow rapidly in terms of sales. Thus, the end result is a headwind in the labor market.

2.4. Globalization

ICT also influences globalization, which in turn affects developments in the labor and product markets.

As is widely recognized, ICT has been one of the driving forces behind globalization. It has greatly reduced the cost of communicating and coordinating across borders. Coupled with the integration of former communist bloc countries into the global trading system, the horizon has broadened considerably for locating business operations. Not only can firms now create networks across borders in order to attain maximum aggregate output at minimum cost, but they can also change them easily as conditions change in various corners of the world. If you have chance to look closely at the content of your wardrobe, you will be surprised by the wide variety of the countries of origin, even for seemingly similar items from the same brand. A fashion brand may design a T-shirt, but it contracts out the production to specialized factories around the world. The multitude of countries of origin on the labels shows that brands are certainly not shy of taking advantage of an offer from a factory in Dhaka to make a T-shirt more cheaply than a factory in Shenzhen.

Such practices put competitive pressure on wages across borders, and contribute to the polarization of wages, because the benefit of increased profitability would accrue mostly to top management or highly-skilled professional workers. Meanwhile, some multinational firms might go one step further and directly play one country's workers against another's. These firms might threaten to leave a country and reestablish themselves in another with cheaper wages, thereby extracting concessions from existing workers. This would exacerbate polarization by lowering the wages paid to manual labor or low-skilled workers.

Now, I am about to conclude my discussion of demographic trends, balance-sheet adjustment, and the influence of information and communication technology, so before I move on to the next part, I would like to summarize where I think we are. First of all, a period of low trend growth is probably here to stay for some time, together with rigidities

that may become more entrenched. It is a problematic combination of factors that could reinforce each other. Secondly, in such a state, economies would be more vulnerable to occasional downward shocks. That could exacerbate inefficiencies. Finally, polarization may become more pronounced, again aggravating general inefficiencies.

This certainly is a challenging situation, but there are opportunities ahead as well. Let me explain by moving on to the final part.

3. What Lies Ahead of Us?

As I have just explained, in my view, the global economy, and the advanced economies in particular, is affected by four strong undercurrents: demographics, balance-sheet adjustment, the impact of ICT, and globalization/polarization. In this final part, since balance-sheet adjustment is essentially a transitional (though prolonged) phenomenon and globalization/polarization has been discussed extensively elsewhere, I will concentrate on the other two, which have been changing the global economy permanently, but the significance of which is grossly underestimated and largely overlooked by many observers. I would like to think about where demographic factors and ICT will take us in the years ahead.

3.1. From Demographic Bonus to Demographic Onus

Firstly, the global population is now in the midst of a significant transition. One by one, economies are watching their demographic bonus give way to demographic onus. Many countries in East Asia will reach the turning point in around 2015, as you can see from the graph on the next slide (page 41). Meanwhile, Latin American countries like Brazil and Chile have a little more time, but are expected to face the transition in the years between 2015 and 2020, as you can see in the next slide (page 42). In short, many emerging economies are going to lose an important engine of growth in the next decade or so. The effects are not going to be uniform, but those economies are going to face their own version of declining flexibility and mobility, leading to reduced growth potential.

Having said this, I should also stress that while this demographic phenomenon is a more or less inevitable outcome of people's choices reflecting increasing living standards, it is not

synchronous across countries. Comparing Japan and Turkey in the next slide (page 43), you can see that the inflection points are roughly 40 years apart, or one and a half generations. If there are complementarities between economies in these cases, for example in terms of resource needs and savings and investment patterns, and if we can take advantage of them, the impact of demographics could be mitigated at the global level.

Looking at the impact of aging on individual economies, firms are beginning to respond to this reality. Mass-production, mass-marketing and mass-consumption now prevalent in the advanced economies came about as firms responded to the post-war demographic bonus. Firms targeted their sales efforts at the large group of people entering the workforce and becoming more affluent by the day. As a result, firms' sales efforts tended to focus on young people, and the portfolio of goods and services available to consumers was tailored to satisfy their preferences. It was the most efficient and effective business strategy. Today, those consumers are ageing, and with it they are becoming more diverse. For example, the majority of young people gather together in schools, whereas older people are divided by their occupation. Young people are generally healthy, but older people are more diverse: some remain quite healthy well into their 80s and even 90s, some prefer to use lifestyle drugs (botox, for example), and there are others suffering from various ailments. The cumulative effect of differences in income and hence wealth could be very large. Firms are finally realizing that, with the shrinking of the young population, they must part with the winning strategy of yesterday that focused on youth. Instead, they should begin catering to older people, if they are to succeed at all. In Japan, there are reports of more and more successes, especially in the retail sector, as the older generation seems willing to pay more for those goods and services that satisfy their needs.

3.2. Adjusting to Ubiquitous ICT

Now I turn to ICT. As I have explained, ICT disrupts the *status quo* because it is one great global leveling force. Competitive advantages that existed before the advent of ICT are now being eroded away. At the same time, since factor endowment among economies is necessarily uneven, the law of comparative advantage tells us that, once ICT becomes ubiquitous, a new pattern of product flows should emerge to the advantage of everyone. Looking at Japan and elsewhere, there are promising signs that this new world will offer

rich opportunities for economic growth and social advances.

For example, in manufacturing, firms are now beginning to realize that selling hardware, be they mobile handsets, flat panel TVs, automobiles or even airplanes, captures only one part of the value accruing to the users over the life of the hardware. Very often, as I have noted earlier, there is a relentless downward pressure on the price that manufacturers can charge for their product. On the other hand, users of mobile handsets for example, will pay many times over the cost of the handset as monthly voice and data subscription charges. They may also pay substantial sums for downloaded content such as music and video. As a result, many firms are now slowly adapting their business models. One option is to become "platform businesses," making their physical products platforms for various services. The aim is to capture as much of what the users are prepared to pay over the life of the product. Meanwhile, another option is to become the provider of one-of-a-kind inputs (especially materials), which cannot be easily replicated by other firms. Successful firms in Japan and elsewhere are now pursuing these strategies, which I noted in a book published several years ago.⁸

One footnote here is the impact of recent breakthroughs in the energy sector regarding shale gas and tight oil production. While the impact is now most visible in the United States, there are many promising geological formations in the world where new exploitable gas and oil deposits might be discovered, including Turkey. While they may or may not become game-changers as some commentators suggest, once discovered and developed, these new sources of energy could affect the global economy in two respects. They will definitely change the energy endowment of economies. However, more uncertain is the effect on energy prices and their impact on the increasing mismatches and polarization we have witnessed in the past decade.

3.3. Challenges for the Aged Society

Finally, what will be the effect of the two forces -- demographics and ICT -- working together? I explained earlier that if the ubiquitous presence of ICT becomes the new

⁸ Nishimura, K. G. (2004), *The Japanese Economy: Inconspicuous Structural Transformation*, Tokyo: Nihon Keizai Shinbun, pp.24-34.

normal, there will be relentless pressure on corporate profits because prices of products will tend to fall and even approach zero, reflecting the very low marginal cost of production for ICT-enabled products. At the same time, the replacement of moderately skilled workers by ICT will lead to a polarization of the workforce, with heavy losses of relatively well-paid jobs in the labor market. That said, the impact of ICT differs between aging societies and those with young and growing populations.

In the case of ageing societies, ICT may create some new business opportunities, because ICT can help firms adapt to the demands of ageing consumers, who tend to be more heterogeneous than younger consumers. ICT could help firms to tailor their products to individual tastes at a lower cost and hence make them more affordable. However, there is a caveat here in that lower prices, which on the one hand make products more affordable, will on the other hand lower the investment returns for the providers of the products, *ceteris paribus*. The key is the degree of demand stimulation from the lower prices. If demand generation is not sufficient, it might be necessary in such circumstances to devise mechanisms that are not completely dependent on market forces in order to provide socially useful products.

3.4. Challenges When Population Is Young and Growing

Meanwhile, in the case of economies enjoying a population bonus, the challenge is to provide the right sort of jobs for the large number of people entering the workforce, who are in many cases, well-educated and technologically adept. When the advanced economies had their population bonus, there were a large number of openings for medium-skilled jobs, where workers could expect to build a career and, with hard work and perhaps some luck, advance into highly-paid management-level jobs. Now, with the prevalence of ICT, those jobs are becoming scarcer. In order not to waste talent in dead-end low-paying jobs, it has become necessary to provide the right social and economic incentives for prospective employers to employ talented youth for the long term, providing them with the training and opportunities to advance their careers.

It is not easy to solve the problem of providing goods and services (in the case of advanced economies) and employment opportunities (in the case of developing economies) that the

market fails to provide on its own. Some time ago, before joining the Bank of Japan, I advocated the creation of socially-oriented investments trusts, where the public sector provides seed capital to socially desirable projects that would not offer adequate returns on capital but could still be run as market-disciplined entities. The idea is yet to be widely accepted, but more and more people seem to be realizing that such a structure might provide a workable solution.⁹

3.5. Challenges facing Central Banks

Central banks are facing enormous challenges, particularly those of the advanced economies. After stepping in decisively to halt the contagious disruption in the global financial markets and economy following the Great Financial Crisis, central banks of the advanced economies have now exhausted the available options for traditional monetary policy. Consequently, these central banks, including the Bank of Japan, are pursuing the most unconventional policies ever imagined. There is still room in this direction for further easing of monetary conditions to support the economy. There are also still means to assist economic agents in making structural adjustments.

One such policy is the Fund-Provisioning Measure to Support Strengthening the Foundation for Economic Growth (Growth Foundation Strengthening Facility [GFSF] for short) adopted by the Bank of Japan in June 2010. This measure, while not providing funds directly to non-financial borrowers, is intended to be a catalyst for financial institutions willing to lend to various private-sector initiatives that attempt to overcome structural headwinds and will enhance potential growth in the medium to long run. I believe the "Funding for Lending" scheme, which was recently announced by the Bank of England and the U.K. Treasury, has a similar purpose, and I am carefully following its outcome, although this and the Bank of Japan's scheme will need a long time before they can show any concrete benefits.

So far, I have explained the formidable challenges now facing central banks. While

⁹ Nishimura, K. G., and M. Saito (2003), "On Alternatives to Aggregate Demand Policy to Revitalize the Japanese Economy", *Asian Economic Papers* 2:3 (2004), pp.87-126, especially pp.118-123.

monetary policy is not a panacea, as often stressed by Governor Shirakawa of the Bank of Japan and other prominent central bankers, it can usefully support efforts by economic agents. There are risks such as economic polarization leading to political polarization, as I mentioned before, which could prevent governments from implementing the necessary policies. That tail risk is significant. Nevertheless, I am cautiously optimistic that what we are doing now will eventually lead to a better future, although there are going to be ups and downs along the way. In any case, enhanced cooperation between countries and regions is essential in achieving this goal, and I hope my presentation today had been one small step in this regard.

Thank you for your attention.

Demographic Transition, Impact of ICT, and Globalization: A Long View of the Post-Crisis World

Speech at the Central Bank of the Republic of Turkey

Kiyohiko G. Nishimura

Deputy Governor

Bank of Japan



INTRODUCTION

TURKEY AND JAPAN: FRIENDSHIP AND COOPERATION ON THE RIM OF ASIA

Plan of Speech

- Part 1: Three emerging trends that seem to define the post-crisis economy
 - Mismatch, Lower Trend Growth, End of Wage Deflation
- Part 2: Root causes of these trends
 - Demography, B/S Adjustment, ICT, Globalization
- Part 3: Future changes and policy implications

3

Part 1

**ECONOMY AFTER THE CRISIS: LABOR
MARKET MISMATCH, LOW TREND GROWTH
AND INFLATION -- US AND JAPAN --**

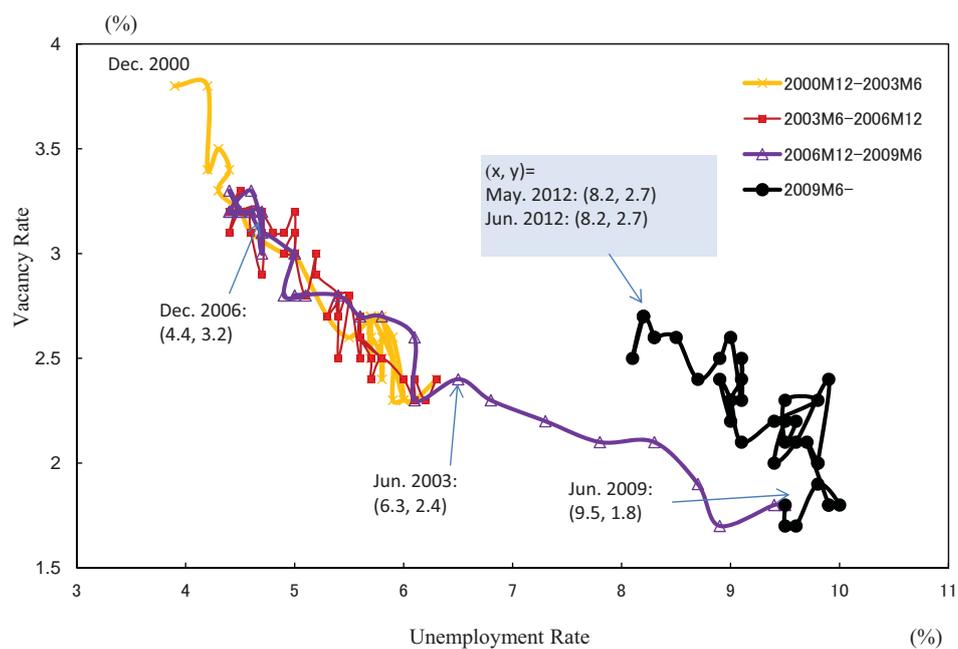
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Features of the post-Crisis economy

- Increasing mismatches in the labor market
- Lower trend growth
- End of services wage disinflation

5

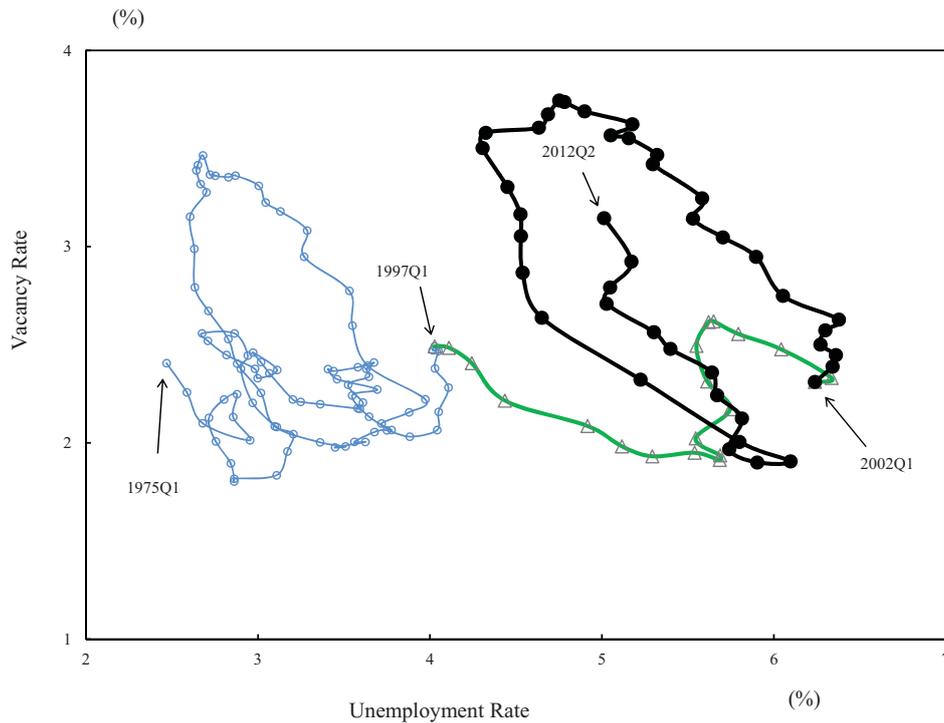
Outward shift of the US Beveridge Curve



Higher unemployment rate in coming years?

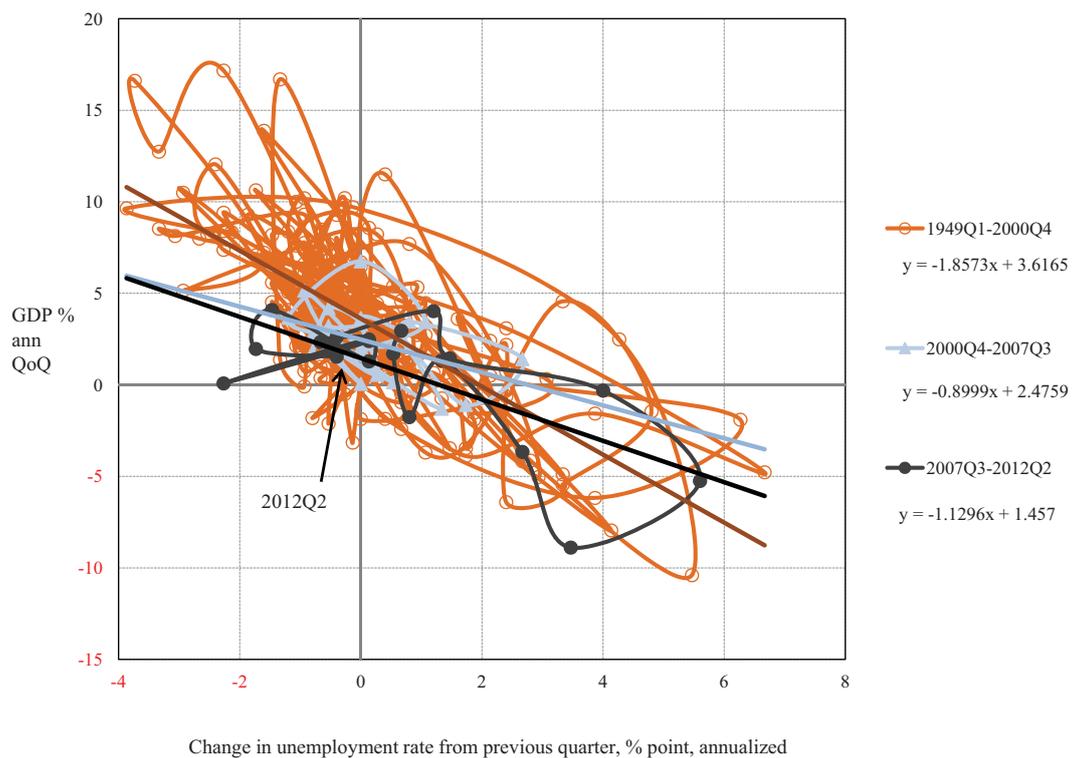
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The Beveridge Curve in Japan



7

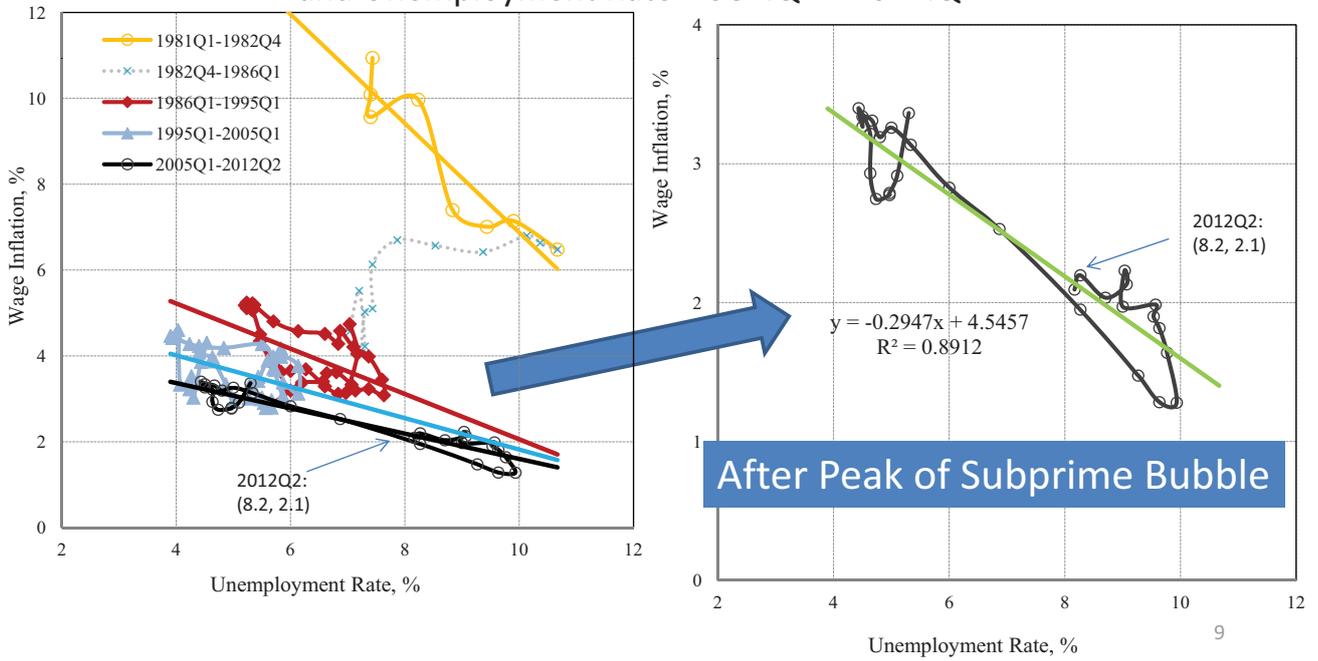
Okun's Law and trend growth in U.S.



8

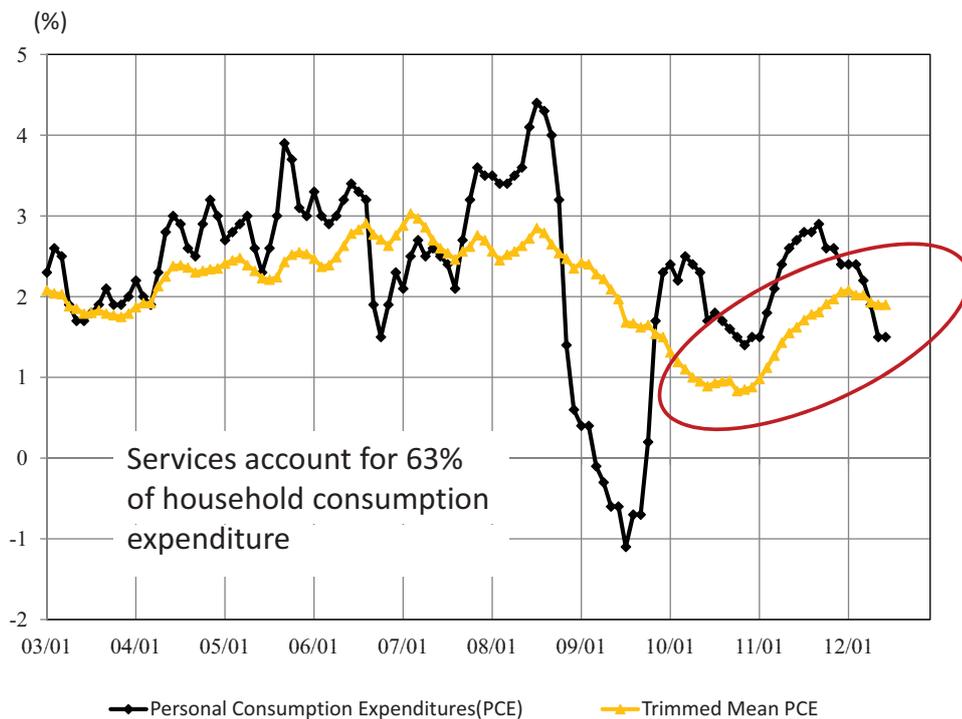
U.S. short-term Phillips Curve (service industries)

Employment Cost Inflation in Service Industries
and Unemployment Rate 1981.Q1—2012.Q2

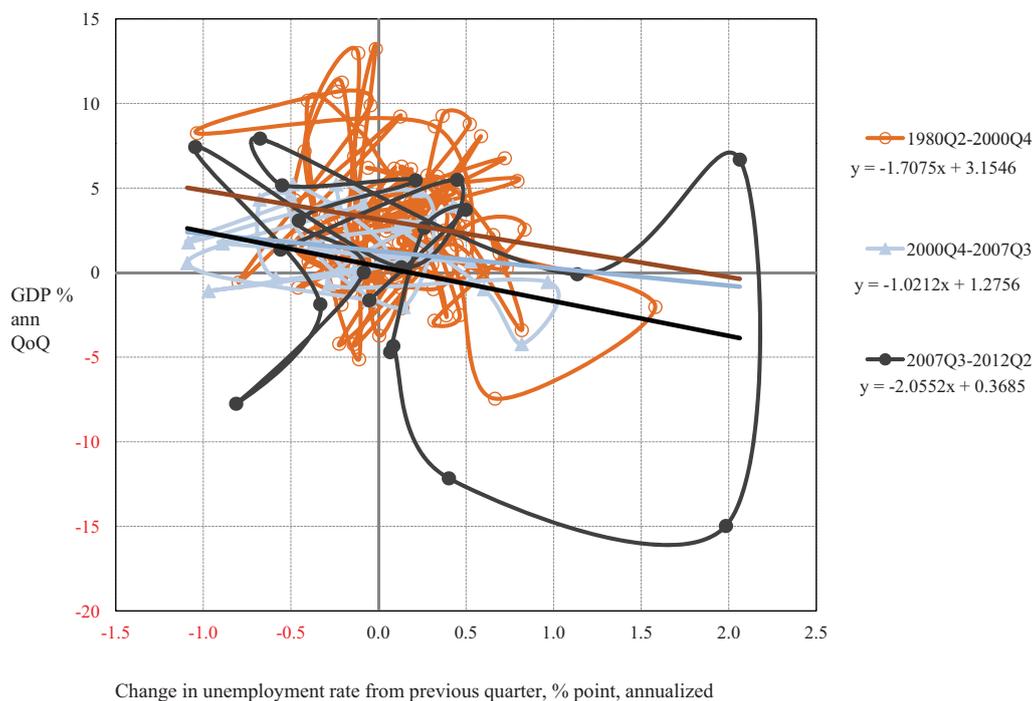


Positive trend inflation in U.S.

Trend in year-on-year PCE inflation rate (trimmed mean)

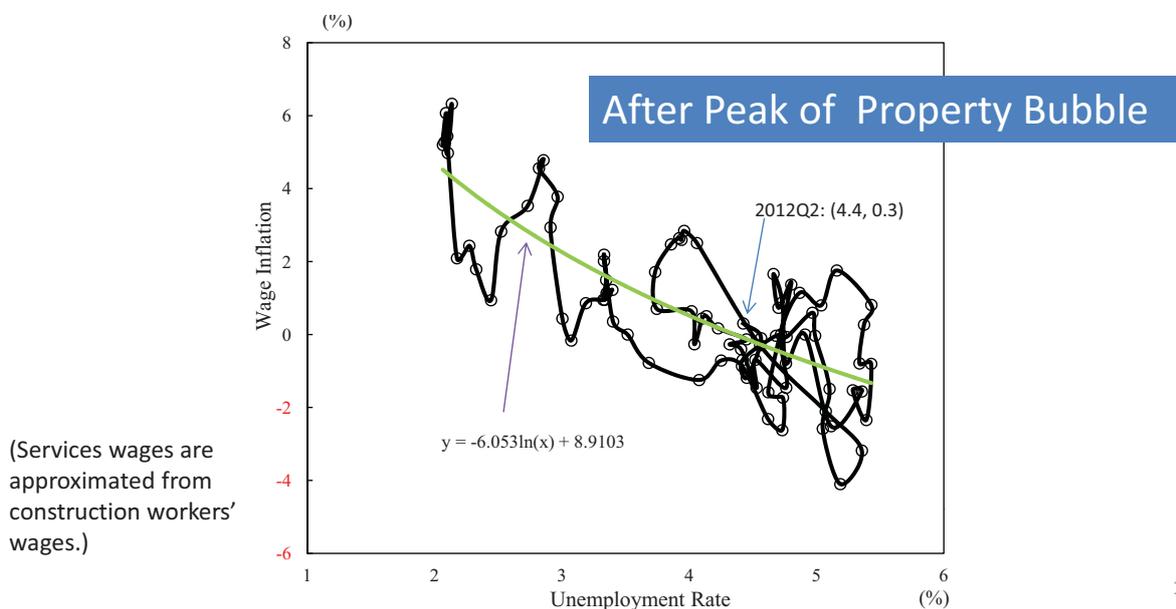


Okun's Law and trend growth in Japan

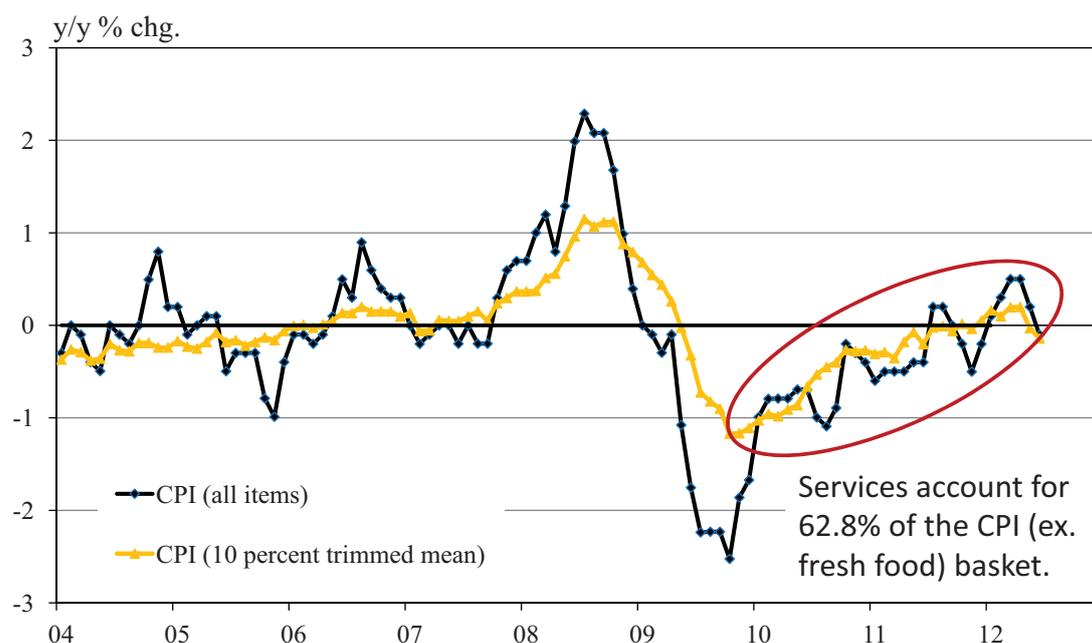


Japanese short-term Phillips Curve (service industries)

Services Wage Inflation and Unemployment Rate 1991.Q1—2012.Q2



Positive trend inflation in Japan



Note: Figures for the 10 percent trimmed mean are weighted averages of items; these items are obtained by rearranging year-on-year rates of price change in ascending order and then excluding items in both the upper and lower 10 percent tails by weight.
 Source: Ministry of Internal Affairs and Communications.

Temporary or permanent?

- Majority view in U.S.=temporary
 - No structural change
 - Reflection of huge negative shock from GFC
 - Possibility of jump-starting demand

CBO's projection on potential growth

(Average annual growth, in percent)

Total Economy	History			Projections	
	1950-1991	1992-2001	2002-2011	2012-2013	2014-2022
Potential GDP	3.6	3.2	2.3	1.7	2.3
Potential Labor Force	1.7	1.3	0.9	0.4	0.5
Potential Labor Productivity*	1.8	1.9	1.4	1.3	1.8

* The ratio of potential GDP to the potential labor force.

Source: Congressional Budget Office

Possibility of prolonged sluggishness

- Very slow (though steady) recovery until now (8/2012)
- Recovery patterns are different from past recoveries
- Nature of financial crises (Reinhart and Rogoff thesis)
- Internationally similar patterns suggest international undercurrents

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Part 2

**WHAT LIES BEHIND MISMATCH AND LOW
TREND GROWTH: AGEING, BALANCE
SHEET ADJUSTMENT, THE IMPACT OF ICT
ON WORKPLACE AND VALUE CHAIN,
AND GLOBALIZATION**

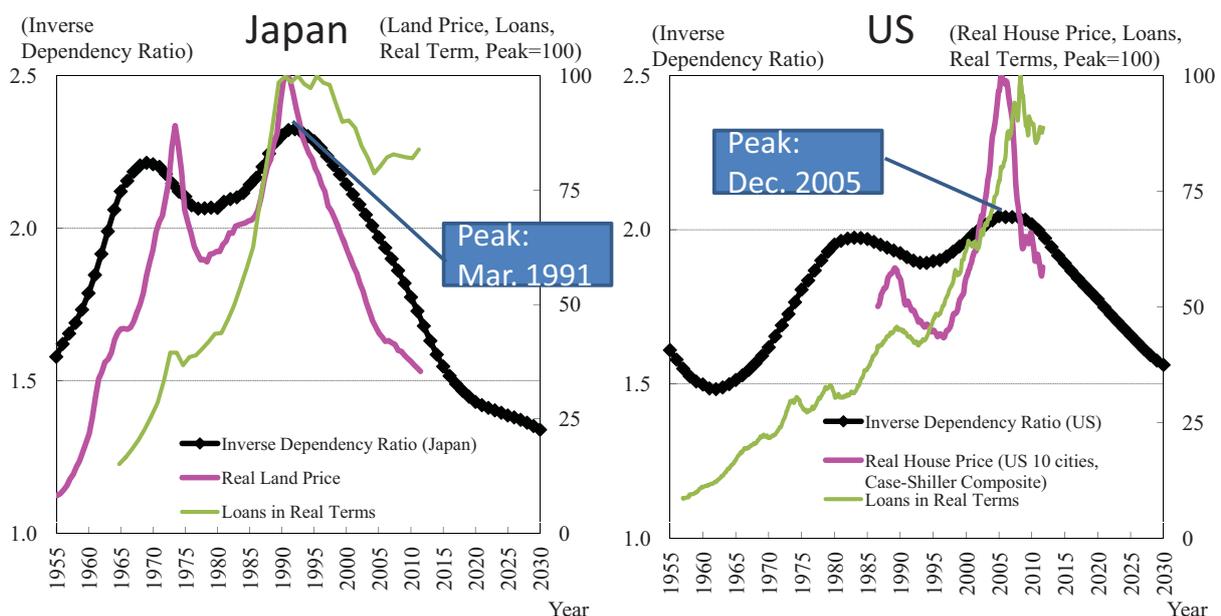
16

Four Common Forces

- Transition from demographic bonus to demographic onus
- Severe balance-sheet adjustment after the collapse of the bubble
- Ubiquitous application of information and communication technologies
- Globalization

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Demographic transition and bubbles



Note: Loans: (Japan) Loans of Depository corporations, Flow of Funds, Bank of Japan
 (US) Loans and leases in bank credit, all commercial banks, not seasonally adjusted, Federal Reserve

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Theory and Empirical Evidence

- Demographic change has a significant effect on:
 - Property prices
 - Takáts (*Journal of Housing Economics* 2012), also Nishimura (*Cambridge Speech* 2011)
 - Long-term interest rates
 - Ichiue et al (*Bank of Japan WP* 2012)
 - Demand for money and property prices
 - Nishimura and Takáts (*Bank for International Settlements WP* 2012)
- Confounding factors: excessive optimism (“this time is different”)

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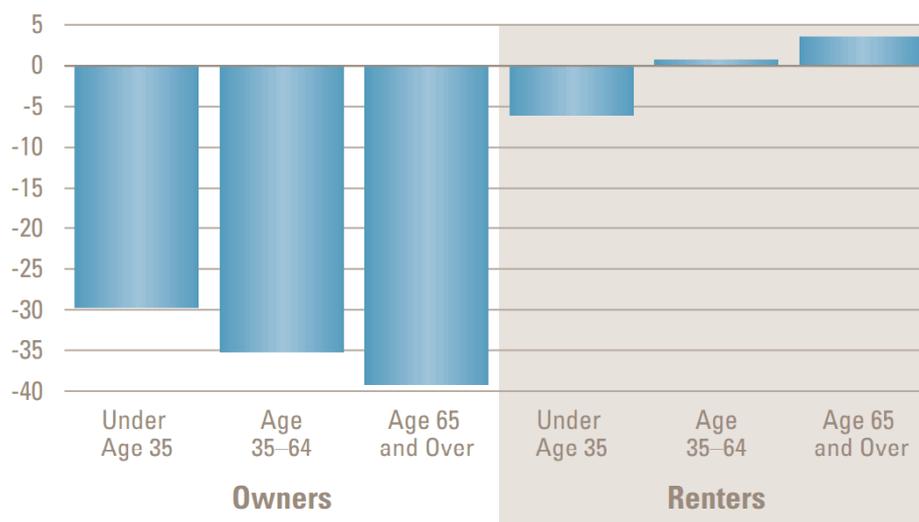
Bubbles and demographic onus

- Reduced flexibility/mobility
- More severe balance sheet adjustment

20

Declining mobility in U.S.

Effects of Aging and Declining House Prices
Changes in Householder Mobility Rate, 2005–9 (Percent)

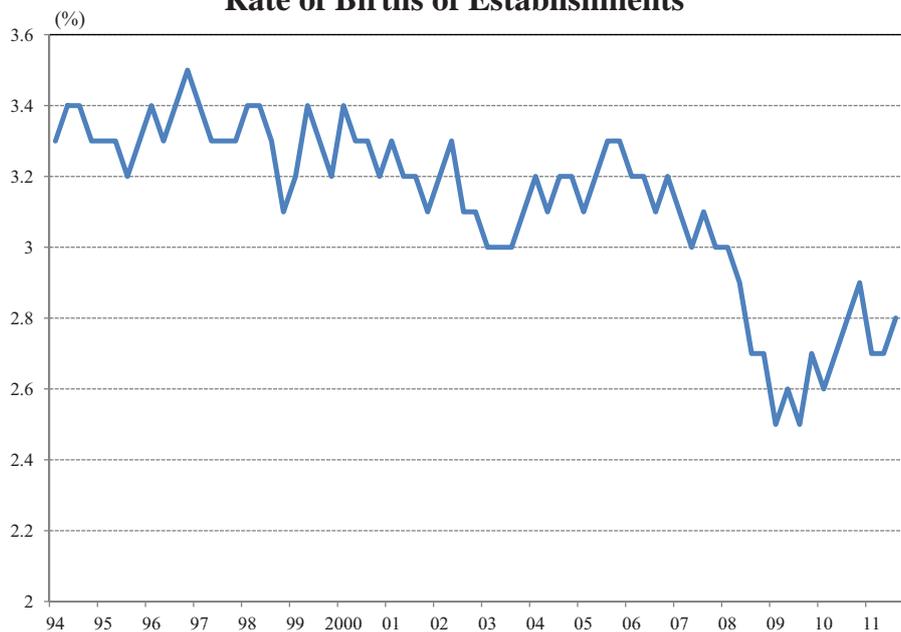


Note: Mobility rate is defined as the share of householders who reported having moved in the previous 12 months.

Source: The Joint Center for Housing Studies of Harvard University, "The State of the Nation's Housing 2010."

Declining establishment birth-rate in U.S.

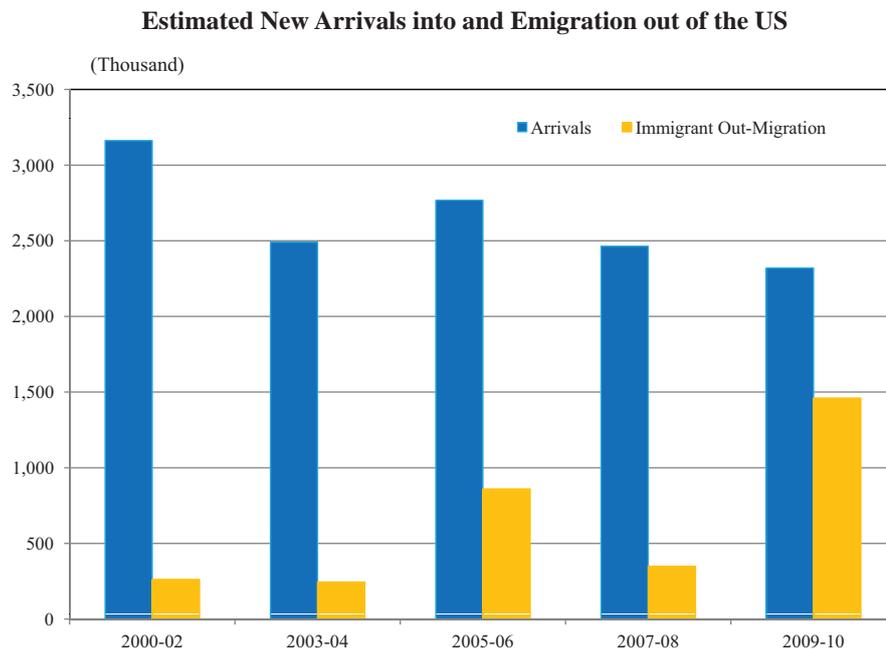
Rate of Births of Establishments



Source: U.S. Bureau of Labor Statistics

Reduced U.S. immigration flows

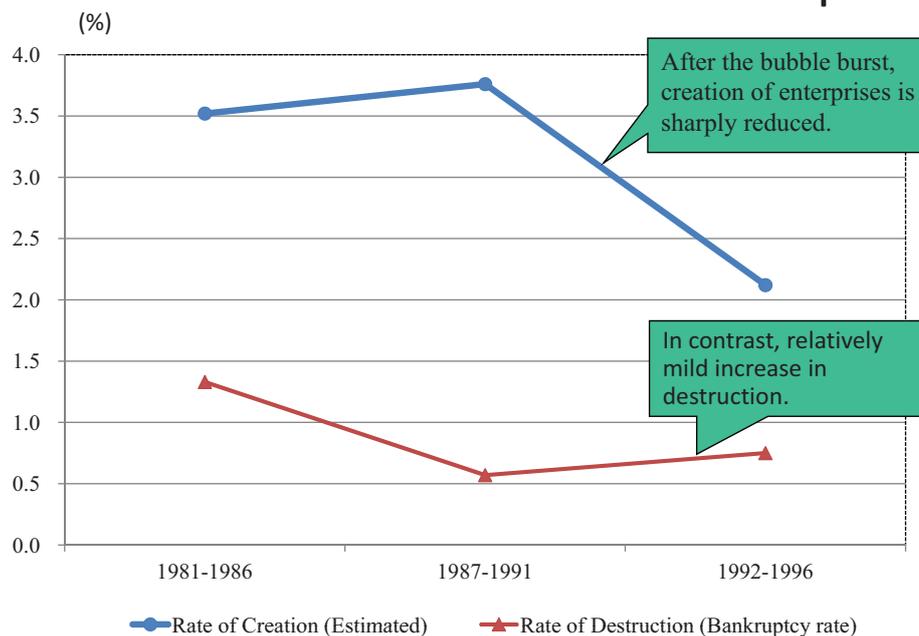
Immigrants are most mobile and considered as major contributor to US flexibility. But ...



Source: Steven A. Camarota "Immigration and Economic Stagnation: An Examination of Trends 2000 to 2010"

Reduced flexibility/mobility in Japan

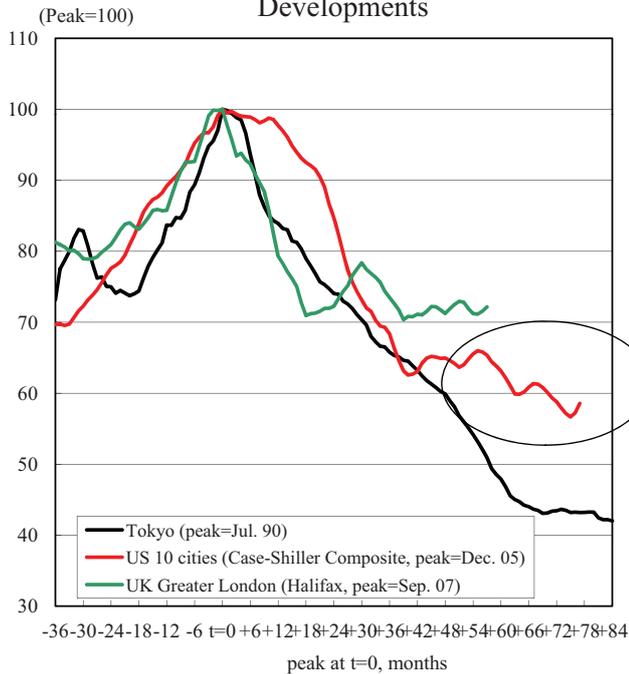
Creation and Destruction of Enterprises



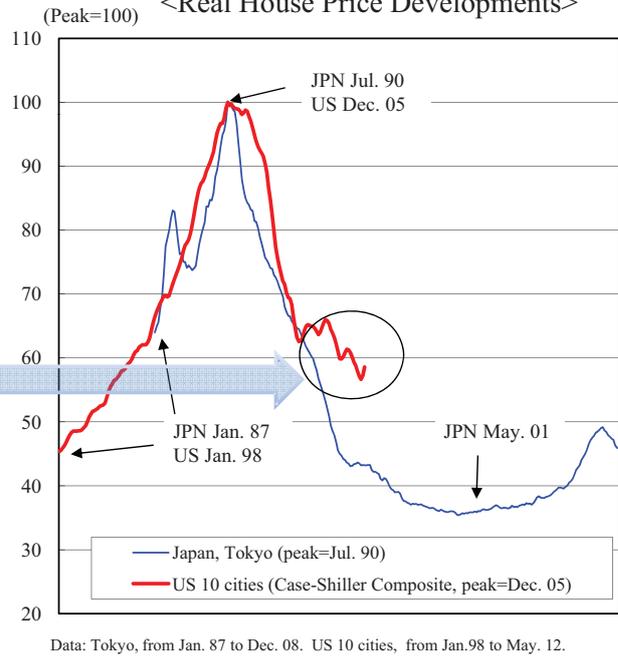
Source: Nishimura and Kawamoto (2003), "Why Does the Problem Persist?: "Rational Rigidity" and the Plight of Japanese Banks," The World Economy, 26 (2003), 301-324

Severity of balance-sheet adjustment

Comparison of Real House Price Developments

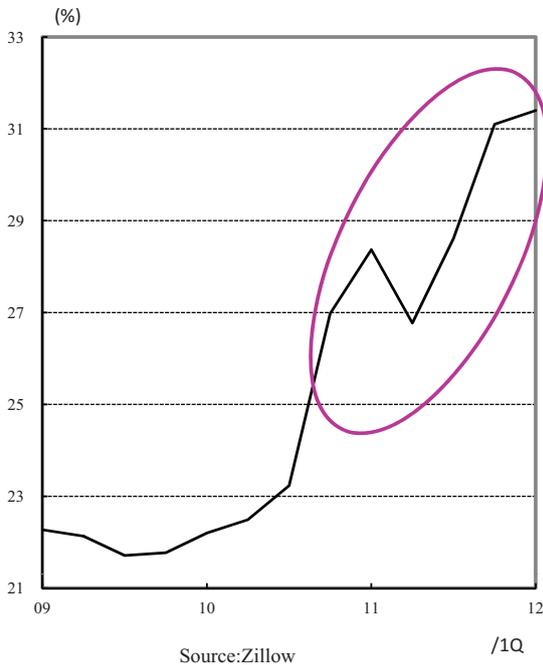


The Current US Position <Real House Price Developments>

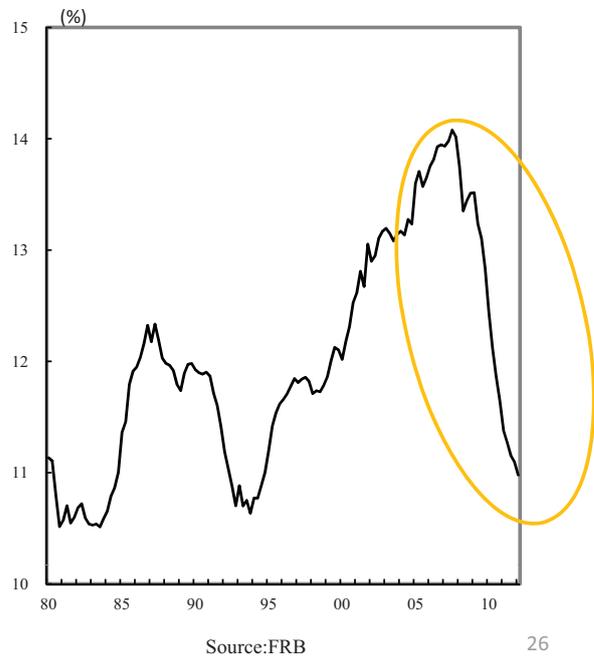


Different impact of B/S adjustment in U.S.

Negative Equity Share



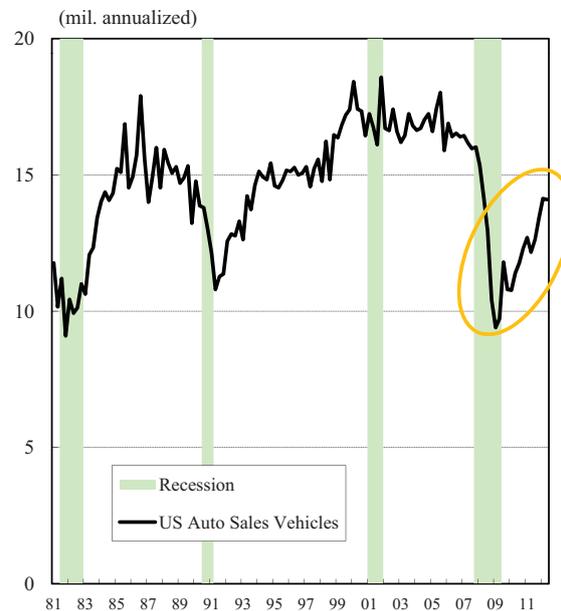
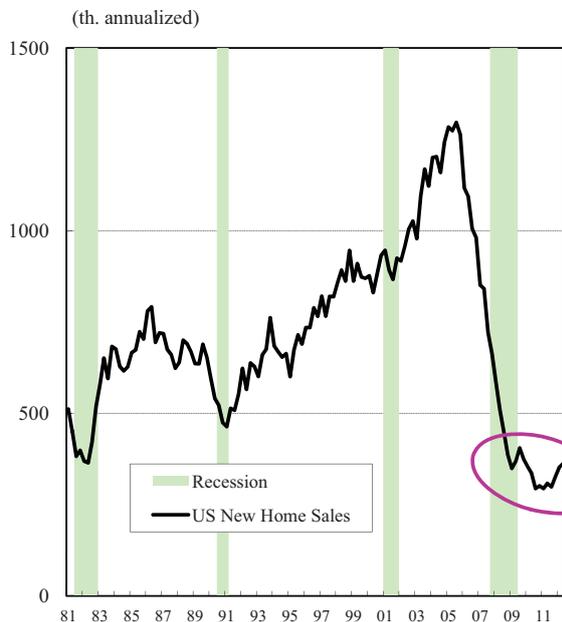
Debt Service Ratio



Divergence between industries in U.S.

Depressed Housing Markets

Recovering Automotive Sales



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Dysfunction of financial system and B/S adjustment

- Severe balance sheet adjustment may hamper financial institutions' efficient functioning as financial intermediaries (e.g. Japan around 1997)
- Pile-up of non-performing loans led to breakdown of market selection mechanism

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Nishimura, Nakajima and Kiyota

Large Scale Firm-Level Panel Data of Japanese Firms, 1994-1998

Total Factor Productivity of surviving and exiting firms

Shaded: exiting firms are more productive than surviving firms

Table 6
Breakdown of the natural selection mechanism

	1994–1995		1995–1996		1996–1997		1997–1998	
	Survive	Exit	Survive	Exit	Survive	Exit	Survive	Exit
All industry								
More than 100 workers	2.02	1.47	1.85	1.52	2.04 <	2.07	2.08	1.92
More than 50 workers	2.01	1.54	1.85	1.53	2.02 <	2.03	2.06	1.90
Manufacturing								
More than 100 workers	1.66	1.35	1.89	1.84	2.24 <	2.41	2.42	2.18
More than 50 workers	1.66	1.51	1.87	1.77	2.22 <	2.32	2.38	2.09

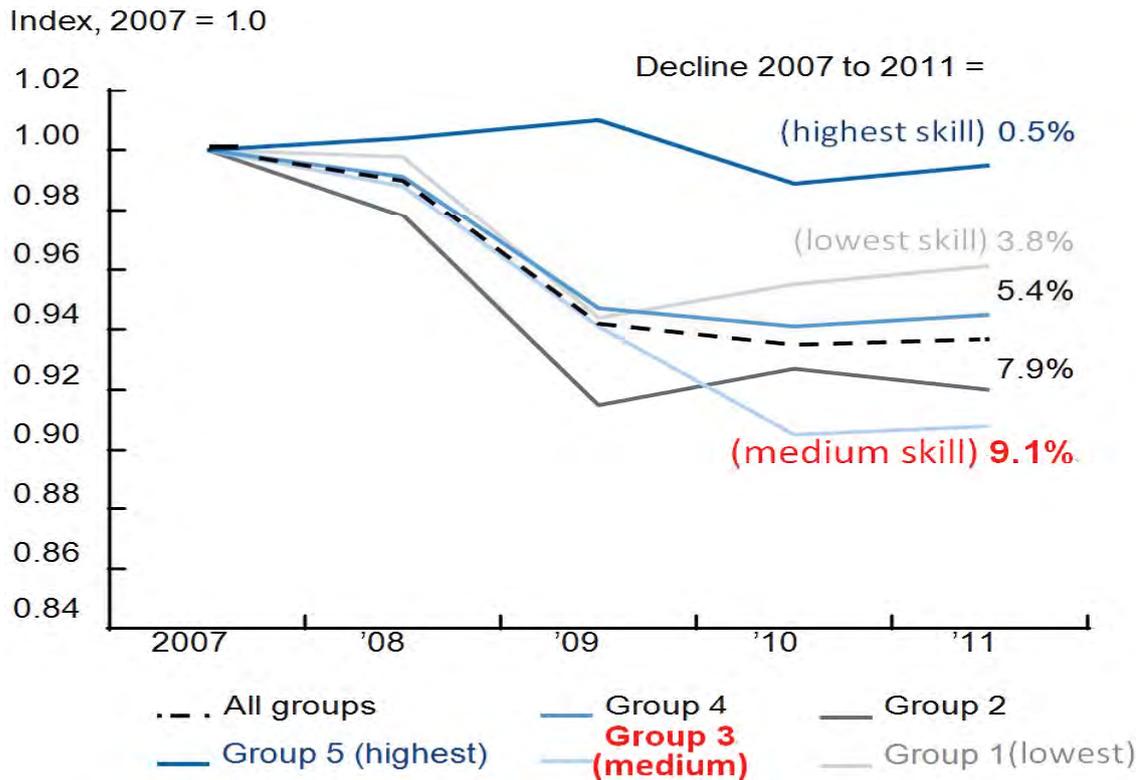
Note: Shaded areas indicate weighted mean of TFP of exiting firms is greater than that of surviving firms.

Nishimura, Nakajima, Kiyota (2005) “Does Natural Selection Mechanism Still Work in Severe Recessions? –Examination of the Japanese Economy in the 1990s-“ *Journal of Economic Behavior and Organization*, 58:1 (2005), 53-78

Ubiquitous impact of ICT

- Polarizing impact on workforce (labor markets)
 - Moderately complicated tasks can be cheaply “programmed” (AI etc.)
- Polarizing impact on value chain (product markets)
 - Skills in mass manufacturing are no longer the source of profits (replaced by ICT-related capital goods like robots etc.)
- Facilitate flexible choice of location (globalization)

Loss of Medium-Skill Employment in U.S.

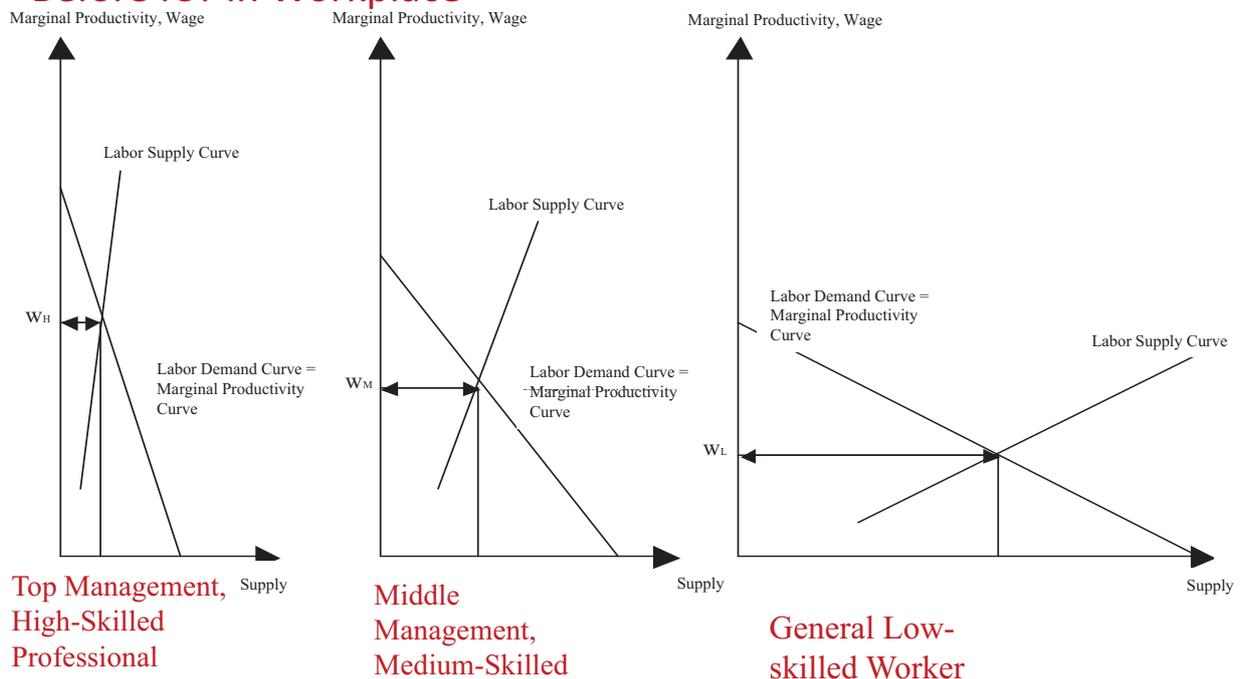


Source: Faberman, R. Jason, and Bhashkar Mazumder, "Is there a skills mismatch in the labor market?" Chicago Fed Letter, July 2012, Figure 4.

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Impact of ICT in the workplace

Before ICT in Workplace

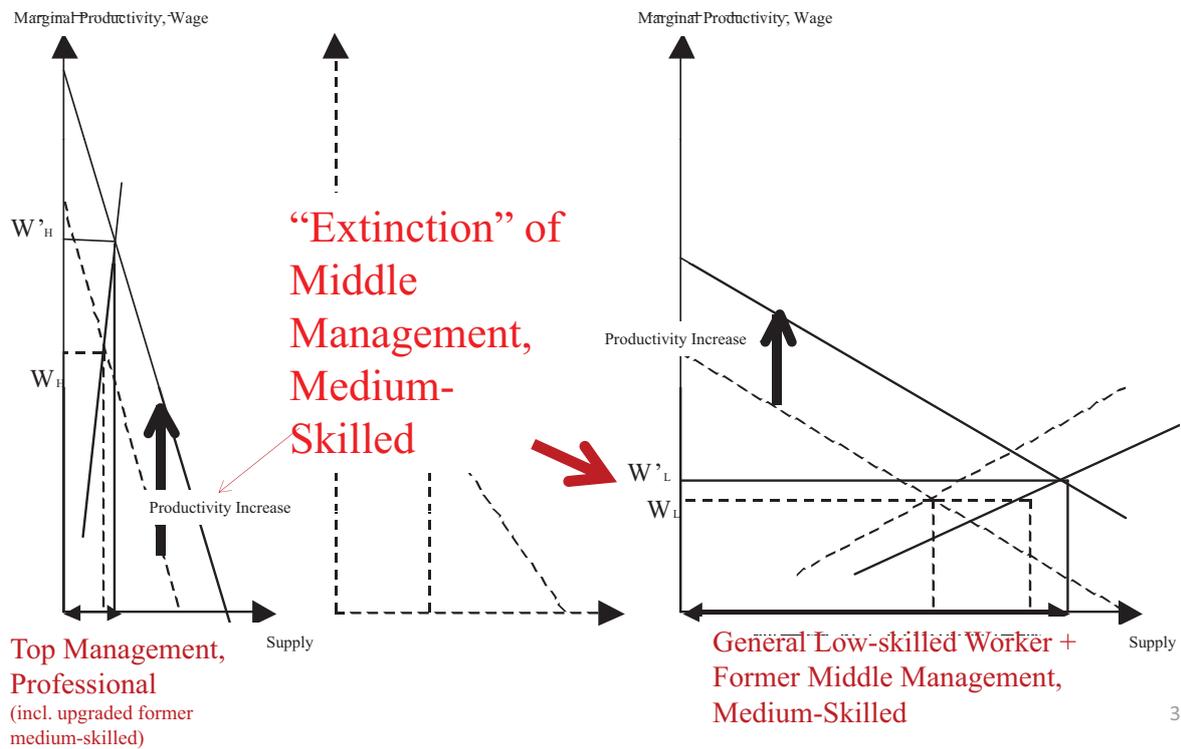


Kiyohiko G. Nishimura, *The Japanese Economy: Inconspicuous Structural Transformation*, (in Japanese) 268 pages, Tokyo: Nihon Keizai Shinbun, September 2004, pp. 76-81

32

Impact of ICT in the workplace (cont.)

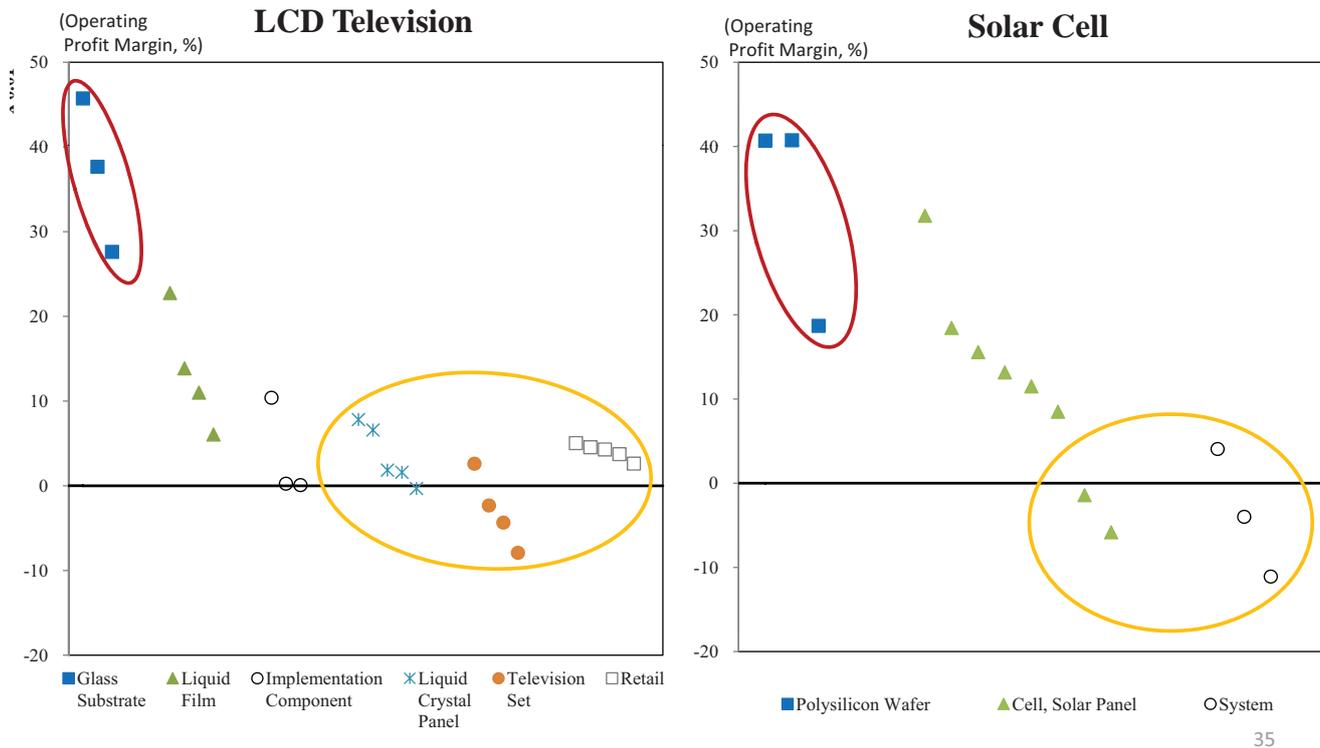
After ICT in Workplace: Productivity is substantially increased, but...



Impact of ICT on the value chain

- Impact on business organization
 - Improved communication and information processing diminished the value of skills in organizing production
- Impact on business models
 - Extremely low marginal cost of production results in ever lower prices
- Interaction with the labor market
 - Less employment creation

Operating Profit Margin: Upstream / Downstream



ICT and globalization

- Reduction in the cost of communication and coordination across borders
 - Creation of networks that attain maximum output at minimum cost
 - Flexibility of changing the network
- Pressure on wages (more polarization)

Where are we now?

- Prolonged period of low trend growth in advanced economies
- More vulnerable to occasional downward shocks
- More pronounced polarization

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Part 3

WHAT LIES AHEAD OF US?

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Outlook for the global forces

- Demographic bonus to demographic onus
- Increasing influences of ICT
- (B/S adjustment and Globalization/Polarization are not discussed here)

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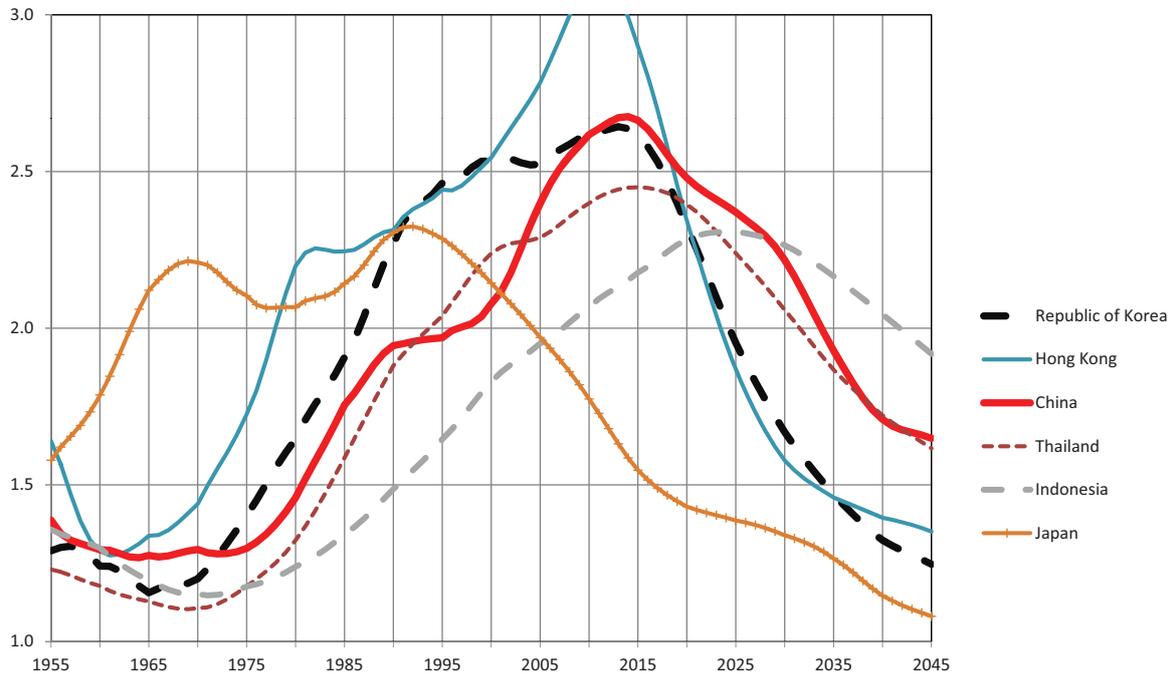
Demographic bonus to onus

- Demographic bonus is giving way to demographic onus in many areas around the globe
- Turning point:
 - Asia ca. 2015
 - Latin America (Brazil and Chile) ca. 2015-2020
- Inflexibility/immobility/declining growth potential will set in before long

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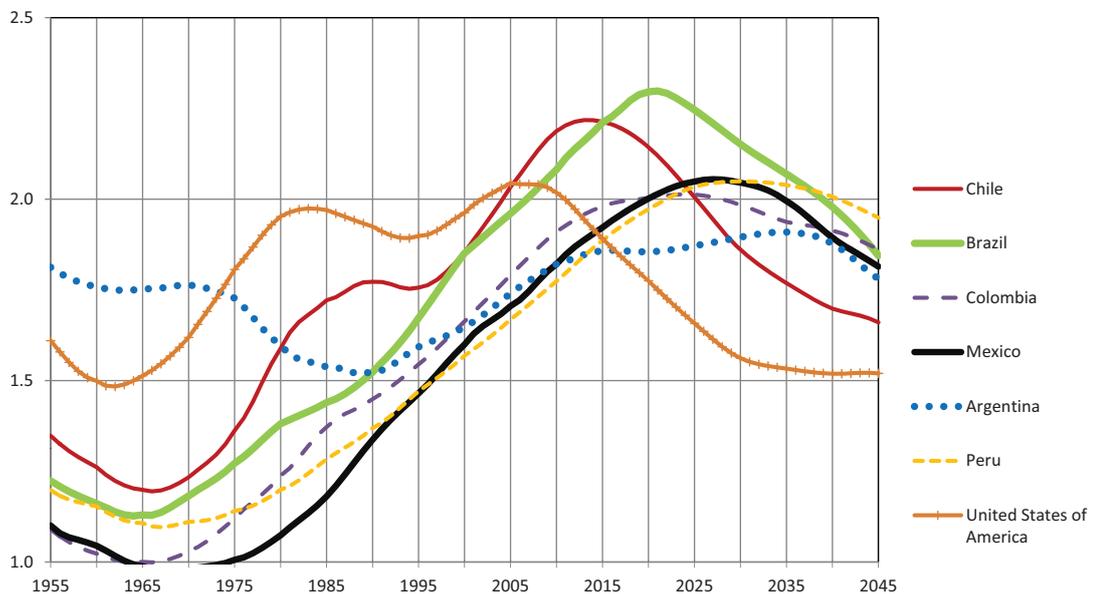
Demographic trends in Asia

Inverse Dependency Ratio



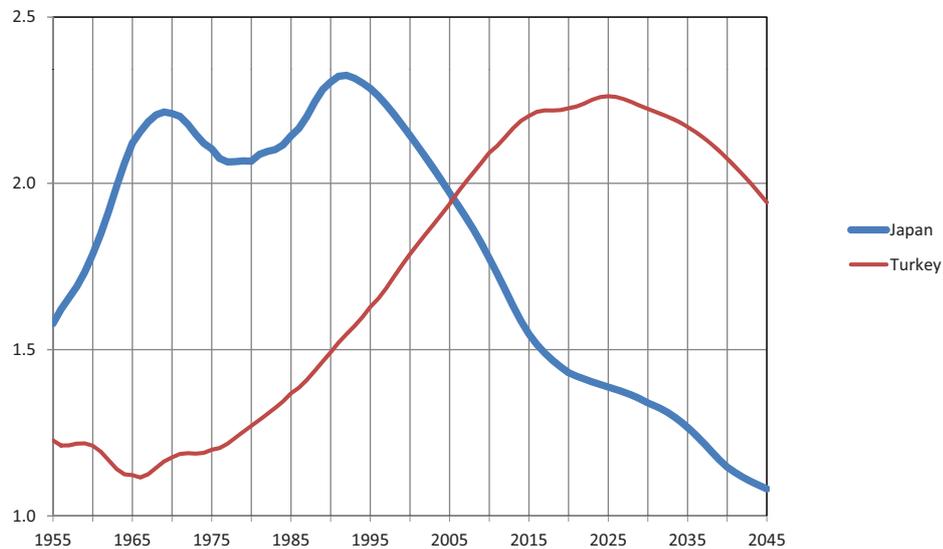
Brazil, Chile and other Latin American countries

Inverse Dependency Ratio



Ageing is not synchronous

Inverse dependency ratios of Japan and Turkey



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Responses to demographic trends

- The number of young people is diminishing
 - Businesses cannot grow if only selling to young people
- Older generation is more diverse
 - Need for non-mass-market strategies
- Some encouraging signs
 - Especially in Japanese retail businesses

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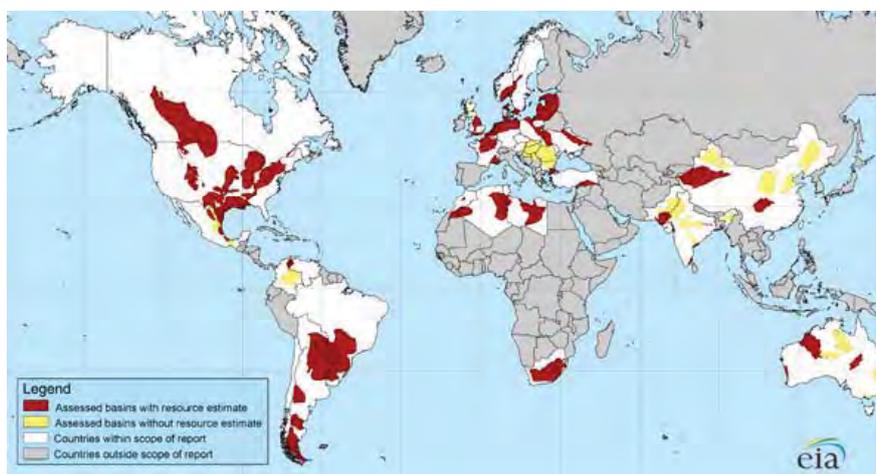
Adjusting to ubiquitous ICT

- New patterns of competitive advantages
- Reappraisal of the value chain
 - Moving upstream or downstream?
- ICT and demographic transition
 - Opportunities and challenges both in advanced and emerging economies

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Changing energy endowment

- Shale gas and tight oil will change resource endowment and hence comparative advantages between economies



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What are the challenges for the Aged Society?

- Ageing: from homogeneous mass consumption of the young to heterogeneous niche consumption of the old → costly “catering” (higher costs)
- ICT-plus-Ageing → market returns (based on marginal utility) fall, but social returns (based on average utility) are higher
- Thus, we must find new ways of promoting and paying for socially beneficial but privately less-profitable projects and services

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What are the challenges when the population is young and growing?

- Young population in the age of ICT: well-equipped, well-informed, demanding, career-oriented
- ICT-plus-growing young population → need to produce significant number of new “career jobs” as opposed to “dead-end jobs”
- However, ubiquitous ICT is likely to reduce the number of medium-skill career jobs
- Thus, new types of career jobs must be created and promoted

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Challenges facing central banks

- Adoption of unconventional policies
- Growth Foundation Strengthening Facility (Bank of Japan, since June 2010)
 - Possibly “Funding for Lending” in U.K. too
- Admittedly, a long way to go...

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End



Dusk at the BOJ Courtyard

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